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Dear followers of idea for sustainable development,

Dear readers,

Dear authors and friends,

You hold serial 33 volume (number 2/2012) of scientific journal “Management and sustainable development”, published since 1999 from Faculty of Business Management at the University of Forestry, Sofia, Bulgaria.

In this volume you can find the integral text of the part of presented papers before the XIV-th International Scientific Conference “Management and Sustainable Development”, held in Yundola in the period 23-25.03.2012. From received for participation 192 applications, with paper abstracts and posters in Conference took part 155 scientists, practical experts, post-graduate students from 43 national and international institutions and organisations (34 universities, 6 scientific institutes of Bulgarian Academy of Science, experts from public administration, NGOs and companies) from 12 countries, from 4 continents. In 1 plenary and 4 parallel thematic section were presented 73 scientific papers and 3 posters.

The important issues of management and sustainable development were discussed. Some main aspects could been summarized as follows: multifunctional forest management have to be developed and encouraged in Bulgarian forests, because of their high importance for environment improvement and biodiversity conservation, there are a high potential to encourage utilization of renewable energy sources, based on the forest biomass; contemporary practical and theoretical issues in human resources management; more attention have to be pointed out to the social aspects for sustainable management; presentation and implementation of the best practices and innovations; the practice for sustainable development shaping have to be reestablished; more attention have to be intended to the students and post-graduated students investigations; the more important issues have to be separated and have to be discussed into a suitable approach – for example, order of round tables, unformal discussions etc.; the all thematic fields have to be protected and the conference have to be approved as a forum for ideas exchange.

The Faculty of Business Management leadership and the Editorial Board of Scientific Journal “Management and Sustainable Development” have managed with the obligation to publish all presented before the Conference papers and posters, but in but in 5 volumes - 32, 33, 34, 35 and 36 (1/2012; 2/2012; 3/2012, 4/2012 and 5/2012) of the Journal. All papers and presentations could be find in the Internet site of the Conference (http://oldweb.ltu.bg/conferences/uur/2012/index_en.html) and of the Scientific Journal “Management and Sustainable Development” (http://oldweb.ltu.bg/msd/index.htm).

In the same time we offer of all of you not only to read published papers. You could send to our journal results of your investigations, ideas and papers on the issues of management and sustainable development.

Kind regards of all our readers!

Editorial board
PROS AND CONS OF GLOBALISATION IN THE POST-SOVIET DEVELOPMENT OF THE BALTIC COUNTRIES

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Abstract

The goal of the presented paper is a detection of the socio-economic problems of globalization processes and looking for the ways of development for the Baltic countries. The rapid increase of the countries inter-dependence as one of the globalization effects has rather controversial consequences for different countries, since the economic security of some of them is gained due to the decline of others. The degree of the world crisis impact on the economies of different countries is also different. Undoubtedly, it depends on both the economic potential of the country and on the previous way of its economic development. Nevertheless, the economic experience indicates that the governing determining factors comprise the institutional conditions and economic policy of the state, the willingness and ability of the governmental bodies to oppose the interests of the own country and becoming more and more complicated actuality of the world economy. The comparison of Latvia, Lithuania and Estonia experiences is very evident.

Key words: globalisation, economic policy, sustained development.

Introduction

According to the Bible fable, after the Flood the mankind was presented by one nation employing one language. The attempt of this nation to construct the single city (Babylon) and the sky-high Tower of Babel was interrupted by God Yahweh, who created the new languages for different nations, due to what people stopped understanding each others, could not continue construction of city and Tower and scattered all over the world. It is possible to assume that the modern ideas of globalisation have the Bible roots, concerning their inconsistency.

Undoubtedly, it is possible to perceive cheerfully and optimistically the Utopian prospects about the time when all people are the citizens of one single state, created instead of all nowadays existing countries, when there are no differences in religions and various ideologies, when there are no reasons for starting the world wars, when all people are fellow citizens and belong to one single nation. Nevertheless, under the condition of equal utility of the globalisation process, difficult of accomplishment, the optimism decreases. There is a decrease in the perception of globalisation concepts due to the threads of losing the significant values.

Intrinsically, globalisation is represented by the process of developing the economic, political, socio-cultural and communication interdependence on the global level. First of all, globalisation is cooperation oriented on the solution of the global problems at the local level. Its figurative expression can be supposed the famous utterance “Think globally and act locally!”.

Due to the integration processes the world is not immense and unbounded any more, and people can communicate without restrictions, employing the modern technologies – the Internet and the mobile connection. Moreover, there are contemporary international organisations, defending the human rights, then it has become possible to exchange with knowledge and experience on the inter-countries level, as well as cooperation between countries focused on mutual assistance and solution of the common issues. One of the most important results of globalisation is declared to be the mobilisation of the resources of developed countries for improving the situation in the countries where the local authorities are unable of doing it.

Rapid increase of the countries interdependence, being one of the globalisation displays, demonstrates rather ambiguous consequences for different countries: the economic welfare of some countries often occurs to be the result of decrease in welfare of others. There is also difference in the degree on influence of the world crisis on the economies of different countries. Undoubtedly, it depends on both the economic potential of the country and the previously employed means of economic development. Nevertheless, the economic practice demonstrates that the following factors can be supposed to be decisive for the sustained development: institutional conditions, state
economic policy, desire and ability of the authorities to contrast and oppose the interests of the country to the complicated conditions of the world economy. Comparison of the experience of Latvia, Estonia and Lithuania in this area is seems to be quite demonstrative.

1. Contemporary Concepts and Aspects of Globalisation
The term “Globalisation” appeared in the scientific terminology in the last quarter of the XX century. In general the globalisation comprises the various social processes of global nature. It is possible to state that there are clear accurate approaches towards the globalisation nowadays, and within these approaches there is a theoretical interpretation of this phenomenon. Being the dimension of various educational and informative disciplines, the concepts of “globalisation” greatly differentiate conceptually. There are also developing philosophical, sociological, geopolitical, ecological and other aspects of this phenomenon.

The contemporary scientific literature employs the concept of “Globalisation” in its two principal meanings: as an objective tendency of the contemporary world development and as a real multi-aspect process.

The first meaning of “globalisation” presents the brand new stage of internationalisation of social life. Internationalisation and globalisation have such common features as widening and deepening the social links all over the world and facilitating the interdependence of the states and nations. At the same time, globalisation is not only the surge of internationalisation in the terms of global tendency, but its conceptually new stage. Its qualitative novelty is determined by new objective circumstances of the world community life.

By the end of the XX century information and technological revolution, new generation of the communication systems (jet engine aviation, rocket technologies, television, computers, microchips, satellites, mobile connection, Internet), have made any point of the planet available for people, capitals, ideas, documents in real time. People have adopted the capability of being in the different part of the planet at the same moment and to participated the events beyond their physical presence; the development of links and interconnection between people has become possible beyond state boundaries, custom rules, regulations, procedures.

In 1991 there was published the investigation of the Club of Rome – the report “First Global Revolution”. From the very first pages of this report its authors A. King and B. Schneider declare their adherence to the general methodological credo of all researches taken under aegis of the Club of Rome:

First, the global approach means simultaneous full-scale comprehensive impact on all issues at all;
Second, the primary attention is to be paid to the long-run aspect;
Third, tendency to penetrate into the essence of complicated combinations of global problems (political, economic, social, spiritual) under the common term “the world problems” or “humanity complications”.

The report consists of two parts. The first one is devoted to the analysis of changes, global problems and their negative impact, appearing in the world. The second part comprises the range of certain recommendations on eliminating the most dangerous “humanity complications” and appeal to the world solidarity in this urgent and noble mission of humanity.

“Humanity complications” are connected with the absence of abilities of humanity in general and single national states in particular to realise the crisis of the situation, to work out the new ethical concept corresponding to the contemporary development level, and then, following this concept, to set the political, economic, social objectives. The drawbacks of political, economic, social institutions and procedures, conditioned by imperfectness of human behaviour and ethic norms are the factors, facilitating the impermissible wastefulness in employing not only the natural resources, but also the human resources in wider concept, restricting the human freedom, decaying the responsibility and self-insurance. The report “First Global Revolution” states that, consequently, the humanity itself becomes the real enemy of people.

At the same time, the authors repeatedly warn against excessive enthusiasm with the economic liberalism. They are absolutely sure that the sustained society will never appear within the world economy, basing on the market mechanism only, since it is far from being all-powerful, although it is very important for providing the innovative process. The market mechanism is very susceptible to the minor phenomena of today but it can hardly become the
real compass in the procedure of solving the contemporary tasks.

To gain the management, based on the balance of interests, it seems to be important to form the multistage system of decision making, the most significant maxim of which would be the discussion of the issue and working out the solution at the level, closest to the layer of society, which is to feel the negative or favourable consequences of this decision [1].

In its second meaning globalisation is considered as a real wide multi-aspect process embracing all sides of the human society life.

To begin with, globalisation is the result of the self-development of economics.

Second, globalisation arranges the best conditions for growth and human wellbeing by the way of facilitating the free flows of goods, capitals and information [2].

Third, globalisation facilitates arranging the united world socio-economic structure, resulting practically in the development non-variability [4].

Then, the international spread of culture is at least of the same importance as the economic processes [5].

The globalisation economic advantages comprise the international competition intensification and accordingly deepening the specialisation and international labour differentiation, increase in production at national and world levels, economies of scale, growth of labour productivity on the base of innovation implementation in the world scale, and finally the general increase of welfare in the world.

2. Negative Aspects of Globalisation

The negative results of globalisation on a par with its advantages have the multi-aspect nature and become evident in spiritual, social and economic and political spheres.

First, the world globalisation results in losses on national values. One of the active international activities outcomes is obligatory adapting the nations to the common subculture forgetting the national one and finally losing the cultures of numerous minor nations. It is said that the ideology of globalisation is liberalism; the currency is dollar; the means of implementation is capitalism; the political system is democracy; the language is English.

Second, globalisation does not allow the countries of the third world to develop independently, and this fact in its turn puts fatal impact on the level of their development and self-provision.

The third factor is occurrence of the sole governor in the created world. Too much power is concentrated in the same hands, and it results in total corruption and “fattening” the certain group of population.

Then, it is hardly possible to set the single price standard for the certain resources.

The fifth factor is greater material differentiation between the certain territories because of transformation of financing due to existence of some objects in certain districts. Most probably, the places of meeting of the authorities or places of holding the significant economic deals will receive the massive material.

The evident negative economic consequences of globalisation are as follows:
- Uneven distribution of the globalisation advantages among the countries, industries, and finally people;
- Decrease of employment in the processing industries and practically de-industrialisation of economy;
- Increase in gap between the level of earning of employers with different qualification, growth of unemployment among the workers with low qualification;
- Transfer of the production capacities into the countries with cheap labour;
- Labour migration and unemployment growth and part-time employment as a loss of investment in education.

The above listed economic disadvantages of globalisation are significant by this time in the Baltic countries and especially in Latvia.

3. Contemporary Problems of the Baltic Countries

After going out of the USSR and sharp fall of all macroeconomic indicators in the first half of the 90ies of the previous century all Baltic countries (post-soviet republics) demonstrate the steady advance of GDP and other indicators starting with 1995 (Fig. 1).

It is worth mentioning that the level of the economic development of 1990 the new independent Baltic countries reached only by the half of the first decade of the XXI century. Estonia employed its geo-economic situation at a comparatively higher degree, and this position is shown in the diagram and by the fact of entering the Euro zone by Estonia.
Estimate

Fig. 1. GDP volume advance

Basing on the analysis of dynamics of the main macroeconomic indicators it has been stated that the economic crisis in Latvia, developing at the background of the world crisis, affected the country deeper than crisis in neighbouring Lithuania and Estonia and in the majority of the post-social countries. It is conditioned by such factors as an excessive belief and trust in the liberal market structure, an insufficiently efficient governmental policy starting with the transition period. The prerequisites of the crisis situation (year 2008) appeared long before the crisis itself. According to numerous indicators Latvia was in zone of high risk, comparing to the countries – new EU members. For instance, Latvia was at the same level as Bulgaria and Romania in correlation of the foreign debt and GDP. There were negative indices of the balance of foreign trade (Fig. 2 and 3).

Comparing the changes, taking place during ten years (years 2000–2010) in the correlation of import-export of new Baltic countries with such neighbours as Sweden, Finland, Norway it is possible to notice the confirmation of existing the significant danger of uneven distribution of the favourable results of globalisation. During 20 years of independence Latvian economy demonstrates the evidences of deep negative structural changes. Agricultural production has contracted by fifty percent, the industrial production by seventy percent. The contribution of the industrial production to the GDP formation was reduced from 46,2% in 1990 till 19,7% in 2009; the contribution of agricultural production changed from 21,9% till 3,6%. There is substantial reduce in Latvian capital in the assets of country economy. Table 1 demonstrates the share of transactions on selling the enterprises in different industries of economy, in which the enterprises lost their belonging to Latvia [6].

Table 1. Share of transactions on selling the enterprises in years 2000 -2011 when their Latvian belonging was lost, %

<table>
<thead>
<tr>
<th>Industry of Economy</th>
<th>Share, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banks, insurance institutions, financial institutions</td>
<td>100</td>
</tr>
<tr>
<td>Food production industry</td>
<td>95</td>
</tr>
<tr>
<td>Services</td>
<td>93</td>
</tr>
<tr>
<td>Wholesale industry</td>
<td>92</td>
</tr>
<tr>
<td>Transport infrastructure</td>
<td>88</td>
</tr>
<tr>
<td>Retain trade industry</td>
<td>86</td>
</tr>
<tr>
<td>Other productions</td>
<td>83</td>
</tr>
<tr>
<td>Forestry and wood processing</td>
<td>70</td>
</tr>
<tr>
<td>Information Technologies and telecommunication</td>
<td>54</td>
</tr>
<tr>
<td>Construction and construction materials</td>
<td>50</td>
</tr>
</tbody>
</table>
Pros and Cons of Globalisation in the Post-Soviet Development of the Baltic Countries

Resources: “To sell out or to Manage the Country Economy?” certainly, it can be taken as a rhetoric one, but Latvia possesses fewer and fewer possibilities for improving the efficiency of managing the economy of the country.

Only the sphere of material production can serve as a basis for managing the economy of the country, even in post-industrial economy. The industrial structure of Latvia manifests the de-industrialisation tendency within the country even in pre-crisis period (table 2).

Table 2. Industrial structure of the GDP of Latvia in 2008

<table>
<thead>
<tr>
<th>Industries of Economy</th>
<th>Share, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Services</td>
<td>28,6</td>
</tr>
<tr>
<td>Trade (including hotel and restaurant business)</td>
<td>18,9</td>
</tr>
<tr>
<td>Public Services</td>
<td>16,1</td>
</tr>
<tr>
<td>Transport and Connection</td>
<td>10,7</td>
</tr>
<tr>
<td>Industry</td>
<td>13,7</td>
</tr>
<tr>
<td>Construction</td>
<td>8,9</td>
</tr>
<tr>
<td>Agriculture</td>
<td>3,1</td>
</tr>
</tbody>
</table>

The situation is worsened by the negative balance of the migration processes – the number of population in Latvia decreased by 13%, or 309 thousand people during 11 years (the data of the population census of 2011). According to the estimation of experts, the non-registered outflow of population of Latvia abroad on the purpose of searching employment doubles the reduction in the population number.

Conclusions

The globalisation process consists of tree interconnected components – new international labour differentiation, international production and political relations. Every of these directions contain both advantageous and disadvantageous opportunities, and this is the key of globalisation inconsistency. It is impossible to eliminate the contradiction without conflicts and social tension. The objective of the government is to directing the vector towards the progress.

The governmental economic policy of the Baltic countries has to be of pre-empt nature for providing the sustained development of the country under the conditions of globalisation inconsistency. The certain stabilizing economic procedures are to be taken not only in crisis times, but also in the stage of economic growth.

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INNOVATION ROLE IN SUSTAINABLE DEVELOPMENT

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Abstract

In Latvia, there is an actual necessity to create the premise for transition from the present economic model to an innovative development model. In this new economic model, innovation must become one of the principal factors in formation and increase of competitiveness and sustainable development. Innovative development will directly be able to increase the labour productivity and the return of resources used in production process, to decrease the costs of production and services. The aim of the paper is to provide a new view to already existing and possibly well known concepts that is innovation and sustainable development, to show how the role of innovation changes in different phases of the business cycle, how it influences the productivity and what the economy gains on the whole. The level of labour productivity is influenced by several factors. The principal attention in the paper is paid to the development of innovations and education, to their interaction and impact on the productivity. Especially, the role of innovations increases under conditions of the crisis, because innovations directly are able to advance the economy to the improvement phase of the business cycle. To be able to carry out innovative solutions practically, well-educated and qualified workers are necessary; otherwise the innovation will be left without support. In its turn, the solution of education and innovation problems will make a positive impact on the productivity and successful sustainable development.

Key words: innovation, education, productivity, sustainable development, business cycle.

Introduction

The end of the twenty century was the beginning of important international political processes that was marked by the start of a new way of thinking. For the first time, the concept of sustainable development was mentioned in Stockholm in 1972, however, it became topical in 1980 in relation to the Report of the Committee of Brandt “North-South: A Programme for Survival”, and later in 1987 with the Report of the Committee of Gru Harlem Bruntland “Our Common Future”; the next time was the Rio de Janeiro Summit in 1992. Sustainable development is a concept that has to combine economic growth with such use of natural resources that provide a benefit for the society as a whole. A sustainable development is such development that satisfies the needs of our generation without creating threat to satisfaction of the needs of the future generations: with such or similar words, the main idea of sustainable development are defined in the documents of both the UNO and the EU. In achievement of a sustainable development, a great role is played by innovation that, in its turn, cannot develop successfully without knowledgeable and qualified staff. The long-term development has three dimensions: environmental, economic and social. In this paper, the attention will be accentuated on economic dimension.

In the Latvian National Development Plan and in other government documents, it is underlined that it is necessary to create preconditions for transition from the existing economic model, characterized by production of the products with low added value, and using of insufficiently skilled labour force, to an innovative development model. In this new economic model, the innovation must become one of the principal factors in creation and increase of competitiveness. Exactly, the innovative development is able to provide the increase of productivity and the return on resources, being used in the process of production, the diminishing of the costs in production and services.

The aim of this paper is to provide a new viewpoint, as it may seem, related to well-known things that include such economic concepts as innovation, human capital, sustainable development and productivity, and to show how the role of innovation can change in different phases of the business cycle, what impact it makes on economy. To achieve the aim, the following tasks are to be fulfilled: to characterize the role of innovation and human capital in economic development; to accentuate the role of innovation and education in productivity increase and in sustainable development of economy. The limited scope of the paper makes it like a thesis to a certain extent.
1. The Role of Innovation and Human Capital in Development of Economy

For more than two centuries, the development, the accumulation and the use of human working capacity attract the attention of economists. Yet its essential development, the theory of human capital has gained on the basis of researches of G. Becker and his colleagues of Chicago University T. Schultz, B. Veisbord, G. Mincer and L. Hansen. This theory offered an undivided viewpoint on such seemingly different things as the contribution of education to economic growth, the demand in medical and educational services etc. For the first time, the term “human capital” was used by Theodor Schultz, but Gary Becker, in his turn, developed this idea further, substantiating the efficiency of investments into human capital and formulating the economic approach to human behaviour. The book of Becker Gary, S. "Human capital: theoretical and empirical analysis, with special reference to education” [1] may be regarded, to a great extent, as a classical work that has made an impact on all further researches in this field. Human capital is the stock of knowledge, skills, motivations, abilities and health, formed and accumulated on the basis of investments by human, which stimulates the increase of labour productivity and income of an individual. Investments in human capital include, for the most part, costs of education (all-round and special, formal and informal), health care (prophylaxis, medical services etc.), as well as the creation of ethical and value norms (for example, loyalty of one to his enterprise). Since in the future, these costs will be compensated frequently with the income they must be regarded as productive, but not as consumptive costs. Exactly, the research on human capital provided the opportunity to understand that a principally important source of economic growth and welfare is the knowledge and competences. Educated and healthy people are the force that forms the national richness; therefore investments into human capital are justified and necessary. Only the educated population are able to generate new ideas, to transform them into innovations and implement into entrepreneurship successfully.

J. Schumpeter was the first who defined the concept “innovation” in his work “The Theory of Economic Development”. He interpreted the innovation as a new scientific and organisational combination of existing production factors to solve commercial tasks. Just in the innovation, Schumpeter saw the development source of economic systems. Taking into account that the specific content of innovation is changes, he indicated straight to them, paying attention to five typical changes: 1. providing of new technology, new technological processes or new production markets; 2. implementation of products with new qualities; 3. use of new raw materials; 4. changes in production organisation and in the material and technical provision; 5. emergency of new markets [2].

Not all inventions can become innovations; innovations are only such inventions that provide profits to producers and satisfy the demand of the market. In other words, first comes the idea that, thanks to the science, materialises, and the next step is the commercialisation of this idea that transforms the invention into an innovation that provides income. The following saying is here at place: if science is the process that transforms money into knowledge then innovation is the process that transforms knowledge into money, providing an increase in added value. Innovation is the one that does not remain on the level of ideas, but is real for itself and exists in the world of real things.

The opinions differ also in relation to the impact of innovation on the economy. The opinion of the author is that, taking as basis the research results of Kondratjev [3] about the irregular development of innovation and relating it with the cyclical development of economy it may be asserted that this cycle is affected to great extent by the development of base innovations. What does it mean base innovations? J. Schumpeter considered (and these considerations are in full force and effect also in the 21st century) that the base innovations are such innovations that are based on important inventions, and these innovations create new, previously unknown products or processes, which are based on new scientific theories. Base innovations are founders of the new long technological wave.

In development of economy and society, the role of technological cycles manifests itself so that, on the one hand, the mass of productive capital increases, and its technological level increases as well, but, on the other hand, thanks a better education and skills, there increases the qualification level of labour force and the management: as a result, there takes place an increase in return of both production factors – they become used more effectively. In the course of time, with achievement of a more
higher technological level in production, exactly the innovative traits of labour force increase most rapidly, because the qualified labour force not only adopts the new technologies more faster and uses them more effectively, but it also creates these technologies by itself.

In his book “Business Cycles”, Schumpeter [3] combined the long wave theory of N. Kondratjev with his innovation theory and, as a result, created an original theory of cyclical development. His opinion was that the cyclical development of economy is related mainly to the internal mechanism of the system, and that it is the innovation process.

In the world’s economic development, there had been five technological cycles or waves, and presently there is a situation that the fifth wave is in its decline stage, and soon the new one – the sixth wave will come. The advancement phase of every new wave is stimulated, for the most part, by base innovations. The present fifth wave is related to microelements, biotechnologies, computers, telecommunications, and information technologies.

The advancement phase of every new wave contributes to development of investment and economy. Arriving to the top of the wave, the new technology has achieved its maturity and, with the help of diffusion, also an overall spread, but then the development tempo becomes slower. Further follows the downward phase, when the return and amount of investments decrease, and this phase continues up to a time, when a new totality of innovations emerges.

There is not a united opinion in relation to the fact, in what phase of the wave are acting concrete countries, still most economists’ opinion is that the world’s developed countries are presently in the fifth wave.

Analysing the economic situation of the world, and the crisis, having touched more or less all countries, the author comes forward with a hypothesis related to the causes of the crisis. The main causes of the crisis are formulated and analysed, and, agreeing to them fully, the author’s opinion, though, is that there may be one more cause that had not been mentioned up to now: and it is the downward phase of the long waves – in both the countries, where the fourth wave takes place, and in the countries, where the fifth. Especially, it concerns the USA, where the end of the fifth way might have been achieved already in the 2010.

However, as it is well known, even the evil may have a positive side, because the economic crisis, especially the depression, may be regarded as a generator, that favour the emergency of new innovations that create technological basis for a new long wave. In accordance with the opinion of Gerhard Mensch [4], the overall worsening of economic conjuncture triggers active modernisation of production and very active innovative activity of economic subjects being involved. As an example, the period of 1970s-1980s of the 20th century may be mentioned, when the world’s developed countries solved the contradiction, existing between the decrease of economic accumulation opportunities and the necessity of radical change in technical and technological basis of national economic systems, with both the help of investments into new technologies and the help of mobilisation of additional financial funds.

Exactly in the depression phase, the economy is structurally ready for transition to new base innovations, and the base innovation clusters are forming in this phase. In the case of lasting economic crises, in the enterprise there takes place a transition from a profit maximisation strategy (being used during the prosperity period) to a relative risk diminishing strategy. As long as the existing production and technology provide considerable profit, the inclination of the enterprise to implement innovations is small, because the innovations are always related to risks. But, when the economy is in a lasting crisis and the perspectives in traditional structures become worse, the innovative risk is no more unsurpassable hindrance, because any other investment project may turn out as a more risky one. And, as a conclusion is: most of base innovations, i.e. the products come into being, exactly, during the lasting and heavy depressions. Consequently, exactly the innovations transform the recession of economic conjuncture into an ascent, and create waving.

Similarly, the innovation is one of the main factors, with the help of which it is possible to increase the labour productivity and to enable a sustainable development. To provide that it takes place, the state needs a certain scientific potential, being able to create new products and technologies, entrepreneurs who are interested in their implementation into production, as well as there must be an educated labour force, being able to carry out it all practically. Is it all on a sufficient level in Latvia? This problem is ana-
lysed by the author in her previous papers, therefore, there are discussed only some data related to the innovative development in Latvia.

The conception on the subject of innovation development in Latvia may be obtained on the basis of the materials of the EU, for example, from European Innovation Scoreboard [5]. It contains the data about 27 countries of the EU, as well as of some other countries of the world. In this report, all countries are grouped in four groups, in accordance with the results of 24 indicators: Innovation leaders, Innovation followers, Moderate innovators, and Modest innovators:

1. Denmark, Finland, Germany, Sweden all shows a performance well above that of the EU27. These countries are the Innovation leaders.

2. Austria, Belgium, Cyprus, Estonia, France, Ireland, Luxembourg, Netherlands, Slovenia and the UK all show a performance close to that of the EU27. These countries are the Innovation followers.

3. The performance of Czech Republic, Greece, Hungary, Italy, Malta, Poland, Portugal, Slovakia and Spain is below that of the EU27. These countries are Moderate innovators.

4. The performance of Bulgaria, Latvia, Lithuania and Romania is well below that of the EU27. These countries are Modest innovators.

In accordance with the summary innovation index, Latvia is on the 27th place, while Lithuania, in its turn, on the 25th place, but Estonia on the 18th. In its turn, Latvia has not succeeded in it (it has suffered from the economic crisis harder than the neighbouring countries). The backwardness from other countries of the EU is to be seen, especially, in such parameters as private sector’s investments into financing of innovations, fully insufficient relationship between several links of the innovative chain, especially between the science and the entrepreneurship, low economic efficiency and others.

One of the main factors that have caused such situation in Latvia is the low level of state and private sector investments into research and development. In 2004, the summary financing of R&D was only 0,42% of GDP, in 2005 – 0,56%, in 2007 – 0,59%, in 2008 – 0,61%, in 2009 – 0,46%, and in 2010 – 0,50%. In comparison, in 2007, the financing for research and development in the EU27 made, in average, 1,84%. In the strategy “Europe 2020” there is the aim to increase this indicator to 3%, yet Latvia plans to achieve only 1,5% [6, 7].

2. Human Capital in Latvia (Education Component)

The opinion that Latvia is a country with a qualified, highly educated work force has put down deep roots. Let us have a look, if it is so in reality.

One of the indicators, describing the human capital, is the Nation development index, which has several components related to education level, health of the population and lifespan. According to the Nation development index, Latvia in 2010 was in the 48th place of the 169 [7].

One of the components – the literacy of adults is, in reality, on a high level (99,8%), and Latvia already, for a long time, is in the group of the leading countries. However, this minimal knowledge level does not yet give evidence of a level of the human capital development that may be able to work productively and create a competitive economy. The proportion of the population with secondary education in the age group from 25 to 64 makes 60,7%. The summary indicator in the EU27 is 46,8%, but in Czech Republic 75,9%, Poland 66,8%, and in Lithuania 60,4% [7]. One less researched problem is such that a part of children does not go to school at all. According to the data summarized by the State Service of Educational Quality, in 2010/2011, 11,3 thousand pupils, in the obligatory educational age, did not go to school. In 2009, the proportion of population in the age group of 18-24, having not finished the school (having not obtained the secondary education and continuing not their education), made 13,9%. The causes of it may be different, but, mostly, they are of social economic nature. Because of the demographic situation in Latvia, there takes place a diminishing tendency of the number of pupils at schools. In 2010/2011, the school year was begun by 858 general educational schools with the number of pupils – 229,0 thousand that is by 10,8 thousand or 4,5% less than in previous school year [7].

The data mentioned above are showing not only the one year’s situation, but reflect a long-term tendency, the improvement in which is not to be seen. The education on the school level is related to a lot of problems, which have to do with closing of the schools (most strikingly, this
moment took place in 2009). Especially destructive, the closing of schools is in the rural areas, where there, simultaneously with closing of the schools, go gradually away also people. The information about unfavourable implications of such behaviour may be found also in the experience of neighbouring countries, for example, Sweden.

A serious problem is both the obtained and the missed knowledge. For a long time, insufficient attention was paid to such sciences as mathematics, physics, chemistry etc., but exactly these sciences are necessary to provide that the staff might be able to adopt new technologies, to implement new products, and to produce export goods in order to develop a really knowledge based economy.

The quantitative indicators are important, but it should not be forgotten about the qualitative indicators, which provide evidence of the quality of education. There we have the following tendency. If we analyse the knowledge level of the fourth class, then the indicators in Latvia are higher than the average level of 70 countries, and this level remains even up to the eight classes. The results of centralized exams evidence that, in average, the knowledge of the most pupils is on a middle level or lower than it. Is must also be taken into consideration that a number of pupils does not take examinations in such disciplines as physics, chemistry, biology (exam in mathematics is obligatory) at all. As a result, the higher educational institutions have often to listen to complaints related to the knowledge quality of the graduates. But how they might be able to provide perfect specialists from the material, they have received from the schools? [9]

In Latvia, the higher education is provided by 58 higher educational institutions. During the five last years, the number of students of higher educational institutions decreases. In 2010/2011, the number of the students of higher schools and colleges made 103,9 thousand that is by 8,7 thousand less that in the previous year. The number of matriculated has also decreased: from 31,5 thousand in 2009/2010 to 31,0 thousand in 2010/2011. In 2010/2011, the number of students per 10000 inhabitants of Latvia made 492 that, although this number has decreased, are yet one of the highest indicators in the world. In comparison, in the 2006/2007 academic year there where 566 students per 10000 inhabitants, and it was the second highest indicator in the world. A higher indicator had only Canada – 580 (the USA – 520) [9]. In the context of the Strategy “Europe20”, the aim of Latvia is to increase the proportion of population with higher education in the age group 30-34 in 2020 up to 34-36%; in 2009 this indicator was 30,1%. The average target indicator in the EU is 40% [14], in 2009 the 32,3% were achieved.

In the higher education, one of the problems is the provision of its adequacy to requirements of the labour market and the economic sector. Still there are not sufficiently specialists in the areas of engineering, production, processing and other technologies. The most popular thematic areas with the vast majority of the students are the social sciences, commerce and rights (49,9%). Engineering, production and construction is studied by 12,6% of higher school students, natural sciences, mathematics, and information technologies – by 5,5%. In 2010/2011, the number of students has increased in the studies financed by the state budget, however, 66% students pay for the studies themselves. The main political directions and measures to increase the number of graduates are: modernization of higher education, bringing up-to-date of material technical bases of higher educational institutions, increase of efficiency in use of resources, provision of an equal accessibility of higher education and improvement of it in both quality of scientific activities [7].

One of the development indicators of scientific system is the increase of scientists per year and the number of persons having taken their doctors. In fact, the following data link two areas – the innovation and the education. In 2010/2011 academic year, the number of doctoral programme students were 2418 that makes 2% of the whole number of students. In 2010, the number of defended theses made 132; for comparison: in 2007 it was 146, in 2008 – 139. The major doctoral programme students are related to social sciences, commerce and rights, making 27% (the situation has improved a little in comparison with the previous year, when this indicator was 35%) of all doctoral programme students. The studies of natural sciences, mathematics and information technologies were chosen only by 15% (unchanged) of all doctoral programme students, and 21% (previously 15%) of all students were involved in doctoral programme studies related to engineering, production and construction. The interest in doctoral
programme studies increased gradually, but, as it is to be seen, beginning with the 2008, the number of defended theses tends to decrease. It is especially alarming, because it is one of the causes of the overall ageing tendency of scientific society to be seen in Latvia [8], for the supplement with young scientists is insufficient. All in all, only 5409 people are acting in the scientific area in Latvia, and only 611 of them in the entrepreneurship sector. In Latvia, 0,8% of all employees are acting in R&D area, and approximately 69% are working in the sphere of higher education, while only 16% in the entrepreneurship sector. In the EU, the proportion of people involved into scientific area exceeds 1,4% of all working population, and approximately one half of them are working in entrepreneurship and about 40% in education. There should be taken also into consideration the moment that, beginning with the 1993, the number of working in the scientific area has decreased, and only in 2007-2008 there emerged a tendency of growth.

Consequently, it may be concluded that the level of literacy of the adult population in Latvia is high, but the quality of education has different shortages, for example, insufficient knowledge in natural sciences that is felt clearly by the higher schools, being not able to correct all faults, having taken place at the school. As a result, the economy does not receive fully all necessary specialists with adequate knowledge level. The number of young scientists and the total of all involved in the scientific area remain still insufficient.

3. Productivity

The problems of educational and scientific areas make their impact also on the productivity and competitiveness of Latvia. On the state level, the productivity is calculated on the basis of the indicators of gross domestic product (GDP) and number of employed. The table contains data about productivity level in several countries of the EU, reflecting the level of Latvia in comparison with the older countries of the EU and its nearest neighbours.

<table>
<thead>
<tr>
<th>Countries</th>
<th>2000</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
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</thead>
<tbody>
<tr>
<td>Bulgaria</td>
<td>28</td>
<td>35</td>
<td>37</td>
<td>38</td>
<td>40</td>
<td>44</td>
<td>44</td>
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<tr>
<td>Estonia</td>
<td>45</td>
<td>57</td>
<td>62</td>
<td>66</td>
<td>70</td>
<td>69</td>
<td>64</td>
<td>54</td>
</tr>
<tr>
<td>Ireland</td>
<td>132</td>
<td>143</td>
<td>145</td>
<td>146</td>
<td>148</td>
<td>133</td>
<td>128</td>
<td>128</td>
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<tr>
<td>Spain</td>
<td>97</td>
<td>101</td>
<td>102</td>
<td>105</td>
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<td>103</td>
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<tr>
<td>France</td>
<td>115</td>
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<td>108</td>
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<tr>
<td>Latvia</td>
<td>36</td>
<td>46</td>
<td>48</td>
<td>51</td>
<td>56</td>
<td>56</td>
<td>51</td>
<td>51</td>
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<tr>
<td>Lithuania</td>
<td>40</td>
<td>51</td>
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<td>56</td>
<td>59</td>
<td>61</td>
<td>55</td>
<td>57</td>
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<tr>
<td>Luxembourg</td>
<td>245</td>
<td>253</td>
<td>255</td>
<td>270</td>
<td>275</td>
<td>279</td>
<td>266</td>
<td>271</td>
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<tr>
<td>Poland</td>
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<td>54</td>
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<td>61</td>
<td>63</td>
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<tr>
<td>Romania</td>
<td>26</td>
<td>34</td>
<td>35</td>
<td>38</td>
<td>42</td>
<td>47</td>
<td>47</td>
<td>46</td>
</tr>
<tr>
<td>Iceland</td>
<td>132</td>
<td>131</td>
<td>130</td>
<td>123</td>
<td>121</td>
<td>124</td>
<td>118</td>
<td>111</td>
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<tr>
<td>Norway</td>
<td>165</td>
<td>165</td>
<td>177</td>
<td>185</td>
<td>182</td>
<td>192</td>
<td>176</td>
<td>181</td>
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<tr>
<td>Switzerland</td>
<td>144</td>
<td>134</td>
<td>132</td>
<td>134</td>
<td>139</td>
<td>143</td>
<td>144</td>
<td>147</td>
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<tr>
<td>USA</td>
<td>161</td>
<td>157</td>
<td>159</td>
<td>154</td>
<td>151</td>
<td>147</td>
<td>145</td>
<td>148</td>
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<tr>
<td>Japan</td>
<td>113</td>
<td>111</td>
<td>113</td>
<td>109</td>
<td>106</td>
<td>105</td>
<td>102</td>
<td>102</td>
</tr>
</tbody>
</table>


In Latvia, the productivity increased gradually since 2000 (in reality since 1997), but with the beginning of the crisis it decreased rapidly. As it is to be seen from the data, not only Latvia has problems with the productivity, but also the whole EU, for the USA has overtaken it. The success of the USA in this area is based on several reasons. One of them is such that the Americans work longer hours per year than people in the majority of developed countries; however, it seems that a more serious there may be another cause. Namely, it is the serious financial investments into development of information technologies in 1990s, and not only into development of IT, but also into implementation of offered by it opportunities into other spheres as well. In its turn, the EU, on the whole, has serious problems in the areas of innovations, and namely with implementation of the newest technologies and commercialization.
of scientific research results. One more serious problem of the European Union is related to demography – the ageing of population that also has a negative effect on this indicator. On the other hand, the working hours in Latvia are even longer than in the USA, but the result is such as it is. For the medium term period – up to 2015, the Ministry of Economics has elaborated three forecast scenarios – the variants of a basic, a faster and a weak growth [13]. We will pay attention to the medium variant because, taken into consideration the present situation in the world, it has a certain reason.

In 2009, a considerable decrease of economic activities was foreseen – the decrease in GDP by 18% (that also came true). Notwithstanding the improvement of the situation in the second half of 2010, the growth rate of GDP remained negative in 2010. The situation in 2009 and 2010 was caused mainly by the weak outer and shrinking inner demand. A positive economic growth recrudesced in 2011, surely, the financial markets stabilized in the world. In the scenarios of the Ministry of Economics, the enlargement of export capacity is regarded as the main growth factor, which, in its turn, is related to the development of industry and increase of competitiveness. Up to now, as the main competitiveness factors in Latvia there were used the relatively cheap labour force and the low overheads. Unfortunately, it is to be recognized that such factors of competitiveness are not sustainable; it was already argued far and wide by M. Porter in the past century. Many Asian “tigers” made use of cheap labour force for some time, but they linked it to the new technologies. So we return again to the impact of innovation on productivity and economy all in all. In the scenarios to be analysed, it is also underlined that the old methods are no more of use, that it is necessary to increase the productivity and to favour the export capacity. However, it is a great deal the declaration of an intention because the aim is indentified, but the instruments, with the help of which the aim may be achieved, are not analysed deep sufficiently.

In accordance with the calculations of the basic scenario, the expected development from the period 2011-2015 will not be able to compensate the big decline that had begun in 2008, and Latvia, in fact, will be in its development on the level of 2006. A true sustainable development is, actually, not to be seen in the present situation.

Conclusions

Summing up the above mentioned, it must be pointed out the following more important moments: one of the principal driving forces is innovation that makes an impact on development with the help of new products, services and technologies, and, secondly, the innovation makes a positive impact on the productivity and sustainable development of the country. Especially, the role of innovation increases during the circumstances that are related to the crisis because, directly, the innovation is the one that is able to move the economy to a business cycle recovery phase. To be able to implement innovative solutions practically, highly educated, qualified workers are necessary, consequently, the attention must be paid mainly to the area of education, realising a well-considered long-term policy. Consequently, the main conclusion: sustainable development of economy is possible, if innovation is supported. On the basis of conclusions, the recommendations derive: more financing on the government level must be granted to scientific and educational areas, a more active involvement of entrepreneurs in financing of these areas must be promoted, the knowledge level of second school graduates must be improved, especially in natural sciences, interesting of the youth in science, strengthening of the relationship between science and entrepreneurship must be provided.

References


MODELLING FOR IMPROVING THE COMPETITIVENESS OF SMALL ENTERPRISES

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Riga Technical University, Riga, Latvia

Abstract

In contemporary world alongside with the expansion of economic activity zones and mutual overlapping of enterprises the competition of enterprises is growing rapidly. Due to this fact modern enterprises (incl. Latvian retail business) should develop and implement their own strategies for fostering their competitive advantage. The concept "competitiveness" defines the ability of the enterprise to exist in the given market conditions and is linked with the quality of goods and volumes sold. Most objectively that would be defined by financial parameters, such as profitability, liquidity, capital structure indicators, etc. Investigating the dynamics of the values of these indicators and external environment of enterprises using PEST analysis it may be concluded that the main sources for problems are linked with inflation (higher than profitability of an enterprise), limited availability of the borrowed capital (due to high interest rates) and high VAT rate (22%). To solve or minimize these problems it becomes obvious that it is necessary to increase the profitability of the enterprise and share of equity capital by considering the internal factors affecting the competitiveness and trying to adapt to the external factors. When developing the strategy to foster the competitiveness, it is important not only to determine the measures to be taken due to which the desirable financial and other effects on the relevant factors could be reached, but also pay attention to the process itself when choosing the measures to be taken in order to gain the maximum effect from the set of measures aimed at increasing the competitiveness taking into account the market strategy implemented in the given enterprise. To this end a new model for evaluation of the measures taken would be useful which is based on 4 objective criteria: impactability (ability to leave an impact on the indicators), benefit (probabilities of positive effect), predictability and controllability (ability of the enterprise to leave an impact on predictability and controllability).

Key words: criteria, model, management, competitiveness, sustainable development.

Introduction

The concept "competitiveness" means the ability of a country, industry and/or enterprise to operate under conditions of national or international competition. According to the existing definitions it is linked with the ability of the enterprise to offer goods of higher quality than those produced by the competitors as well as the ability to sell the products in the market. There are many ways how to determine the competitive edge of the enterprise, though mostly it may be characterized qualitatively (e.g., by marketable innovation descriptions). Therefore, to get an objective and relatively accurate information financial indicators have been used in this research, including profitability indicators (e.g., commercial profitability, total return on capital, return on equity, return on assets, etc.) that characterize the profit share of enterprise revenue or the profit level of the capital, as well as liquidity indicators (e.g., total liquidity L1, intermediate liquidity L2, absolute liquidity L3) that characterize the enterprise ability to settle its liabilities, and financial structure indicators (coefficients of financial dependence, financial independence and financial balance) characterizing the stability of the enterprise as a ratio of equity and borrowed capital. Analysing the economic situation in Latvia, in the first place the situation in such an important sector for cooperation among countries and enterprises as retail trade, its characteristics by objective methods (financial analysis and PEST analysis of external environment) turns out to be rather ambiguous. On the one hand, financial analysis of Latvian retail companies shows that today and in the near future the retail companies will remain quite competitive, i.e., they can be characterized as being able to remain in business long enough, even not undertaking any measures to foster their competitiveness and relying only on the existing profit level without attracting additional capital, e.g., borrowed capital (further in this research, especially when making forecasts, this situation is referred to as the passive scenario), they will still be able to make profit. Of course, following the economic decline in 2007-2008 the profitability (both total return of capital and commercial profitability) remains low constituting only about 2,2–2,3% (see Figure 1), while the liquidity remains at its lowest permissible level and the equity continues to grow, though negligibly (see Figure 2).
Vitalijs Jurenoks, Konstantins Didenko, Pavels Lencheviks

Fig. 1. Dynamics of profitability indicators and forecasts for Latvian retail companies

Fig. 2. Existing and projected size and structure of financing in Latvian retail companies

It manifests as inflation rate (which in the last 2 to 3 years was as high as 4.9%, but perhaps could be reduced to 2.7% - see Figure 3).

Fig. 3. Dynamics of inflation rate in Latvia in 2005–2012

Taking into consideration the following circumstances of external environment of Latvian retail companies, it becomes obvious that further hold on the market for those companies which would not undertake any measures to foster their competitive advantage in the market, may become problematic. The three reasons mentioned that could lead to this situation are the following:
1. inflation “eats up the profit margin” because the level of the profitability indicators is 1.5–2 times less than the inflation rate;
2. limited accessibility to borrowed capital due to high loan interest rates, in particular for credits in lats;
3. VAT rate which has risen to 22% since 1 January 2011.

The problems identified show that there is a growing need for the local retail companies to develop and implement such strategies that would help them to gain competitive advantage over their competitors under existing conditions of Latvian national economy. Moreover, in the recent years alongside with the economic crisis and the entry of established European companies into the Latvian market, the need for such strategies has become a survival issue for many of the local companies. While developing and implementing their strategies for solving the three above mentioned problems, the companies have to use their internal factors in trying to adapt to the external ones. As a result some indicators may be affected, including the financial indicators being linked with the problems mentioned above, namely, indicators of profitability and indicators of capital structure.

The enterprises very often have to choose which measures to take since there are situations when it is possible to undertake more risks, but in other situations it would be more advisable to take more conservative measures. It means that in different situations the priority could be given to different model criteria combinations which are usually set depending on the financial condition of the enterprise or taking into consideration the characteristic indicators (see Figure 4).

![Profitability assessment of an enterprise](image)

**Fig. 4. Scheme for choosing the prioritized criteria of the model**

**Criteria of the model**

The coefficients „a“ and „b“ are calculated by the least square method on the basis of forecasts of impacted indicators by trend functions see Table 1.

The corresponding indicator changes are considered to be the given values of functions \(y(x)\) and the anticipated impact base values – the values of the given arguments \(x\).

**Table 1. Calculated values of „a“ and „b“ coefficients**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Scenario</th>
<th>Formula coefficients „a“</th>
<th>„b“</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial profit-</td>
<td>Pessimistic</td>
<td>-1.221619</td>
<td>0</td>
</tr>
<tr>
<td>Ability</td>
<td>Average</td>
<td>1.170456</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Optimistic</td>
<td>4.318012</td>
<td>0</td>
</tr>
<tr>
<td>Equity value</td>
<td>Pessimistic</td>
<td>0.051823</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>3.314412</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Optimistic</td>
<td>8.359928</td>
<td>0</td>
</tr>
</tbody>
</table>
The next stage of the study is the evaluation of the effect by implementing the measures fostering competitiveness (see formulas 1, 2).

$$B_n(\text{ILPK}) = \frac{L \cdot P}{100} \left(1 + \frac{K}{100}\right)$$

where

- $B_n(\text{ILPK})$ – the anticipated impact base by implementing of $n^{th}$ measure (coefficient);
- $I$ – the average $n^{th}$ measure description by impact criterion;
- $L$ – the average $n^{th}$ measure description by benefit criterion;
- $P$ – the average $n^{th}$ measure description by predictability criterion;
- $K$ – the average $n^{th}$ measure description by controllability criterion.

Using the values of the anticipated impact base as data, we may calculate the impacted indicator change rate – the linear function of the anticipated impact base that shows how much (%) the level of the impacted indicator is changing when implementing the relevant measure fostering the competitiveness (see formula 2).

$$e_n = \frac{aB_n(\text{ILPK}) + b}{100} \times 100\%,$$

where

- $e_n$ – rate of indicator changes by implementing of $n^{th}$ measure (%);
- $a, b$ – formula coefficients.

Inserting the values of coefficients into the formula 2 we obtain formulas oriented on Latvian retail companies that forecast the results of strategies to foster competitiveness (see Table 2).

### Table 2. Average financial indicators of competitiveness of Latvian retail companies

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Passive scenario</th>
<th>Pessimistic scenario</th>
<th>Average scenario</th>
<th>Optimistic scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Profitability indicators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial profitability, %</td>
<td>2.3</td>
<td>2.3</td>
<td>1.88</td>
<td>1.88</td>
</tr>
<tr>
<td>Total return on capital, %</td>
<td>2.2</td>
<td>2.2</td>
<td>1.78</td>
<td>1.77</td>
</tr>
<tr>
<td>Return on equity, %</td>
<td>6.9</td>
<td>6.7</td>
<td>6.82</td>
<td>5.34</td>
</tr>
<tr>
<td>Return on assets, %</td>
<td>1.2</td>
<td>1.2</td>
<td>1.40</td>
<td>1.13</td>
</tr>
<tr>
<td>Return on capital</td>
<td>0.95</td>
<td>0.94</td>
<td>0.95</td>
<td>0.94</td>
</tr>
<tr>
<td><strong>Liquidity indicators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1 – total liquidity</td>
<td>1.19</td>
<td>1.23</td>
<td>1.20</td>
<td>1.24</td>
</tr>
<tr>
<td>L2 – intermediate liquidity</td>
<td>0.85</td>
<td>0.88</td>
<td>0.86</td>
<td>0.90</td>
</tr>
<tr>
<td>L3 - absolute liquidity</td>
<td>0.25</td>
<td>0.28</td>
<td>0.26</td>
<td>0.30</td>
</tr>
<tr>
<td><strong>Financial structure indicators</strong></td>
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<tr>
<td>Coefficient of financial depend-</td>
<td>0.68</td>
<td>0.67</td>
<td>0.68</td>
<td>0.67</td>
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<td>ence</td>
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<tr>
<td>Coefficient of financial independ-</td>
<td>0.32</td>
<td>0.33</td>
<td>0.32</td>
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<td>ence</td>
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<td></td>
</tr>
<tr>
<td>Coefficient of financial balance</td>
<td>2.13</td>
<td>2.05</td>
<td>2.09</td>
<td>2.01</td>
</tr>
</tbody>
</table>

### Conclusion

According to the pessimistic scenario and comparing it to the passive one it would be possible to slightly raise the share of equity (for about 45 million lats or approximately by 1% for the whole industry, though the stimulation of the profitability would not bring the expected success and due to the fall of profitability indicators on average the profitability of retail trade would be much less than the projected inflation rate (<2.7%).

For many Latvian retail businesses there would not be any sense in undertaking the events contributing to promoting competitiveness and under such circumstances the future existence of such businesses would be more than doubtful.

By implementing the average scenario and comparing it to the passive scenario the equity of retail businesses would grow much faster for the industry as such (on average increasing by 8% taking into account the coefficients of capital structure), though the profitability indicators would on the whole be equal to the inflation rate. However, judging by expected total return on capital (2.59% < 2.7%) and the level of return on assets (1.65% < 2.7%), for some companies the forecasted effect would still not be sufficient to ensure development under forecasted market conditions.
Moreover, according to the optimistic scenario and comparing it to the passive one by fully implementing the set of measures to be undertaken to promote the competitiveness, on the whole the equity of Latvian retail businesses would additionally grow by 7 thousand million lats or by 20%, while the profitability would double and to a great extent would exceed the projected inflation rate. Therefore, further promotion of the competitiveness of local retail businesses would be ensured.

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PATH OF ORGANIZATIONAL CHANGE TOWARD BUILDING LEARNING ORGANIZATION

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Abstract

Discussion on change management and its impact in organization is on organizational changes and implementing new ways of working in organization. The essence of organizational changes is directed toward organizing whole potential in organization in a direction of competitive advantage and changing the organization itself. Accepting reality and time that organization works today, they must accept the fact that they must change if they want to survive at the marketplace. It is well known that the main source of that is knowledge, and the main source of knowledge is continuous learning. That makes organization different from others and ready to answer the challenges from environment. Learning organization looks at different kind of changes as a possibility that can be used for organizational development. High instability, uncertainty and changing environment, needs adequate organized answers and people. Readiness for change, and flexible use of knowledge and creativity, becoming the essence of qualitative people in organization and society established knowledge. The accent of learning organization is on recognizing and implementing different kinds of change. On the other hand learning organization creates changes itself, it develops process of organizational learning through systematic thinking. In that direction the aim of this paper is on implementing the different types of changes through learning process for building learning organization. For that reason it was made empirical researches in organizations in Macedonia which shows dependence of implemented different types of organizational changes through learning process as an independent variables on building learning organizations as a base for system thinking in organizations as dependent variable.

Key words: change management, organizational change, organizational learning, learning organizations and system thinking.

Introduction

It is well known that organizational change may be defined as new ways of organizing the work for competitive advantage of organization. Organizational changes leads organization to its aim. With that kind of working are emphasized new ways of managing the organizations, decentralizing the way of working and functioning of organization itself, and the main accent is on development of all the employees in the organization. In that direction the old organizations become organizations with different structure and the different hierarchy. This kind of organization appears as a result of empowering the employees, delegating the work from managers and taking bigger responsibility from the employees itself. All those elements create different kind of organization with different functions and different structural look.

Success of realization of organizational changes depends on readiness of organization for accepting and realization of changes at all levels in organization. Furthermore, the idea for readiness for change is directed on readiness of employees for accepting or declining the change in organization. This is possible only in the case where strengths, weaknesses as well as acquisitions are well known in the process of realization of changes. In that situation employees will work toward implementing the change in whole organization. Also, the vision of the organization must be clear and well known for all employees. Furthermore it is necessary to give the big picture where are connected all parts; where are connected the past, present and future of organization as a base for readiness of organization for change.

Even if organizational change , comes as a reaction from external environment, the necessity for change become from organization itself and requirement for leaving the traditional way of working and becoming future oriented organization. The aim of moving the organization from present to future state is the fact that organization needs improving the way for using its resources, and improving ability of organization for creating values, and improving the way of working for all employees in organizations.

Discussion for change management is directed toward changing the way of working in organizations. The essence of organizational change is directed toward organizing whole po-
tential in organization for getting competitive advantage in organization. Accepting today’s reality and environment in which organizations works today, it must be accepted one more fact that organizations must change constantly if they wants to survive. It is well known that knowledge is the main source of competitive advantage, and it can be got from process of learning. It makes organization different and ready to answer on challenges in environment. High instability, incertitude and change of environment look up for adequate answer and people. That means flexible use of knowledge and creativity and empowering the people in organization to give its potential in working.

As it was mentioned in abstract, the direction of this paper is on measuring the input (organizational changes) trough process of learning to getting output (learning organization) or system thinking in organization.

1. Path of organizational change

Change management which is part of wide theoretical frame of social change; lately become popular theme which is directed on progress of organization, and part of literature of management. Identifying the necessity for organizational change and leading the process of organizational change become one of the most responsible processes which are needed to be implemented by leadership or managers in organization. Necessity for implementing in dynamic environment, today, occupies every institution and organization in public and private sector. Challenges which enjoy technology and the way of working and communicating are directed to organizations as a whole. All this contribute for change in working in organization, modernizing the structure and processes and alignment of aims of organizations with issues (McGlumn, Geraldine, 2000).

Change management is structural process of enriching changes on the individual level first, than teams and organization itself from present situation to desired future state.

Process of change management include creating of new state which enables two way communication in organizations, as well as deep social understanding of leadership style and group dynamic. As evidence of that is the fact through organizational changes are connected expectations of groups in organization, communications are constant, teams are integrated and employees in organization are trained.

For successful accomplishing of change management it is necessary to put accent on (Lehman K. E. Waine, 2000):

- Establishing effective communication channels for informing employees in organization why changes happens which acquisitions of successful implementation is for change.
- Establishing effective trainings for employees according the necessity of organization.
- Getting over the resistance of change from employees and involving all employees in realization of strategic direction of organization.
- Observing of change implementation.

Change management is systematic approach for establishing changes from perspective of organization and on individual level. It is directed toward tree aspects of change: adapting the change, controlling the change, effects of change.

Proactive path for accomplishing the change is essence of all tree aspects mentioned before. For organization, change management means defining and implementing procedures and technologies for accomplishing changes form environment in which organization works, for profit from work; from change itself.

Latest researches (Christensen and Overdorf, 2000; Miller and Moris, 1999; Thusan et al., 1997) show that it is big challenge to manage today’s organization in time when external environment gives a lots of changes. So, there is one and only question to answer; what’s organizational change path? That is explained with Fig. 1 where is explained steps how changes happens and implemented (Gunn, 2008).

As it is shown in Fig. 1, first change starts with changing the workplace or process of re-designing, than changing the rules of way of working. This means empowering of employees, trainings for improving way of working. Through changing and redesigning the workplaces, changes the way of working and that changes the structure itself. Teams are formed and it is established new organizational design. Those elements from pyramid are easy to be changed and to be noticed. Next step is change behaviour and culture. It is hard to be changed. It was discussed of organizational change and its path, but there is one more question for organizational changes as well, and that is about different kinds of changes that is happening in organization.
Ackerman (1997) defines three kinds of changes:
- Developmental change which may be planned or not planned. Those kinds of change are changes that are made from some aspects of organization, focusing on improving the skills and process.
- Traditional kinds of changes are directed toward some desired state which is different from existing. It is periodic. Planned and it refers to one or more sectors.
- Transformational changes are radical changes. This kind of change needs establishment of way of working for employees and from organization. Transformations can be noticed in structure, processes, culture and system.

2. Characteristics of learning organization

In the previous discussion was on change management and organizational changes. But those changes as input must give some outputs or changing the organization itself and that is learning organization- organization of the future.

Discussion on learning organization starts with thoughts of Peter Senge. According to him it is necessary to explain that learning organization is kind of organization which: “Simplify process of learning of all employees in organization and it constantly transforms for competitiveness in marketplace” (Senge, 1995, p.8).

Learning organization needs enlarging the abilities and knowledge through empowering and through constant training all employees in organization. It is well known that traditional organizations needs to transform in learning organization and use disciplines for learning organization as base for building learning organization. Those disciplines are:
- System thinking,
- Personal mastery,
- Mental models,
- Shared vision,
- Team learning.

This can be done only with new kind of leadership. According to the concept of learning organization, leader is creator and person who implements change, developing its employees through process of learning, sharing the vision in organization and promotes new way of working and thinking.

Work as well as way of working in organizations is based on individuals and teams. Activities of employees are looked in context as a whole.

So it can be explained definition on learning organization (Senge, 1995, p.10): “Sum of interactions between people and dynamic system which constantly adapt and improve.”

Furthermore, employees improve through learning process and build skills which are necessary for accomplishing work tasks. Through organizational learning are spread possibilities for creating and participating in creative processes.

Phenomenon on learning organization is interesting as concept and because of that increase numerous researches.

3. Concept and results from empirical research

In Republic of Macedonia there are many organizations that follow the concept of learning organization. But, still we have organizations that have traditional way of working.
It is well known that this is era of changing in organizations. We are witnesses of many changes and reforms which are constant the new way of working are implemented existing systems are reformed which shows that environment dictate numerous of changes and future organization that accepts and work with is learning organization.

So it was made empirical research in some organizations from the public sector. This research was made through questionnaire consisted of questions about organizational change and learning organization. It is made by two parts.

First part was for detecting what kinds of changes are implemented now in organizations of public sector.

Results from this empirical research show that in Macedonia are implemented transitional changes. Second part of research or of this questionnaire was for detecting elements of learning organization in organizations of public administration in Republic of Macedonia.

Collections of data from research that:
- Employees are rare empowered for taking risks;
- Rarely tolerated mistakes;
- Rarely generating ideas;
- Rarely maintaining researching;
- Rarely implementing the knowledge from researches.

This shows that changes are implemented but still needs some elements to be put during the process of change for organization to become learning.

For this reason is needed to be implemented and controlled the process of learning during organizational change. It is also necessary to be explained why change happens and what are contributions from change for employees and from organizations. Especially it is important to put main accent on system thinking and addressing all efforts in raising it in organization because learning organizations are future organizations.

Conclusion
Change management and organizational changes are implemented in organizations for changing the paradigm and transforming organizations in learning organizations.

From empirical and theoretical research made for this paper it is establish that it is very important to accept changes from environment and implement organizational change processes in organizations. In organizations from public administration in Macedonia needs process of transformational changes to be made because this traditional organizations needs to become learning organizations- organizations that accept change as a challenge and use them for their development.

Successes of organizations today have just one name- become learning organizations.

Reference
USING ENNEAGRAM IN SMALL BUSINESSES AS A WAY FOR SUSTAINABLE DEVELOPMENT

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Abstract

There are many different ways of leading and managing people in today's companies. Enneagram offers an interesting way of finding people's motivations and explaining their attitudes to work. It divides people in nine personality types and the history of the method goes back into the 4th century. The nine types are the basic division of personalities and the concept takes into account that the tested person may have a wing to another personality type and also that people may have different behavior when they face stress or when feeling secure. Enneagram concept assumes that the basic personality type is inborn. In small businesses, where each single employee is very important, Enneagram can help to hire the right people or to build efficient teams and pleasant work environment as in a small company of 5 employees 1 employee represents 20% of the whole business. Surveys have found Enneagram as reliable and valid. Enneagram is a very good and cost-efficient alternative to commonly used personality tests and using the method can improve management and leadership leading to sustainable development of small businesses.

Key words: leadership, management, Enneagram, sustainable development.

Introduction

I was very impressed by Enneagram theory when I heard it in a class of Managerial Leadership in 2007. I started thinking how reliable it can be and how it could be used in business to achieve better results. The word Enneagram comes from a Greek word “enneas” which means “nine” [4]. According to Kamineni [3], Enneagram technique of dividing people into different personality types is more than two thousand five hundred years old. The system comes from East and originated in Naqshbandi order of Sufism [7] however there is probably a difference between the Enneagram symbol and the concept of division into nine different personalities. The Enneagram symbol is probably the oldest and the nine types of personalities have sources in Seven Deadly Sins in the 4th century and Kabbalah in the 12th century (Fig. 1). It is certain that the symbol was introduced to the West by George Gurdjieff in 1940s while the descriptions of the nine types belong to much younger times – Oscar Ichazo in 1980s and Claudio Naranjo in 1990s were the founders of the modern Enneagram system. The concept was further developed in 1996 by Don Riso and Russ Hudson who added some other features into the types’ descriptions [3]. To the Czech Republic the concept of Enneagram arrived in 1997 when the first lecturers started teaching it and in 2002 David Daniels introduced Enneagram at the Charles University (Brazda).

Results and Comments

Each of the nine types can have a wing to the type which is next and may behave differently, based on the individual’s health [5]. Enneagram concept assumes that the basic personality type is inborn. I found myself and many friends who would belong to these categories but can we really believe that?

Jerome P. Wagner and Ronald Walker [7] performed a research in the early stage of Enneagram development. Their research was based on 390 respondents and the aim of the study was that the system has any “empirical validity and validity to complement its intuitive validity”. As a part of the survey, the respondents were given information on Enneagram and were asked to find themselves in the categories. After 3 months to 9 years they were
asked again to categorize themselves. As a result, more than 79% of the people did not change the opinion and were consistent with the previous result. The conclusion on the survey was that the results are positive. Another study on Riso-Hudson Enneagram [6] has also shown the system as reliable and valid. However there are not many sources on the reliability and validity of Enneagram, I consider the concept as a good classification of peoples’ behaviour as I also asked few friends of mine to find themselves in Enneagram and also to complete an online Enneagram test. Most of the feedback I got was positive and the people would agree with their characteristics. As being a good leader requires understanding of humans, the Enneagram system might be a good and proper way to help managing people.

It might be good to connect a chaotic but creative person with someone organized and practical. In small businesses where there are just a few employees it is important to have the right team, keep the right people and use their abilities efficiently. In a company of five people one employee performs 20% of the whole business thus the need for efficiency and satisfaction is extreme. Elisabeth Taeubert from People Smart Consulting G.P. said: “Companies often have plenty of technical talent ... What stops a company most often is the relationship side of the business.” [1]. There are different personality tests which can be used, including the Enneagram.

One of the mostly used tests is the Myers-Briggs Type Indicator which divides people into four categories and then it classifies people as ones of sixteen types. Some companies use the Myers-Briggs test for hiring, some to build teams. But some companies believe that Enneagram has better and more accurate results and the result provide them chance for perfect combinations [1]. To get some quantitative results for deploying personality tests, Adler [1] mentions company which has taken an in-house Enneagram workshop and they increased their productivity by 5-10% after the program. However, the same company does not find the test absolutely reliable – they used Enneagram for hiring and they hired a wrong person – as they later found out, the person was lying on the test. If I as a leader used such a test, I would always have to rely on my own feelings and not purely on the results as it might be incorrect. Also, although the tested person might be in the right type with the right wing, we shouldn’t expect there is theory which would be 100% accurate and for some people there is not just one “box” – no single decision should be based purely on a test.

I see a good potential on using the Enneagram in business as I believe business is about people and not about numbers. When the relationships work then the numbers can be good.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>CHARACTERISTICS</th>
<th>MANAGERIAL ORIENTATION</th>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>One: Reformer, Perfectionist, Idealist</td>
<td>Wise, Realistic, Reasonable, A Principle Teacher</td>
<td>By the Book, Leads by Example, High Standards</td>
<td>Idealism, Reasonableness, Objectivity</td>
<td>Intolerance, Obsessiveness, Puritaniuess</td>
</tr>
<tr>
<td>Two: Helper, Giver, Mentor</td>
<td>Disinterested, Altruistic, Caring, Nurturing Helper</td>
<td>Cheerleader, Appreciators, Management by Encouraging Others</td>
<td>Disinterestedness, Empathy, Generosity</td>
<td>Manipulation, Control, Feeling Victimized</td>
</tr>
<tr>
<td>Three: Motivator, Performer, Producer</td>
<td>Authentic, Self-assured Person, Outstanding Performer</td>
<td>Task Oriented, Belief in Authority, High Profile, Autocratic</td>
<td>Inner-directed, Adaptability, Ambitious</td>
<td>Opportunism, Duplicit, Vulnerability</td>
</tr>
<tr>
<td>Five: Thinker, Observer, Sage</td>
<td>Pioneering Visionary, Perceptive, Knowledgeable</td>
<td>Philosophical, Well-informed, Detached</td>
<td>Understanding, Involvement, Expertise</td>
<td>Rejection, Distortion, Derangement</td>
</tr>
<tr>
<td>Six: Loyalist, Trooper, Partner</td>
<td>Self-affirming, Engaging, Committed, Loyal</td>
<td>Reckless, Protective of Inner Circle, Ally</td>
<td>Self-Affirmation, Engagement, Cooperation</td>
<td>Insecurity, Over-reaction, Misconduct</td>
</tr>
<tr>
<td>Seven: Generalist, Visionary, Futurist</td>
<td>Energetic Appreciator, Enthusiastic, Accomplished Generalist</td>
<td>Management by Juggling, Walking, Avoid Ambiguity, Networking</td>
<td>Gratitude, Enthusiasm, Productiveness</td>
<td>Disillusion, Compulsion, Glibness</td>
</tr>
<tr>
<td>Eight: Leader, Advocate, Boss</td>
<td>Magnanimous Hero, Self-confident, Constructive</td>
<td>Authoritative, Blunt, Contemplative</td>
<td>Self-Respect, Self-Confidence, Influential</td>
<td>Ruthlessness, Recklessness, Destructiveness</td>
</tr>
<tr>
<td>Nine: Peacekeeper, Mediator, Diplomat</td>
<td>Self-possessed, Receptive, Supportive</td>
<td>Participatory, Inclusive, Sharing-orientation</td>
<td>Autonomy, Non-aggressiveness, Supportive</td>
<td>Neglect, Disinhibition, Self-abandonment</td>
</tr>
</tbody>
</table>

Fig. 2. Description of Enneagram types [3]
and increasing while bad relationships can destroy the whole company, especially when we talk about small businesses. The Enneagram could also be a very good tool for motivating employees in a small company. Money does not need to be the main motivator and there might be some better motivators based on the personality type. For example, type 7 could appreciate flexible work hours while type 3 could be happy for a vision of a promotion.

Conclusion

The Enneagram is a very old method of dividing different personalities into nine groups and each of the groups can have a wing to the other one. People may behave differently when they are under stress or when they feel safe. There are not many sources on the reliability of Enneagram but from those available I believe it is a reliable method of personality testing, although in our country sources on Enneagram can be mostly found in “esoteric” or “spiritual” section. In my opinion it is caused by the youth of the system and this will change as the theory will get into practice. Using Enneagram may be a very useful tool in small businesses as each employee and his/her performance is very important and these people can not be substituted easily. In my business I would prefer to use it to get to know people’s motivators and to build the right teams. In comparison to large corporations, I believe the Enneagram system could be used only in much decentralized corporations – in the classic ones all results usually turn into numbers in a system and there is a lack of individual approach. It could cause more damage than profit. Such an approach is much easier in small businesses where I believe Enneagram is the right way to help doing business better and develop sustainably!

References

SUSTAINABLE DEVELOPMENT AND SOCIAL RESPONSIBILITY: NEW CHALLENGES AND OPPORTUNITIES FOR COMPANY’S REPUTATION

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Abstract

The sustainable development paradigm emphasizes the need to redefine the term development. Sustainability in products, processes and services has been increasingly emphasized by placing environment at the center of some industrial transformations. These transformations are characterized by economical, social and ecological changes which have to be harmonized with the basic values of society. Many well-known corporations have been subjected to international pressure to ensure that the welfare of the employees manufacturing their products (generally in third world countries) is considered and enhanced. Corporate social responsibility is the form of purposeful activity, which is made by organizations to attract the strategic stakeholders (consumers, partners, employees, local community, public institutions). Despite of significant difficulties in the development of socially responsible management in Ukraine, we have identified the possible prospects of socially responsible business. The results of researches allowed defining the core characteristics of socially oriented enterprises. These characteristics can be used in the process of identifying the levels of social orientation of enterprises. We identified a set of quantitative and qualitative indicators which can estimate the state of socially-oriented business management. The results of calculating the integral indicators of socially-oriented management allowed defining the coefficients which show the level of company’s reputation.

Key words: management, sustainable development, corporate social responsibility, company’s reputation.

Introduction

The dominant tendencies in development of the global business community confirm the importance of corporate social responsibility. The discussions about the content and significance of social responsibility have been passed in leading academic and business circles since 60s years.

As mentioned in the Report about development of social responsibility in Ukraine, corporate social responsibility is one of the key factors for building an effective dialogue between the government, business and civil society [1]. The development of corporate social responsibility displays the level of partnership between companies, governments and main persons of civil society in solving social problems and accelerate the development of society.

Corporate social responsibility is the form of purposeful activity, which is made by organizations to attract the strategic stakeholders (consumers, partners, employees, local community, public institutions). The main task of this cooperative activity is to provide legislative implementation of organization mission and vision by voluntary and targeted social investments to solve social problems in the long-term perspective.

1. Preconditions for Sustainable Development of Companies

1.1. Social Responsibility as a Component of Sustainable Development

The development of modern economic science is aimed at providing the sustainable economic growth by achieving social, economic and environmental priorities of society. The doctrine of “sustainable development” ensures inter-generational equity (better quality of life for present and future generations). The interaction of social and economic components requires to achieve fairness (equal distribution of wealth among groups or individuals) and legal assistance for poor people. The integration of ecological and economic components requires assessing the anthropogenic impacts on the environment. These components contribute to human welfare, both directly and indirectly, and therefore represent part of the total economic value of the society. Integration of science and business seeks to integrate the economic, environmental and societal aspects to achieve sustained financial success, safeguard the environment and develop the company’s reputation as a respected corporate citizen.

1.2. Corporate reputation

Corporate reputation is the concept that focuses on held company’s profit based on its ef-
effective partnership with internal and external stakeholders. Corporate reputation is formed by the company’s various publics on the basis of information and experience. The company may have a slightly different reputation with each stakeholder according to their experiences in dealing with the organization or in what they have heard about it from others. Many companies put the importance of a good reputation to the back of their minds while they attend to more hard-edged, day-to-day urgencies. On the other hand, many organizations consider their greatest asset to be their good name or reputation. This is especially true in knowledge-based organizations such as professional services firms in the consulting, legal, medical and financial sectors. They work actively to build their good reputation, to develop their core competencies.

2. Challenges and Opportunities for Company’s Reputation in Ukraine

2.1. Components of Corporate Social Responsibility

We have conducted extensive researches of 57 Ukrainian industrial enterprises, being different by size, ownership, sectors of industry and regions. The results of researches are based on surveys and questionnaires of managers. 175 persons were involved in the process of the research, 75 of whom worked by managers in big companies, 46 in medium enterprises and 54 in small firms.

At present, majority of companies perceive the social responsibility as the direction of internal social programs. Such social programs aim to meet the needs of staff for providing decent wages, health and safety personnel, training and development of human resources (Table 1).

Table 1. The features of social responsibility perception by managers in Ukrainian companies

<table>
<thead>
<tr>
<th>The components of social responsibility</th>
<th>Small (till 50 persons)</th>
<th>Medium (50-250 persons)</th>
<th>Big (over 250 persons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concordance with social standards in the sphere of employee payment and personnel safety</td>
<td>70,5</td>
<td>66,5</td>
<td>63,1</td>
</tr>
<tr>
<td>Training and staff development</td>
<td>68,4</td>
<td>50,8</td>
<td>56,2</td>
</tr>
<tr>
<td>Meeting the needs of customers for product quality</td>
<td>58,7</td>
<td>43,5</td>
<td>47,8</td>
</tr>
<tr>
<td>Payment of taxes and fees to the state budget in time</td>
<td>40,9</td>
<td>38,6</td>
<td>36,9</td>
</tr>
<tr>
<td>Creating new jobs</td>
<td>9,5</td>
<td>16,8</td>
<td>34,8</td>
</tr>
<tr>
<td>Reliability in relations with partners and customers</td>
<td>26,5</td>
<td>19,9</td>
<td>34,7</td>
</tr>
<tr>
<td>Openness and transparency of activities</td>
<td>26,5</td>
<td>18,6</td>
<td>20,4</td>
</tr>
<tr>
<td>The implementation of environmental programs</td>
<td>3,4</td>
<td>11,8</td>
<td>15,4</td>
</tr>
<tr>
<td>Charity</td>
<td>3,2</td>
<td>8,9</td>
<td>12,6</td>
</tr>
<tr>
<td>Meeting the demands of shareholders and investors</td>
<td>10,4</td>
<td>28,5</td>
<td>29,6</td>
</tr>
<tr>
<td>The development of social infrastructure</td>
<td>1,2</td>
<td>19,5</td>
<td>26,7</td>
</tr>
</tbody>
</table>

2.2. Challenges and Incentive Measures for Promoting Business Social Responsibility in Ukraine

We have analyzed the factors which hinder the development of social responsible management in Ukrainian enterprises. According to survey we have found that the main obstacles for the development of social responsibility industry are lack of financial resources, absence of the acceptable legislation, low level of motivation in business (Figure 1). In addition, the lack of appropriate tax incentives in state leads to loss of interest of Ukrainian enterprises to implement the social responsible programs.
Despite of significant difficulties in the development of socially responsible management in Ukrainian enterprises, we have identified the possible prospects of socially responsible business in Ukraine. These results showed that tax relief, reduce of regulatory and administrative pressure are the most important incentives to develop the social responsible business in Ukraine (Figure 2).

2.3. Basic Characteristics of Socially-Oriented Companies

The results of researches allowed us to define and systematize the core characteristics of socially oriented enterprises:

1. Presence of harmonized management system which includes values and strategic goals of social responsible activity. This statement characterizes the capabilities of enterprise to harmonize its activity with the strategic interests of stakeholders. It should assess the needs of staff, owners and investors.

2. Positive dynamics of key financial and economic performance of companies over the past 3 years. Government spending increased sharply as an increasing number of unprofitable enterprises required state support in Ukraine.

3. Implementation of social responsible policy development by enterprises. Such policy must be aimed to the implementation of mandatory social benefits (social benefits according to national legal system, benefits to Social Insurance and Pension Funds etc.).

4. Meeting additional social needs of workers by improvement of life-limiting conditions, benefits of long-term housing loans, payment of financial assistance, getting health insurance and medical care etc.

5. Development of social infrastructure. Social infrastructure is a subset of the infrastructure of the enterprise and typically includes assets that accommodate social services. Ex-
amples of social infrastructure assets include medical centers, recreation and health centers, kindergartens, cultural institutions, housing etc. Social infrastructure characterizes the level of enterprises social activity. In Ukraine only big comprehensive companies with employees more than 500 persons have modern social infrastructure.

6. Effectiveness of corporate policy in health and safety personnel, including comprehensive technical and organizational measures, appraisal jobs, training and testing of employees, reducing the number of accidents and fatalities etc.

7. Training and staff development through a variety of training activities, including training as individual learning, training of various categories of personnel, coaching, mentoring and other forms of training.

8. The financing of social projects related to the charity, sponsorship and patronage. Implementation of this component describes the development of philanthropic responsibility of the enterprise to internal and external stakeholders.

9. Effective environmental policy of the company. The policy is the corner stone of its intent to reduce its carbon footprint, improve recycling, reduce reliance on packaging, minimizing waste, improve efficiencies on finite natural resources in all of the company’s operations and all departments.

These characteristics can be used in the process of identifying the levels of social orientation of enterprises. We used the A. Shyhverdiyeva and A. Seryakova’s approach to determine the quality index of social investments [3]. So the quality index of social orientation of any company (SOI) can be calculated by formula (1):

$$\text{SOI}_i = \left(\frac{1}{m} \sum_{i=1}^{m} X_i\right) \cdot 100\%$$

(1)

where

- $X_i$ – a boolean variable, which can be used to hold the integer values 0 or 1;
- $m$ – number of attributes of social orientation of enterprise.

The calculation of degree of availability $j$-th attribute in the statistical sample of companies can be made by formula (2):

$$\text{SOI}_j = \left(\frac{1}{n} \sum_{i=1}^{n} X_i\right) \cdot 100\%$$

(2)

The calculation of these indexes allows determining the appropriate level of social orientation of company. We propose three levels of social orientation of enterprises: unsatisfactory (SOI $[1–30]$), acceptable (SOI $[31–60]$), optimal (SOI $[61–100]$).

Creation of conditions for socially oriented management of enterprises requires the investigations of measuring the impact of corporate social responsibility on business reputation. According to fundamental scientific researches in the area of social responsibility [4, 5, 6] the business reputation is a valuable treasure. Some people make the argument that company’s profit is one of the factors that gives a company a positive reputation. However, a company’s reputation is often one of the factors that contributes to its ability to make profits in the first place. When companies are known to be reputable, customers feel more comfortable doing business with them. Consequently, shareholder value rises along with a company’s bottom line. Companies who invest in social projects, such as development local communities, can expect a very positive return on this investment.

Measuring the corporate social responsibility is one of the main conditions of the effective modelling the impact of social indicators on business reputation’s level. In economics, a model is a theoretical construct that represents economic processes by a set of variables and a set of logical and/or quantitative relationships. We identified a set of quantitative and qualitative indicators which can estimate the state of socially-oriented business management. We have analyzed the performances of 16 mechanical engineering companies for the period 2004–2009. The complex and ambiguous dependency between different groups of quantitative and qualitative indicators was defined. In such way we decided to use the methodology of fuzzy sets in the analysis of parameters that have indirect statistical relationships among the indicators of measuring of corporate social responsibility.

Conclusions

Corporate social responsibility is the form of purposeful activity, which is made by organizations to attract the strategic stakeholders (consumers, partners, employees, local community, public institutions). Despite of significant difficulties in the development of socially responsible management in Ukraine, we have identified the possible prospects of socially responsible busi-
ness. The results of researches allowed defining the core characteristics of socially oriented enterprises. These characteristics can be used in the process of identifying the levels of social orientation of enterprises. The results of calculating the integral indicators of socially-oriented management allowed defining the coefficients which show the level of company’s reputation. The most important activities which impact on the corporate reputation are good business practice in relation to suppliers and other business partners, competency management system, charity and sponsorship activities, regional employment rate. The main quantitative indicators which impact the company’s reputation are net income, net assets, social costs on social welfare programs in relation for netted income etc.

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REENGINEERING OF HUMAN RESOURCES ON THE BASIS OF SUSTAINABLE DEVELOPMENT

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Abstract

The article concentrates on the concept of reengineering of business processes, which incorporates a large-yield potential for reformation and modernization of various economic systems. It analyses peculiarities of the current stage development of reengineering, based on cognitive approach. It also covers the importance of creativity potential of the employees as a efficiency increase factor.

Key words: creative potential, cognitive science, business-process, the system approach, cognitive reengineering, cognitive management, reengineering, self-learning organization, creativity.

Introduction

McKinsey survey revealed that as much as 70% of the corporate M&A failures sprout from human behaviour, since mere modification of business-processes, structure and strategic goals renders insufficient. It is of paramount importance to revise the essence of the staff day-to-day working environment. Success (or failure) of any organization depends not only on the quality of goods manufactured and services rendered, but also the speed on innovation applied. Modern organizations require new ideas, approaches, viewpoints and hence – open-minded people ready to embark on that.

Creative, imaginative, zetetic and not-easy-to-manage person are the key component of the efficient manufacturing process. Up to 40% of GDP in the developed countries is generated through work of creative staff. Proper application of skills, talents and perks of the talented staff members enables organizations to boost innovation and therefore increase the quality of services/products. Creative potential of employees becomes the major pulling power for successful development of an organization, its efficiency pillar and stairway to achievement of strategic goals.

Results and Comments

Re-engineering of business processes within the organization is based on the use and development of the creative potential of the employees. To ensure that staff is able to contribute not only to the aims of the organization but can be held answerable for the results it is important to understand the degree of creativity applied and thus to have a tool to measure that. Evaluation itself will become possible only in case the working environment meets the necessary conditions.

Employee creativity is defined as ability and determination of the staff to meet challenges and achieve business goals. One generally defines two basic approaches: motivated and non-motivated. Within the motivated approach creativity reclines against knowledge, choice of methods, social criteria, culture etc. In the second case knowledge may not be put as a key factor and thus creativity comes through intuitional actions through trial and error method.

Solving of a particular business-case one meets with the contradiction between the necessities of the re-engineering and actual availability of resources. One the one hand this drives the internal creativity of each of the employees, and on the other hand it propels holistic approach within the whole organization.

Reliance on creativity can originate through joint efforts of many people that drive the set up of separated groups of creative professionals in the form of teams – which appears to be the most widely-spread type of such union. Joint cooperation should provide for proper application of skills and perks of a single employee, realize his/her human potential, be complex and comprehensive, leave room for autonomy, self-education and be properly remunerated.

Effectiveness of an organization based on creativity is driven by the atmosphere of working environment. Should the latter be healthy, it will boost creativity through trust, open-mindedness and the spirit of competition. Reserved characters, ambiguity and mistrust are the characteristics of the non-efficient organization, which can-
not function properly and will most unlikely develop its employees' human potential.

Team development is done via coaching on both top management and employee level, as it help team member sot recollect, become closer, though which a team becomes capable of duly and proactively meet the challenges and cope with critical situations.

Team job is a link between a single employee and an organization. Team initiatives can be viewed as catalyst for both personal development of staff and a way to achieve corporate goals. Therefore development of the management team is essential for manpower productivity on the organizational and individual scales. Gradually, such teams will become the decisive factor in shaping of a organization's competence and drive its strategic development. Therefore, team set up is an inevitable part of an organization’s development.

It should be noted that current systems, models and processes of creativity management deem to vary due to differences of strategic goals of different companies and experience, knowledge and resources of those entities.

Management of creativity can be arranged as a separate business-process or be integrated into general business processes of an organization. They may be linked to the human resources management that can be achieved via quality management (knowledge, creativity) or via quantitative measures.

These processes can be positioned as a driving force themselves as well as a response, since teams deem to link realization of the strategic goals with individual change.

It is important to underline that a team acts as originator, sponsor as well as implementer of the strategy. The process of modelling, use and development of creativity should encompass all teams and employees, as in the contemporary elastic organizations (those that lack middle management and have broad responsibilities of team members) the difference between employees and managers are blurred.

Any change impacts various interested parties, with managers often disregarding the human factor. One generally takes into account the change in product assortment, market conditions and new technologies during the growth, decline of reorganization of an organization. It is assumed by default that employees adapt to these changes. However, such changes may tell negatively on the working environment and relation-ships between team members, that reflects in their professional judgment and behaviour, which is also sometimes omitted by management.

Major shifts lead to a mix of reaction from different people. There exists an efficient equilibrium: 20-60-20 [1]. It implies that any major shift in strategy inspires 20% of employees, 20% are generally against any changes and these are the 60% that are the cornerstone of the success/failure of the undertaking. Many surveys reveal that the lion’s share of the changes does not lead to the anticipated results: capitalization growth, market share, cost reduction or access to new market niches.

There are many reasons to failure with non-acceptance of the change by employees being one of the key. An organization does not change unless there is a change in mentality of staff. By altering the behaviour, management generally faces emotional reception based on different aspirations of various people.

Our own research in this field drives us to the conclusion that emotional reaction of employees, their viewpoint are not merely crucial, but are of paramount importance for the success of a change. Measuring of the personal attitudes would enable the management to make timely adjustments to strategy to make sure that the ultimate goal is reached.

Re-engineering of business-processes is part of the management innovations that must be carried by the gifted employees and managers. This would enable the organization to proceed with implementation of its strategy.

The launch of the re-engineering should be commenced with posting answers to the following questions:

- How to convince employees to the necessity of re-engineering?
- Are the internal environment and general methods of an organization adequate to the nature of the changes undertaken and what exactly should be amended?
- Which new skills and abilities are crucial to ensure that employees can successfully perform the planned enhancements and which type of training is essential?
- To which extent the corporate structure, business processes and remuneration levels are adequate to the sheer state of the change promoted?
Therefore, it is not the company that is being re-engineered – it is staff. The following roles are generally assigned within re-engineering [4]:

- **Leader**: a senior executive who validates the re-engineering and ensures motivation;
- **Process manager**: a person, answerable for a particular process and its re-engineering;
- **Re-engineering team**: a group of people (team) that investigates the current status of the existing process, its peculiarities and is involved in its refurbishment and implementation of new rules, procedures etc.;
- **Organization committee**: a body, consisting of a number of senior executives, who elaborate and determine the general strategy of re-engineering and monitor its implementations step by step;
- **Head of operations**: a person, who is responsible for coordination of efforts within an organization within re-engineering of various business processes to ensure continuity and synergy between them.

The leader appoints the Process Manager, who in his turn assembles the team that conducts re-engineering with the help and with concurrence from the Head of Operations with support of the Organization committee.

However it is the Leader who gives green light to the re-engineering process and attains its ultimate goals. By being a senior executive with sufficient internal authority. Having a view of the post-re-engineering structure, the Leader inspires all employees with ambition. Motivated and dedicated Leader is the cornerstone of the re-engineering. He also appoints the process managers, formulates key bullet points of the go-ahead plan and creates the business environment within the Team by serving as a living example of ambition, proactive management and cognitive approach. The Leader combines team members out of the best employees available, removes those who oppose/make a poor contribution to re-engineering. Therefore, most of the re-engineering failures are direct result of poor leadership.

The Process Manager is responsible for re-engineering of a single process and is obliged to create a working environment for the Team. He manages resources and removes the red-tape as well as tries to communicate and interact with of the process managers whose functional groups may fall within the scope of a given business process.

The Process Manager motivates, inspires and renders support to its team members, as well as acts as initial reviewing authority. On the other hand, he acts as intermediary in case ideas of his team are criticized by other process managers to allow his team members to concentrate on re-engineering.

The actual re-engineering is anyway carried out by the team, which must generate ideas and transform them into plans (and execute those plans as well). This is the real power that transforms the organization.

A single team can conduct re-engineering only of one process. That is why a number of teams must be set up in case more than 1 process is subject to re-engineering. In order to act efficiently a team must consist of 5–10 members [3], who are subdivided into two sub-groups: (1) those who perfectly know the process and (2) those who are not involved with it.

Employees from the first sub-group are important to understand the aspects that are subject to change. A Team should be arranged to be self-sufficient in terms of internal management.

To ensure the ultimate success team members must working in a single room space, since re-engineering stipulates vast brainstorming and team work – sitting in separate cubicles may hinder the whole process. The team must be capable of working with comprehensive and ambiguous issues, not be afraid to make mistakes and be able to learn from that experience. Statistics show that each team member must dedicate at least 75% of his working hours to re-engineering otherwise failure is imminent. All day-to-day activities should be left outside the team-room, all the business ties to internal processes should also be torn asunder in order to fully concentrate on the re-engineering.

A team is supported by an additional group of employees which participate in re-engineering on the part-time basis and execute more specialized tasks. These can be specialists with insight into generalized field (IT, HR, PR).

Head of operations has a two-fold objective: the first one is to ensure the flawless operational efficiency of the process managers and the teams; the second one is to coordinate the whole re-engineering process. He also monitors performance of the process managers during re-engineering and has the authority to initiate intra-team discussions.
Employees’ day-to-day environment is greatly affected by the change in business processes as many small positions become multi-functional within re-engineering, leading the fact that managers start to act as coaches, not monitoring authorities. Employees tend to dedicate more time to client needs, not to please their bosses. Employee values and its dedication to work also adjust to the new principles.

All team members constantly broaden their fields of responsibilities and authorities. Though the borderline between different job responsibilities is blurred, all team members will concentrate on their specific part and will not do the same, while retaining understanding of the whole process.

Re-engineering tends to exclude not only counter-productive costs, but also low added-value work that increases satisfaction and remuneration levels. Personal development within a team is not linked to hierarchy but to widening of the field of responsibilities. The old model was based on the principle “simple task for simple people. The new concept is dominated by another motto: comprehensive tasks for creative employees. After the re-engineering there hardly can be found a job with a simple list of tasks that raises expectations from the staff: they must show initiative, disciplined, motivated and suite the clients’ needs.

In the permanently changing environment it is hard to find persons who possess all skills and knowledge, and therefore constant training of employees is inevitable and should be inherent.

Effectiveness of employees and their remuneration are driven by the outcome of their job. In case the job is subdivided into a series of simple tasks the efficiency of an employee can be determined only on the basis of execution of those tasks. However, the problem is that the increase efficiency of execution does not necessarily lead to increase in efficiency of the project itself. When employees do something as a team the performance can be evaluated by analyzing the added-value they created. The remuneration comes in the form of a bonus, not salary increase.

Remuneration is becoming less dependent on the hierarchy of the position of an employee or number of subordinates/size of the managed portfolio or time spent “in the office”. It is derived from the positive impact on the performance of the whole organization and its efficiency.

Employees tend to refrain from sticking to their position, but effectiveness of the work they do. Re-engineering involves massive transformation in the corporate culture of an organization, not only in its corporate structure. Dominating corporate values should mirror the efficiency of the business processes [2]. Employees must be convinced that they work for their clients, not their immediate supervisors that should be reflected by the remuneration policy since this is the key factor which transfer corporate values to the staff. It should be understood that introduction of new processes will fail in case these values remain the same.

Contemporary re-engineering differs from the concept of the 1990s as it has been influenced by cognitology, which is defined as science that covers cognitive processes and consciousness, and the processes of interaction between perception, understanding, modification, imagination and reflection and self-education as well as modelling of artificial intellectual systems on the basis of the analytical, synthetic and synergy concepts. Informational, cybernetic, systematic and synergetic approaches are the methodological cornerstone of this approach [1].

Development of cognitology is going into such “irrational” fields as intuition and creativity. Business practice shows that there are many situations in which spontaneous decision are made, and subsequent consideration of such decisions reveals that positive outcome can be achieved even without thorough consideration and having a chaotic influx of data.

Understanding of the fact that competition has migrated from competition for natural resources to competition for intellectual resources has led to evolvement of the cognitive management concept.

Cognitive management is a systematic process management which concentrates on identification of knowledge, accumulation and distribution of data within an organization for efficiency purposes.

Principles of cognitive management:
- Knowledge originates and rests in the consciousness of people;
- Mutual use and application of knowledge is based on trust;
- Advanced technologies lead to development of new forms of cognitive behaviour;
- Knowledge is act of will through creativity and its development should be encouraged [1].

Information technologies assume a new role in the re-engineering process: they transform from being a mere instrument of innovation into the basis for the organization’s evolution, because even the most sophisticated IT background will render null and void without a significant change in the employee competence (responsibilities and authorities) and capabilities (skill, perks, etc).

Conclusions
Given the above the modern situation with Russian organizations requires new methods, which should be elaborated on the borderline of humanitarian and technocratic approaches that would provide for synergy from both. This new approach would be centred around state-of-the-art IT and technological solutions. It is essential to ensure the development of knowledge management concept alongside cognitive approach of human behaviour since that turns out to be the most sought-after instrument for modernization and innovation, ensuring full-scale use and application of human creative potential.

It is the cognitive re-engineering that meets all of the above requirements. Its key priority is to create a self-learning organization that will resemble an organization that creates, acquires, transfers and uses knowledge and know-hows and is capable of duly reacting and proactive responding to the challenges of the business environment.

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LEADER’S IMAGE IN AN ORGANISATION FROM THE SME SECTOR IN POLAND - BASED ON EMPIRICAL RESEARCH

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Abstract

A modern leader is not quite a Rambo of business but more a fifth level leader whose character is a paradoxical mixture of personal modesty and professional determination. The leader is shy but aggressive, unsure of himself but fearless. A fifth grade leader is a person at the very top of the managerial skills hierarchy, capable of leading the business on the path to sustainable success. The fifth grade leader is also the person who has left the effective leader on the fourth level. The effective leader “only” stimulates members of the team to work at the full speed in the strive for achieving its clear and inspiring vision of the future or a “competent manager” – at the third level - as the leader can “only” organise his resources to achieve this targets. The second and first levels are not worth mentioning [1]. This article has been written to present an image of a leader in an SME sector organisation – will the leader be the fifth degree leader or an effective leader or maybe only a competent manager?

Key words: leader, organization, SME sector.

Introduction

Technical progress and innovation make the world to change at a dizzying speed. The number of people who travel around the world exceeds all that we could imagine only 50 years ago. ICT remains right in the heart of the emerging global economy as it helps uniting and strengthening global production capacities, consumption and market needs. Apart from differences of race, ethnic origin and sex, there will be a larger differentiation of believers and religious practices, age, life style and broader participation of the disabled in a life of organisations. The pace of changes brings a question about the shape of the effective leadership model in such an unpredictable reality.

1. Reflections about the Essence of Leadership

J. Collins’s deliberations [1] lead to the conclusion that the author is very much confused in his understanding of the applicable leadership terminology. A leader, a manager – these are different levels of the same ladder. This approach is quite innovative. According to most analysis, these terms are considered antonyms in their full right. According to Koźmiński and Piotrowski, definitions of a leader and of a manager are very different. “Leader has a task (...) to set out a remote and ambitious goal and mobilise his people to follow that direction while a manager should be, first and foremost, capable of managing any processes which have been launched. Leaders set out the target and an exemplary manager leads their team effectively to achieve this target taking the best approach or road possible. Jasiukiewicz, Oczachowski, Soroka indicate that differences between a manager and a leader may differ depending on the source of their authority. “A manager enjoys a formal authority arising from the position which they occupy and which gives them a right to give, control and exercise instructions. Manager’s authority is technical in nature, based on their knowledge and motivation, while a leader has a personal authority based on his personal features [3]. In turn, Merlynn Beeman defines a leader as a person-oriented person and a manager as a resource-oriented person [4]. As much as it is possible to find a difference between a leader and a manager, the term “leader” means the same in all contexts. The literature on leadership uses the concept of a leader in various contexts. A leader can be a person who formally occupies an official position, who is generally recognised because of their position (hierarchy). The term “leader” can be also used in a less formal sense. Someone may be perceived by others as a leader. When trying to understand who a leader is, we can refer to sports, e.g. cycling or the popular Formula 1 car races where the winner of a race (or a stage of a race) wears the yellow leader’s shirt. There are some privileges that come with the shirt. This person is followed and shows the way. Gareth Jones, London Business School and INSEAD professor shares this view. He believes that a leader is a part of non-hierarchic leadership and cannot result from a promotion [5].
It is also interesting to learn that the management guru, Peter Drucker, has to say about leadership. In his opinion, leadership is now the latest cry of fashion. It seems that every general manager must look like Elvis Presley, while leadership is certainly important but, unfortunately, it is something very different from the features that are usually labelled as leader’s features. Leadership has little in common with “leadership skills” and even less with charisma. Leadership is down-to-earth, deprived of any romanticism and simply boring (...). Leadership is a means to achieve a goal. For this reason, the most important leadership question is a question about the goal (...). Effective leadership is: responsibility and not position and privileges, consequence and not cunning, effective leadership is hard work [6]. The real mission of a leader is to focus a particular attention on employees (their competencies, self-assurance, and work motivation) and not on themselves [7]. A contemporary leader must pay particular attention to optimal tailoring of their leadership style to the style of work of their team and the type of employees [8, 9]. A competent leader must appreciate the importance of new human capital management strategies, including variety management [10, 16]. Culturally varied groups need different leadership styles [12]. A contemporary leader is facing great challenges but also many limitations, significant opportunities but also many threats. And what, in the context of the above-specified expectations, is a leader of an organisation in the SME sector?

2. A contemporary leader of an organisation in the SME sector

My empirical research was to identify the image of a leader in the eyes of employees of an organisation in the SME sector in Poland. The research tool was a questionnaire of 21 questions, both open and closed. Men represented 36,92% of the research sample while women represented 63,08% of the same. They came from different age group and had different educational background.

1. First, organisations are in a great need of leaders – this opinion was expressed by 85,15% of respondents.
2. Second, anyone can be a leader, including our colleagues (Fig. 1).
3. Leader is the key decision-maker in a company. According to 86% of respondents, it is the leader who is responsible for decision-making.
4. In most cases, the leader influences a decision-making process through discussions and collecting opinions in the team and taking other actions (Fig. 2).
5. Typically noticed features of SME organisation leaders include: firmness, organisation skills, energy, ambition, self-assurance.
6. The least noticeable features of the leaders include: extraversion, arrogance, conformism, persistence and sense of humour.
7. Leader is a man of principles. According to most respondents, they are “responsible” (14,46%), “honest” (11,24%), “trustworthy” (9,24%), “respecting others” (9,24%).
8. The leader personifies model leader features behaviour. A leader is charismatic and also presents to employees his vision of developing the organisation and motivates them to work.
9. Leader influence a group in different ways. Typically, leaders show people their goals and targets and also encourage them to optimise their action (Fig. 3).
10. According to 85% of respondents, leaders motivate them to improve their performance at work.
11. A Polish leader has different ways of asking their staff to do things. The most typical style of a Polish leader is to give specific instructions “do it exactly this way” (according to 50,77% of respondents). According to 30,77% of respondents, leaders are supportive when asking their staff to do something “how can I help you” while, according to 18,64% they give orders “you must do it”.
12. A leader remains cool, calm and collected when under stress which should be certainly considered to their advantage. It has been appreciated by employees as shown on the Fig. 4.
13. Most respondents look at their leaders with a kind eye. Feelings they show in the “me and the leader” relation are presented on the Fig. 5.

Conclusions – a bit on the funny side

The following conclusions can be drawn on the basis of facts collected in the research:

- there are no doubts that the boss is the leader,
- the leader tries to ask their colleagues about their opinion,
- leader rules by instructing their staff,
- a colleague may become a leader,
- a leader has a large impact on the decision-making process,
- the leader has a large impact on a group/team,

- in a company, a leader is perceived as a firm, energetic person and a good organiser,
- outstanding leader’s competencies include: self-assurance and employee motivation skills,
- leaders motivate by encouraging improving performance and showing the
target,  
in crisis, a leader is perceived as a support and a person capable of staying calm while trying to control the situation,  
- leader’s principles are predominantly responsibility and honesty,  
- a leader is perceived as a colleague or a nice person,  
- 70.38% of respondents do not believe they are leaders.  
Leaders according to employees - below find some (selected) drawings made on request by members of some SME organisations (Fig. 6).  

Source: own study  

Fig. 6. Leaders according to employees- in a little funny way  

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PSYCHOSOCIAL WORKING ENVIRONMENT (CASE STUDY)

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Abstract

The material environment is an integral part of working conditions and plays an important role in the life of each employee, since it affects their life activity and professional activity. This is due to close correlation, which exists between the level and quality of work. The quality of work is one of the fundamental elements that generate the overall quality of life. The working environment is a stimulating, directs and organizes human activity. It has a relative meaning, since it refers to a specific entity. In any working environment, there are varieties of psychosocial factors, which decide on its level, they are constantly changing under the influence of new technologies and changing economic, social and demographic conditions. The paper presents psychosocial working conditions and their impact on its functioning on a basis of a selected occupational group.

Key words: material environment, working conditions, psychosocial factors, mobbing.

Introduction

The problem of man in the work environment is of interest to many scientific disciplines (e.g. economics, sociology, psychology). Each of them deals with the analysis of another part, the aspect of human interaction with the working environment, depending on what otherwise define the concept of labour and the environment, and uses a variety of methods and tools in their research.

Considering the needs of each of people it should be noted that, consciously or unconsciously, people endeavour to act in such a way as to adapt the surrounding environment so its particular elements foster realization of people’s assumed goals. In many cases, it is difficult to achieve since most people’s correlation with the environment can take two very different aspects. This may be due to the fact that the individual does not always have an impact on the conditions under which it will operate, particularly in relation to the work environment being an integral part of working conditions. In this aspect, the decisive role is played by the decisions of superiors, which unfortunately does not always benefit the employee.

Issues concerning the provision of working conditions at the appropriate level, i.e. which will allow for safe and hygienic work, are particularly important because largely they determine the performance and efficiency of workers. This is due to the fact that the work environment is a stimulating guide policy and organizing the activities of the individual. At the same time, it has a relative meaning, since it refers to a specific entity. The working environment is a part of the human environment. In addition, there arises a specific system of relations of people working together in order to accomplish specific tasks arising out of employment.

The nature of the work environment depending on the specific profession is quite diverse. The result is that in some professions, the nature of work environment carries significant psychophysical burden affecting the regulatory systems of workers, which are reflected negatively on their quality of life and health and quality of their work. Usually it applies to the so-called support professions, which main purpose is helping other people (e.g. doctors, teachers, social workers). A characteristic feature of human-oriented profession is also a fairly large disparity between the giving, and taking on a psychological level, which means that the costs incurred by the employee for discharging professional duties normally do not exceed the salary received. Added to this, specific type of liability related to both, own standard and high social expectations to people performing these kinds of professions.

The article presents the psychosocial working conditions for teachers. Particular attention is given to stressors in the work environment of teachers and the impact of the working conditions on the teachers, both those presented in the literature and obtained as a result of own research in this field. The article also addresses the phenomenon of bullying that is increasingly emerging in the teacher work environment.
Characteristics of the teaching profession

In the scientific literature, the teacher as a profession is mentioned among the main groups belonging to the human-oriented profession [4] whose main feature is constant contact with another person who is not always nice and positively received by both, the employee and his/her client or ward. Work in these occupations always causes a much greater burden for the individual performing it than in other professions. Teachers are a special group because even though the social recognition for their work according to CBOS research from 2009 is quite high (70% of respondents positively perceived the teaching profession, and has respect for the teacher), yet they themselves completely different recognize their work. This will primarily be related to the belief of many people that work performed by teachers is easy, fun and does not require much effort. Another argument is that teacher’s direct time of work is much shorter than employees of other professions. In addition, lots of free time and not bad earnings are listed. Few people notice the various burdens occurring in the teaching profession. The basic interactions include teacher - pupil, they are often difficult because at each school there are students with different needs, different family situation and educational problems.

Moreover, among other negative psychosocial factors in the work environment one can include stress, bullying, constantly changing regulations, fear of job loss, changes in the education system, low status of teacher and limited opportunities for promotion after achieving graduate teaching level and more and more responsibilities not related to the work of teaching, but paperwork.

Looking objectively at the workload of Polish teachers, the real, weekly hours of work are contained in the Teachers’ Charter which perfectly describe it. Currently, teachers’ working time for full time may not exceed 40 hours per week. Within this time the teacher is obliged to perform:

- teaching, nursing and educational activities,
- other activities resulting from statutory of the school (e.g. junior high school teacher cannot refuse to teach hours which are assigned in mainstream education programmes),
- activities and operations connected with the preparation of the lesson, self-education and professional development.

Commonly known, the basic quota of teaching hours in Poland amounts to 18 hours per week plus two hours of unpaid extra-curricular activities. In comparison to other European countries, it can be adopted as a moderately high [8].

The term psychosocial work characteristics with particular reference to the work of teachers

Until recently, psychosocial work characteristics were not taken into account in determining the most important factors influencing health and well-being of employees.

The psychosocial characteristic of the work is divided into two categories. The first of these are known as salutogenic working conditions, that is, those which can positively affect the health of individuals. The second includes the so-called psychosocial risks that are at the core of this article. This term means any kind of stimulus, or any situation, which through psychophysiological processes may result in deterioration of general condition of employees and reduce their productivity.

Among the main threats in the work environment of the teacher, not listed above, should be distinguished:

- unwell physical working conditions,
- inadequate organization of work,
- lack of social support,
- exposure to aggression from supervisors or colleagues,
- inappropriate relationship with the pupils parents or their absence.

While the main salutogenic factors include the above mentioned factors but in the positive aspect e.g. good physical working conditions. Generally, one can say that these factors always result in the appearance of stress with different levels of intensity, which may influence the employee positively or negatively. The level is usually determined by the teacher’s personality and the situation (for example, one teacher additional activities may consider as mobilizing and motivating, while in second one it may cause symptoms associated with stress).
Effects of exposure to occupational hazards of teaching environment

Analyzing the scientific literature it can be considered that commonly occurring negative consequence of increased psychosocial burden arising in the teaching profession is professional burnout. This process according to the Theory of Three-dimensional Burnout Ch. Maslach includes symptoms such as [1]:

1. Emotional exhaustion relevant to the considerable burden related to work. Sometimes it is so immense, that it may lead to physical exhaustion, mental breakdown of the regulatory system of an individual.

2. Decreased sense of own achievements, which is understood as lack of competence and professional success.

3. Depersonalization of customers of the institution where individual works, in this case, pupils and parents (such teachers have cynical attitude toward work, ignoring the problems of pupils).

Polish research on professional burnout of teachers indicates that this phenomenon in our country, in terms of the first two groups of symptoms, is at a comparable level as in other European Union countries. Differently, it is shaped in relation to depersonalization, in which the Polish teachers generally achieve worse results than teachers from other countries [7], this means that more and more teachers have reduced sensitivity to their students and their parents.

Among other frequently occurring consequences of burnout there can be listed:
- frequent interpersonal conflicts,
- sleep problems,
- diseases of the organ of voice,
- reduced involvement in work,
- cardiovascular disease,
- high level of morbidity,
- problems with high pressure.

Mobbing in the teacher’s workplace

Mobbing is one of the most important, yet having a major impact on employee health, stressor occurring in the workplace. This is relatively new phenomenon, which brings so far many uncertainties even in determining the consistent definition. In addition, there are various terms defining mobbing, except this term, there are also used terms such as: bullying, moral harassment, emotional abuse, psychological terror and harassment in the workplace. Apart from this, it is commonly known, that this term is closely related to the ethics of human resource management.

It is widely accepted that the term mobbing focuses on harassment and violence related to place of work and its performance [2]. At the same time specialists in mobbing agree on the fact that these activities are structured form of intentional mental torment that causes many adverse effects, both for individual (causing disturbance in the functioning of personal and professional employees - such as making mistakes or taking wrong decisions) for the organization (it may be reflected in less attachment and loyalty to the employer, the increase in turnover of employees) and social (they are due to the costs of mobbing, which are ultimately borne by society as a whole - for example, accelerated pension plan).

Certainly, beyond the scientific definition in many countries, there is a legal definition of this phenomenon. The definition in Polish legislation, in accordance with article 94 of the Labour Code, defines bullying as actions or behavior of an employee or against the employee, consisting of the persistent and prolonged harassment or intimidation of employees evoking his/her low opinion of professional life, causing or intended to cause humiliation of the employee, isolating or eliminating him from the team staff.

The literature mentions many examples of mobbing activities. Among the most common one can distinguish four main groups [4]:
- behaviour which tend to undermine the professional status (e.g. continuous, permanent),
- intentionally causing work overload (e.g. assigning too many tasks to perform at unrealistic deadlines, to interfere with individual work),
- leading to a lack of professional confidence (such as issuing conflicting orders, depriving responsible tasks, constant attention),
- isolation (e.g. preventing access to the necessary work materials, failure of passing important information).

One of the occupational groups particularly at risk of bullying in the workplace are employees of the education sector, which is confirmed by repeatedly conducted research in this direction. The reason for this phenomenon may be
such factors as the specificity of the teacher’s work, the need to adapt to the existing rules and high level of unemployment in the profession. According to research conducted by the European Foundation for the Improvement of Living and Working Conditions, percentage of bullying workers among teachers amounted to 6.5%. Higher results are oscillating from 7% to 9% were observed in only three other professions. The situation is similar among Polish teachers (nearly one in ten teachers has been bullied), which is confirmed by study conducted by the Central Institute for Labour Protection in 2008. In addition, more than half of surveyed had experienced hostile behaviour at work.

Similar results were also observed by the article’s author, who in late November and December 2011 conducted a study in four secondary schools in Opole district on the prevalence of psychosocial hazards in the teaching profession. The study involved 80 teachers. 60% of respondents said that they had to deal with hostile behaviour in their school, in the case of 7% of these behaviours, they were so lengthy and cumbersome that they met the diagnostic assumptions of mobbing. At the same time, every second respondent had experienced hostile behaviour from their colleagues (e.g. dissemination of rumours, false accusations, criticizing the methods of work), and every third person experienced it from the school’s headmaster (such as ridicule in the presence of co-workers, ostentatious disregard, devalue of the achievements).

The data clearly shows that the phenomenon of bullying and hostile behaviour is significant risks both for the teachers and for the institution where they work. Therefore, it is important to take preventive measures that will reduce to minimum the risk of harassment and hostile behavior. According to the experts on this issue, it is possible in two ways. First, through direct actions performed at a school where the problem occurred. The alternative or ensuring, are indirect actions, e.g. conducted by co-operating institutions. A common feature of both approaches is to direct all kinds of activities directly to the teachers and their physical and social environment.

Taking preventive actions should be based on anti-bullying programs. Such programs should be created by all employers, particularly by those who represent these professions in which the likelihood of harassment or hostile behaviour is high, such as the employees of education, or health care system. Well created, yet the optimal program should be based on the three-tier model, involving actions of primary prevention, secondary and tertiary. Primary prevention mostly includes educational activities aimed at increasing public awareness of the risks in the work environment and its negative consequences, and restricted activities (e.g. actions focusing on changes in management) that must be taken in specific organizations vulnerable, because of their specificity, to the presence of hostile behaviour and the phenomenon of bullying.

The purpose of activities undertaken in the area of secondary prevention is to prepare staff to cope with stressful situations that have occurred and reduce negative effects of stress. The objective measures of recent tertiary prevention is to help individuals, which, due to the stress occurring in the workplace, have their mental and physical health deteriorated, which does not allow them to normal functioning both at work and outside it.

Hazards in the work environment and the effects of teacher interaction (self-study research)

In a study on psychosocial hazards in the work of teachers, in relation to harassment and hostile behaviour, there has been also conducted studies to establish the basic organizational burden and the one resulting from inappropriate behaviour of students and cooperation with their parents. Efforts were also made to determine the consequences of the impact of environmental hazards in the work of teachers.

To develop the fundamental organizational loads, there were used questions presented in the manual called Questionnaire of Teacher Burdens [6], thanks to which, it was possible to define to what extent teachers undergoing survey, experience various features of their work environment as incriminating. 95% of respondents as the most significant burden find too low wages, which are not satisfactory for the performed work. This high response rate should not be surprising, since the Polish teachers are among the poorest earners in the profession in the European Union. For fundamental load, the majority of respondents (87%) also consider increasing amount of paperwork. In their opinion didactic work slowly, but steadily, goes to
second place. Among the other factors usually appeared the following:
- lack of support from the school headmaster (61%),
- constant changes in education policy (74%),
- work in large classes (59%),
- low impact on what happens in school (39%),
- overloaded curriculum (71%),
- little chance of promotion (62%),
- competition between teachers, which is not always on fair conditions (35%).

Some teachers as an important issue, acknowledged inappropriate relationships among educators of the institution. 55% of respondents believe that among their colleagues, there are people who perform only a minimum of their work and are not involved in the school matters, and that the pupils lose the most of it. Every sixth teacher believes that works with people who like to spread rumours. The same number of respondents also indicated that they work with people who use the ideas of others seeing them as their own.

Many surveyed teachers believe that equally important are the burdens associated with direct contact with students and their parents. More and more often they have to deal with such behaviour of pupils, which are contrary to accepted principles in the school, and also cause stressful situations. As the most common bad behaviours of students, teachers indicated: loud behaviour in the classroom, ignoring the teacher’s instructions, chewing gum, no activity, threat of another student, damaging school property, cheating during tests, using mobile phones despite a ban (especially the older class pupils). According to respondents, in many cases they are simply helpless, and these situations overwhelm them. It can be therefore concluded, that the serious, professional stressor is the one, which occurs regularly over a long period of time and can lead to professional burnout.

For a serious threat in their profession, respondents also consider contacts with parents or foster parents of pupils, which apart from teaching, are permanently inscribed in their duties. However, in many situations in order to properly help a child the teacher and parents have to work together (e.g. in the field of education), which can cause conflicts, because parents often do not want to take into account obvious matters. Most of the surveyed teachers (71%) pointed out important factors influencing the non-optimized contacts with parents as following:
- unrealistic expectations of parents regarding the educational progress of their children,
- lack of mutual trust,
- lack of adequate childcare and educational support from the parents (this factor, by the respondents, causes more stress than others, since the entire responsibility falls on teachers).

Furthermore, the validity of such charges provide the answer to the question of teachers state of mind after meeting with parents - every fourth declared that he/she felt tired. Often these responses were also irritability and helplessness.

Taking into account the objective burden of teacher work, respondents were asked how much time they spend a week at job. More than 60% of respondents stated that they spent between 35 to 40 hours. Over 40 hours were stated by¼ of respondents. This shows that, contrary to the common opinion, many educators devote as much time to their work as workers in other professions.

In conducting a survey there have been attempts to determine the effects of occupational burden experienced by the surveyed teachers. Among the most important consequences, the respondents indicated: trouble with sleeping, problems with hypertension, neurotic disorders, and frequent misunderstandings among the teachers. A large percentage also indicated burnout that is primarily manifested in the feeling of emptiness and lack of strength for further work, a sense of impersonality, cynical approach to the student and a sense of wasted time spent on work. Half of the respondents experiencing professional burnout in the past benefited from the annual sick leave.

Conclusion
The analysis of the literature and own studies on the occurrence of psychosocial hazards in the work environment, it can be clearly concluded that the work of teachers is subject to a number of psychosocial burden, which are not always perceived by the employees of other professions. Among them, are those, which are characteristic of all professions, and those that are specific to the workplace of teachers. The
consequences of these burdens are many negative effects, both in the personal functioning of teachers, as well as in the social aspect.

Analysis of own research indicates that for most, the teachers' working week is not as many people (it is commonly perceived by the society) believes 18 hours, but average about 35-40 hours. It is a well known fact that, as in any other profession, there are individuals whose time and performance leaves much to be desired. A large group of teachers indicated health problems that result from the specificity of their work, which shows they need to seek help from professionals both in the field of medicine and psychology (e.g., through participation in training to cope with dealings with coworkers, headmaster, students and their parents).

Reference

TRENDS OF INTERACTION BETWEEN URBAN AREAS AND HUMAN CAPITAL TODAY

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Abstract

Knowledge, culture, material and energy resources are concentrated in the urban areas, and there their interaction takes place, thereby providing a good basis for development. Although social, as well as health, and environmental problems exist in the urban environment, still closeness of the people, proximity of businesses and various services also mean greater opportunities.

Key words: cities, population, human capital, facilities, competitiveness.

Man and nature find themselves in constant interaction, and their relationship over time has been changing and diverse. Urban area is a reflection of these mutual relations, which has an eclectic character. The city can reasonably be regarded as the place where the most important global, political, economic and social processes take place. Cities and towns are the places where people, their knowledge, skills and abilities are concentrated, and there, as a result of human physical and intellectual development and activities, values are created.

Under conditions of limited global material and energy resources, the city becomes the dominant socio-spatial form of the society existence. The city is a special administrative, territorial, socio-economic and socio-cultural form of community existence. The city is characterized by the following features:

- large number of human concentration;
- high population density in a relatively limited area;
- building compactness (often multi-storey buildings);
- high human economic diversity and integration degree;
- greater part of the population is employed outside the agricultural sector [1].

The city is an urban area with its socio-economic environment and a relatively higher population density compared to the rural areas. Cities are characterized by dense construction of city infrastructure - streets, squares, transport networks, energy, water, waste management and other businesses. Social infrastructure and security services play an important role in the urban environment. Even a small town cannot do without medical institutions, emergency, rescue, social welfare and other agencies. Educational establishments and cultural institutions, e.g., nurseries, schools, universities, museums, theatres, etc. are mainly located in cities and towns [2].

Today the largest part of the world’s population lives in cities. The United Nations report “State of world’s population” emphasizes that 2008 became a very important milestone in the development of the world, because for the first time in human history, more than half of the world’s population, i.e., around 3.3 billion people, live in cities. It is expected that by 2030, this figure could rise to 5 billion people. This is evidenced by the statistics data that show that in the 20th century the urban population has been rapidly growing (see Table 1).

Table 1. Urban and Rural Population of the World 1950-2030 (population, billions) [6]

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</thead>
<tbody>
<tr>
<td>Total</td>
<td>2,52</td>
<td>4,07</td>
<td>6,09</td>
<td>6,46</td>
<td>8,2</td>
</tr>
<tr>
<td>Urban</td>
<td>0,73</td>
<td>1,52</td>
<td>2,84</td>
<td>3,15</td>
<td>4,91</td>
</tr>
<tr>
<td>Rural</td>
<td>1,79</td>
<td>2,56</td>
<td>3,24</td>
<td>3,31</td>
<td>3,29</td>
</tr>
<tr>
<td>Urban percentage</td>
<td>29,0</td>
<td>37,2</td>
<td>46,7</td>
<td>48,7</td>
<td>59,9</td>
</tr>
</tbody>
</table>

While the world’s urban population grew very rapidly (from 220 million to 2.8 billion people) over the 20th century, the experts predict that the next few decades will experience an unprecedented scale of urban growth in the developing countries. This will be particularly notable in Africa and Asia, where the urban population will double between 2000 and 2030. This means that the accumulated urban growth potential of these two regions during the whole span of the history of humanity will be duplicated in a single generation. It is expected that, in 2030, the urban residents of the developing countries will constitute as much as 80% of the total urban population across the world.
The significance of cities for the development of national economy continues to grow. The cities have a leading role in regional and national economic development, as they have become major drivers for economic activities. They focus on a large capital and intensive turnover of goods and services. In the cities decisions are made that determine the economic life, progress and development of the country.

The most important contemporary urban developments are as follows:

- population (labour force) mobility;
- capital mobility;
- information revolution;
- rapid and extensive dissemination of new technologies;
- transition to market-based principles of production of almost all goods and services;
- international trade and investment expansion;
- reduction of logistic costs;
- increased spatial differentiation, etc. [1].

All the above mentioned factors can have a direct impact on the fact, why more and more people are choosing to move to the cities. In principle, cities can offer their population higher quality of life, because of more favourable economic, social and environmental conditions. Cities generate new jobs faster, thus increasing people’s income. With good governance, urban population can be delivered education, health care and other services more efficiently than the rural population.

One of the most important gains of the cities is the variety of positive effects, resulting from business, human capital and creative people being relatively close together, for example, using a common infrastructure and labour market, creating new knowledge or building formal and informal communication. These positive side effects reduce the costs of innovation, promote their development and spread.

The pulsating urban life and its various options attract both the skilled and non-skilled workforce. If someone wants to build a successful career, he/she usually has no other choice, but to move to cities, where the best universities, companies and the government departments are located. Studies have shown that, in all countries of the world most of the gross domestic product is generated in urban areas. The higher the country’s level of urbanization, the greater the prosperity; the richer the country, the more people live in cities. In Latvia, more than 50% of the gross domestic product is produced in Riga, where the GDP per capita is almost twice the national average [7].

The urban areas must provide wide opportunities for education and for acquisition of valuable cultural heritage. The opportunities for human interaction in the cities are presented in Figure 1.

As shown in Figure 1, the urban population can make use of many benefits in a concentrated form, providing themselves a higher quality of life than for the rural population. The city offers its residents every opportunity to prove themselves, and to this end, local government should promote both entrepreneurship activities, thus ensuring revenue growth, and create a
harmonious, convenient and secure environment, as well as, help people integrate into society and realize themselves in the most acceptable and appropriate manner.

Human capital is a set of human knowledge, abilities and skills and the economic and social activity potential depends on it. The concept of human capital is mainly linked with individuals' economic behaviour, especially with the way in which their accumulated knowledge and skills increase their productivity and income, thereby increasing the productivity and income of the society as a whole. One of the founders of the concept of human capital G. Becker characterizes it as follows: the technological breakthroughs are unable to bring benefit to those countries where there is a shortage of qualified staff who know how to use them. Economic growth depends on the synergy between new knowledge and human capital. Therefore, better access to education and training is accompanied by the technological knowledge progress in all countries that have reached a significant economic growth [1]. Furthermore, in their researches such scholars as E. Glaeser, J. Scheinkman, etc. have shown that human capital is an important factor in urban socio-economic development. Human capital concentration at specified locations reduces the costs of transfer of knowledge and creation of new knowledge and ideas, thus increasing the productivity of individual companies, as well as, the entire region as a whole. In addition, higher level of education can reduce criminal activities and increase participation of urban population in public decision making at local and national level. In addition, today, in urban areas with developed knowledge, creativity and innovation capacities, including the ability to use them, socio-economic development is occurring faster. In the future, particularly in Europe, human creativity and innovation will play a more important role in fostering national, urban and business competitiveness [7].

In any city, its main functions have changed over time, while changing the city’s appearance and layout, leaving an impact on the city’s economic growth and social structure. When analyzing the urban functions, the American scientist L. Mumford stressed that “the chief function of the city is to convert power into form, energy into culture, dead matter into the living symbols of art, biological reproduction into social creativity.” [8, 14].

In the future, economic development will need to promote cities successfully as drivers of economic growth, which together with their regions can assert themselves as attractive locations. This aspect is of great importance, taking into consideration the increasing mobility of workers and enterprises, and the increased internationalization of the economy. Many cities have significant development potential, so that in today’s fast changing environment, they could establish themselves as places for successful knowledge, skills and social capital use. These locations serve as a basis for knowledge-intensive economic growth, for example, they do not offer only a wide range of services and the necessary infrastructure, such as universities, popular education establishments and research institutions, but also provide higher quality of life and cultural diversity for highly skilled and creative workforce.

In the research paper “Socio-economic development trends in Latvian urban areas” where 38 Latvian cities and towns were involved, it was found, that urban areas have sufficient human capital. Almost all cities and towns, involved in the research, indicated that they face a new trend of brain drain, leading to losses of young specialists. Taking into consideration that the socio-economic situation is not stable, smart and creative people from small towns look for opportunities to moving and finding jobs in larger cities, where they are offered a more competitive salary and better living conditions. The SWOT analysis is presented in Table 2.

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>- existence of human capital</td>
<td>- lack of qualified specialists</td>
</tr>
<tr>
<td>- developed employability</td>
<td>- outflow of people abroad</td>
</tr>
<tr>
<td>- highly educated workforce</td>
<td>- uncompetitive remuneration</td>
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<tr>
<td>- greater cooperation opportunities</td>
<td>- low ability to pay aging</td>
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<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
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<tbody>
<tr>
<td>- creation of new jobs</td>
<td>- deterioration of socio-economic situation</td>
</tr>
<tr>
<td>- increase in overall level of city infrastructure</td>
<td>- decrease of individual income level</td>
</tr>
<tr>
<td>- use of renewable energy resource</td>
<td>- overall public health, education and social deterioration</td>
</tr>
</tbody>
</table>

Table 2. Analysis of human capital and creativity in cities [made by the authors on the basis of 11]
In comparison to rural areas cities and towns have indicated that they have a developed educational system and better health care and social services, as well as, utilities and infrastructure services are more accessible and diverse, thus higher quality of life is ensured.

At the same time, the research found that the city of Riga still lacks a critical mass of creative people and international investments, to become recognized, as a centre of European significance, and resemble such cities as London, Paris, Munich, etc. In turn, other Latvian cities and towns lack the critical mass required for their development, so that they could provide companies with growing return on investment opportunities, and generate substantial, positive external effects in a variety of knowledge. The critical mass necessary for urban development should not be created by resource concentration, but rather by combining the resources of different cities with the transport and information technology infrastructure [11]. This would help to promote mutual co-operation between cities and towns. Nevertheless, within one region the majority of self-governments in the future plan tourism development, industrial development, and development of culture, sports and recreational activities, which lead to town seclusion, isolation and mutual competition rather than networking.

The urban environment and social, economic, political or environmental processes affect all the urban population, as well as the guests, so in the long run the winners or losers are all of them.

References
OVERVIEW OF CHANGES IN PUBLIC ADMINISTRATIONS OF LATVIA AND ESTONIA PROVOKED BY ECONOMIC CRISIS

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Abstract

The concept of sustainable development has many facets, all of them related in various ways to the current and future quality of human life. The core of the notion is the idea of an overall improvement of the living conditions of the society compatible with the needs of future generations. In this respect reforms performed in public administrations should encourage development of sustainable development principles first of all in the public institutions with future perspective in transformation of these principles in future policies. As we all now economic crisis has provoked changes in the public sector. Necessity to reduce budget expenses has led to situation with cut of number of public employees in different countries. It is clearly evident that financial crisis has encouraged European Governments to foster Public Administrations reforms during last two years. The purpose of this paper is to provide overview of changes in public administrations of Latvia and Estonia provoked by economic crisis and to look on the human resources management aspect, to understand whether actions taken are facilitating development of sustainable public administration.

Key words: sustainable human resources management, financial crisis, public administration.

Introduction

Salvador Parrado and Elke Löffler assure that in the current financial crisis of the public sector throughout EU Member Countries, sustainability has become the single most important issue for policymakers and public managers. Clearly, sustainability of public policy will also stay on the agenda of public administration for some years to come [1]. It is evident that sustainable development concept and definition is mainly focused on the results of policies implemented by public administration. There is not much empirical evidence on the sustainability of public administration as a resource. Therefore this paper analyses some economic development aspects of relatively small neighbour countries Latvia and Estonia in the period of economic crises, decisions taken by Latvian and Estonian governments and the current consequences in the light of historical decisions. This article shows that budget cuts and fiscal consolidation has caused human resource turnover in state administration institutions. This has facilitated to pay attention to several human resource management (HRM) instruments ensuring sustainability concept in public administration HRM policy. This article is based on empirical study of sustainable development concept and review of several economic development indicators of Latvia and Estonia.

1. Sustainable development concept in HRM

The concept of sustainable development has received growing recognition, but it is a new idea for many employers in the context of human resources management. For most, this concept remains abstract and theoretical, because of the broad definition. There are over 100 definitions of sustainability and sustainable development, but the best known is the World Commission on Environment and Development’s. This suggests that development is sustainable where it “meets the needs of the present without compromising the ability of future generations to meet their own needs”. This concept is investigated in a broader sense looking more on environmental aspect of sustainable development rather on human capital. Also Daniel J. Fiorino argues that a major deficiency in commonly used definitions of sustainability is the narrow way in which the political/social dimension is treated. The social imperative is defined narrowly as a matter of social equity and fairness rather than as a broader one of just and effective governance [2].

For the business enterprise, sustainable development means adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining and enhancing the human and natural resources that will be needed in the future [3]. It is evident that we can’t treat human resource management aspect differently in public administration and business because those responsible for results are human beings. According to Strandberg sustainable human resource management is the contribution HRM can make to sustainable development [3]. So when thinking
of sustainable development concept in public administration and human resource management we shall look how public policy planning and measurement can be coinciding with human resource planning and development.

J. B. Miner and D. P. Crane assure that human resource planning and policies have crucial role in overall institution strategy consequently in sustainable development in all areas [4]. Talented, satisfied and motivated people are critical to ensuring business grows to its full potential. That’s why it is so important during challenging and uncertain times for the public administration continue to build employee engagement. It is clear that highly engaged employees are more productive in their roles, which clearly results in improved business performance. There are variety of means how employees can be engaged, including: developing their skills, having a clear set of values, undertaking worthwhile community activities and having an objective appraisal system that recognises achievement and encourages development. According to Louis Taylor there are two major aspects for investigation in human resources development. First, organisations can only succeed in the long-term if they recruit and motivate people who are able to respond to and shape the challenges of the future. These are the individuals with the capacity to create competitive advantages from the opportunities presented by changing environment and who possess the ability to build and influence long lasting and effective partnerships. Second, all organisations should recognize that employees are motivated by a complex mix of factors. These include financial rewards and promotion and peer recognition.

It should be noted that not many researchers have paid systemic attention to the link between sustainability as a concept and HR related research or HRM. One of those who has studied this is Ina Ehnert doing a conceptual and exploratory analysis of sustainable human resource management aspect [6]. She emphasises that in corporate practice, topics related to social dimension of sustainability have emerged increasingly in recent years. Key topics are recruiting and retaining top talent, developing critical competencies, motivation incentives for exceptional performance, employability, lifelong learning, demographic trends, aging workforces, employee health, safety, quality of life, work-life balance, justice, ethics, CSR. She also reviews that historically, sustainability emerged in situations of crisis when at least one of the following topics turned out to be of importance:
- economic, natural, or social resources were scarce;
- side and feedback effects threatened long - term exploitation of these resources [6].

2. Overview of economic development of Latvia and Estonia during the economic crisis

In order to successfully implement reforms, public administrations must strike the right balance between the daily business of delivering policies, programmes and services, and carrying out its strategic function of anticipating needs, prioritizing responses, and preparing and improving itself to meet those needs more efficiently and effectively, based on a full understanding of its strengths and weaknesses. Since re-independence in 1991, and prior to the global financial and economic crisis, both countries Estonia and Latvia enjoyed one of the most dynamic periods of economic growth among transition countries. Estonia and Latvia enjoyed the fastest growth amongst OECD and CEE countries between 1996 and 2007, with an average annual rate of real GDP growth of 7,5% – far above the CEE average of 4,8% and over twice the OECD average of 3,6%. Economic development of both countries since 2000 has gone through two stages: steady economic growth (2000-2007) and impact and response to the global financial and economic crisis (2008-2010) [7].

Estonia and Latvia are very small countries compared to EU and OECD member countries in terms of both GDP and population. In 2008, Estonia was the second-smallest OECD economy with a GDP of USD 29 billion. In terms of its demographic size, Estonia is the third-smallest OECD country with a population of 1.34 million in 2009. Estonia in all main characteristics is smaller than Latvia [see Table 1].

| Table 1. Basic Statistics of Estonia and Latvia, 2009 [7, 8] |
|-----------------|---------------|---------------|
|                  | Estonia       | Latvia        |
| Area (km²)       | 46 227        | 64 589        |
| Population (1 000) | 1 324        | 2 249        |
| GDP, current prices (million EUR) | 13 861 | 18 845 |

The main characteristics of economic development shows that Estonia even with smaller economy than Latvia is much better dealing with challenges provoked by economic crisis.

Today, Estonia and Latvia faces the impact of the crisis together with other challenges threatening fiscal sustainability, including demographic decline and regional disparities. Over time, both Baltic countries will need to continue to take advantage of its small size to remain strategically agile and to make the most of its national assets. This requires a public administration that is fit-for-purpose in terms of implementing the government’s policy agenda in most effective way.

In the end of 2008, as the global financial and economic crisis spread to the real economy, and in response to an expanding fiscal gap, the both government revised the 2009 budget. Even if Estonians had two supplementary budgets and a budgetary amendment representing 9,3% of GDP in 2009, previously ensured strategic and long term thinking in public expenditure management supported for Estonia “soft landing” comparing to Latvia.

To ensure cut of budget deficit in Latvia, since 2008 budget consolidation estimate 16,6% of GDP, of which approximately 6,6% of GDP represents revenue side and 10% expenditure side (see table 2).

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
<th>Expenditure</th>
<th>Total</th>
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<tbody>
<tr>
<td>2008</td>
<td>n/a</td>
<td>0,5</td>
<td>0,50</td>
</tr>
<tr>
<td>2009</td>
<td>2,6</td>
<td>6,7</td>
<td>9,50</td>
</tr>
<tr>
<td>2010</td>
<td>2,1</td>
<td>1,9</td>
<td>4,00</td>
</tr>
<tr>
<td>2011</td>
<td>1,7</td>
<td>2,8</td>
<td>2,60</td>
</tr>
<tr>
<td>Total</td>
<td>6,6%</td>
<td>10,0%</td>
<td>16,6%</td>
</tr>
</tbody>
</table>

In comparison with Latvia Estonia concerned one-half expenditure. In 2009 Estonian government had the ambition to reduce public expenditure by 5% and improve the overall public balance position by over 9% of GDP. One of the measures included was a 10,6% cut in operational expenditure by the central government.

This was mainly ensured by long term public funds management within the period from 2002 to 2007, when Estonia ran a public budget surplus for five consecutive years, accumulating assets amounting to approximately 10% of GDP. As a result of weak long term planning and the recession, the Latvian government was forced to rapidly accumulate debt. To deal with sequences of recession with a world-historical drop in GDP of more than 25 percent Latvian government was forced to apply for financial assistance to international financial organizations. In December 2008, an agreement was reached to provide multilateral financial assistance to Latvia with an overall amount of €7,5 billion. This caused increase in Latvia’s debt ratio comparing to debt ratio decline between 2004 and 2007 from just 7,9 percent of GDP in 2007 to 39,1 in 2010. Even this was not the worth scenario projected by IMF at 74 percent of GDP for the year 2010 it was much worse in comparison with Estonia where gross government debt as percent of GDP in 2010 was 6,7% of GDP.

Beside this Estonian public expenditure as a percentage of GDP is in the lower range compared to Latvia, however, Estonia’s public expenditure in 2009 was a little bit higher than Latvia’s (see Fig. 1). In both countries public expenditure has increased by almost 10% reaching highest point in 2009 when both countries experienced highest decline of GDP.
3. Consequences of reforms in public administration

Governments were forced to perform public administration reforms by reducing number of institutions, cutting wages in public sector as well as reducing administrative costs. Even if Estonian economic situation was not as worse as Latvian number of civil servants were declined by 5,5% from 2008-2010. The size of the public service, in terms of numbers of officials, dropped by 3,5% between 2008 and 2009, with the strongest reductions taking place in ministries (-16,9%) and in county governments (-11%). In Latvia this scenario was even worth. In 2010 in state budget institutions in average were employed 62,9 thousand people, this is 25,4% less than in 2008 and 11,4% less than in 2009. Nevertheless Estonia’s public service is 4,5% of general employment, compared to 8,3% in Latvia.

Public employees were also forced to suffer from cut of personnel costs. In Estonia series of overlapping budgetary measures first to freeze and then to cut personnel costs began in April 2008, with the decision to freeze pay in 2009 and 2010. The overall impact is that the total pay bill in 2010 is 15% below that of 2008. However, in contrast to Latvia, in Estonia individual ministries and agencies could choose their own means of cutting personnel costs. In Latvia situation was much worse. The government agreed to cut pay by 15% in 2009, although with protection for the lower paid. The large number of those whose pay was protected meant that the impact of the cuts was less than planned and in June 2009 a second round of cuts was adopted, cutting pay by 20% for the higher paid and by 15% for the lower paid; many bonuses were abolished and there was widespread use of unpaid leave. As part of the package agreed with the IMF, the government has introduced a single remuneration system for those in central and local government institutions, which cut pay in 2010 by an average of 5% compared with 2009 [11].

During the period of economic crisis in Latvia salaries of public employees were reduced approximately by 27,7% between 2008 and 2010. This has caused consequences.

Since beginning of 2011 approximately 10% of employed in central government institutions has left public administration. This tendency is going to grow up. Current situation in Latvian labour market shows that layers working in state institutions earn 53% of equal performance in private sector. Persons leaving public administration are those with experience in the sector for more than 5 years. The reasons for leaving public administration are different, but in most cases it is not only the question of salary. People are overloaded; they don’t feel satisfaction with their results [12]. Pay strategies influence employee behaviour and consequent performance, but are not the only ones who influence employee motivation. One of those would be the role of satisfaction and motivation of public employees producing results [4].

Situation in Estonian state administration is not so worthwhile, since much more strategic driven HRM is foreseen. The proportion of officials who left in 2010 was highest in ministries (9,8%). Number of the proportion of state administrative agency officials whose length of service exceeded 10 years also characterise that human resource management in Estonian state administration is much more driven to sustainable development in HRM than Latvians. In Estonian state administration number of officials whose length of service exceeded 10 years reached 54,2% in 2010 in comparison to 11% in Latvian state administration[12, 13]. Nevertheless survey of the situation in personnel management conducted in 2010 among heads of administrative in Estonia come to conclusion that strategic personnel management has yet to become the recognised, systematic approach:

- different areas of personnel management have been developed unevenly: recognising, motivating and rewarding employees, planning careers and personnel and evaluating performance need the greatest attention;
- there is no common ‘best practice’ in personnel management nor a system for evaluating performance which would provide a basis for comparing the level of personnel management, including the effectiveness and performance of actions [12].

Leaving of experienced stuff and lack of performance based motivation system raises question on sustainability of both public administrations in terms of long-term human resources and effectiveness of state institutions. Therefore in both countries HRM policy instruments encouraging improvements in performance measurement and assessment should be introduced. This would facilitate development of sustainability in
HRM in public administration as well as improve effectiveness and efficiency of state institutions.

Conclusions

According to Nickols, managing change has at least two meanings [14]. The first one refers to the making of changes in planned and systematic fashion. The second meaning refers to the response to change over which the organisation exercises little or no control, for example economic crisis and political up heavens [14]. It is evident that changes in Latvian and Estonian public administrations have been reactive to solve short term problems. This assures conclusions of several empirical studies that concept of sustainability emerged in situations of economic crisis, since decisions taken to solve economic discrepancies are primary oriented on budget cuts and fiscal consolidation.

Efficient, effective, accountable and transparent public administration can boost legitimacy, trust and commitment to the economic and political reform agendas, as well as improve the quality of policy design and implementation. However, public sector reforms are often complex, unpopular, contested and risky. They require time to produce results and prove their benefit. The combination of prioritising economic objectives on the one hand, and the ability of a limited number of individuals to exercise quite a bit of influence – “personalism” – on the other, may have created circumstances in which public administration needs are unrecognised and under-valued in terms of providing immediate political payoff.

Therefore the overview of actions taken during the economic crisis between 2008 and 2010 suggests that undertaking administrative reforms, particularly on HR issues, is not the main concern of government per se: reforming the public service is a vehicle to respond to financial demands. Current situation proves that actions taken during economic crisis to reduce number of public employees and cut of personnel costs were not facilitating development of sustainable public administration. Statistics shows that Estonian state administration is much more driven to sustainable development in HRM than Latvians. Nevertheless the positive conclusion for both countries is that changes in public administrations of Latvia and Estonia provoked by economic crisis has encouraged both governments to look on human resource policy in public administration more strategically, planning and introducing HRM instruments facilitating development of sustainability in HRM in public administration.

Reference

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POSITIVE AND NEGATIVE EFFECTS OF THE INTRODUCTION OF RADICAL LOCAL MUNICIPALITIES FINANCE EQUALIZATION SYSTEM MODEL

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Abstract

In the article there is the suggestion to introduce new and radical model of local municipalities finance equalization system. This model includes the change of redistribution system of personal income tax among local municipalities. At present distribution of this tax among local municipalities is very unequal, because the main criterion, which is used to distribute personal income tax, is base of the tax – taxable incomes of population declared in local municipalities. It means that local municipalities, that are located in the economically active regions of the country, can receive considerably more income compared to those municipalities that are located in the less developed regions. This problem can be solved in two ways: it is necessary to change distribution of personal income tax among local municipalities: one part of incomes (approximately 50%) would be distributed using the existing mechanism (using base of tax), but the other part would be distributed based on the costs criterion. In this case local municipalities finance equalization fund with local municipalities payments is not formed. The aim of subsidies from central government budget would be the second stage finance equalization – extra subsidy to those municipalities, in which incomes from personal income tax are considerably less then the average of the country; it is necessary to change the procedure how the part of personal income tax is shifted to local municipalities. The part of personal income tax is shifted no to the local municipalities budgets, but directly to the local municipalities finance equalization fund. In the next stage local municipalities finance equalization fund will distribute resources maximally objective, based on the latest data about the number of population. At the end of the article the strengths and weaknesses of the suggested radical model of local municipalities finance equalization system are analyzed and evaluated. There is also conclusion about the introduction effectiveness of the model in case of Latvia.

Key words: taxes, finance equalization, municipality, fund, model.

Introduction

As the result of administrative territorial reform, there are 119 local municipalities (110 counties and 9 republic cities) in Latvia. Before the reform, till July 2009, there were 26 districts and 522 parishes in the country. New municipalities are very different if we are going to consider their area, population, distribution of population, nature, location, cultural and historical conditions, as well as socio-economical situations, development possibilities, legal capacity, financial resources, quality and efficiency of local government work and other factors.

One of the most important regional development instruments, which are used to decrease unfavourable difference among municipalities, is local municipalities finance equalization system. Equalization of local municipalities finances have been realized through finance equalization fund, which takes into consideration differences in tax revenues and different needs of local municipalities that depend on demographical structure. Resources of this fund consist of contributions of municipalities and subsidy from national budget.

Till 2008 incomes of local municipalities finance equalization fund increased and in 2008 they reached the maximum – 93,8 millions lats. But, from 2009 incomes of local municipalities finance equalization fund decreased. In Latvia subsidy from national budget is calculated based on the law “About local municipalities finance equalization”. From 1998 till 2000 subsidy from national budget increased from 2,7 millions lats to 6,9 million lats, but in the period from 2001 till 2010 the subsidy didn’t change and it was 7,2 millions lats. Only in 2011 subsidy from national budget increased to 7,9 millions lats. In the Figure 1 it is possible to see that subsidy from national budget makes considerably small part of total local municipalities finance equalization fund incomes. The biggest part is contributions of local municipalities.

It would be optimal to provide regular increase of subsidy from national budget and to fix its changes to the trend of GDP or tax revenues. Or it is also possible to define minimal increase of national budget subsidy taking into consideration the forecasted level of inflation during next year. But this problem in Latvia still is not solved.
1. Local municipalities finance equalization at regional level

In Latvia to calculate local municipalities finance equalization, local municipalities finance capacity is characterized by revenues of two taxes - personal income tax and real estate tax. The value of local municipalities’ contributions in the local municipalities finance equalization fund is calculated only for those municipalities, which estimated revenues exceed the highest non-equalized margin of finance necessity. It means that estimated incomes are 10% higher than finance necessity of the local municipality. These local municipalities pay in the local municipalities finance equalization fund allocations to the tune of 45% from the exceeded value of estimated revenues that are higher than the highest non-equalized margin of finance necessity. But the revenues do not exceed 35% of the local municipality estimated incomes.

Subsidies from the local municipalities finance equalization fund is given to those municipalities which estimated incomes are less than the lowest non-equalized margin of finance necessity. It means that estimated incomes are 95% lower than finance necessity of the local municipality.

Local municipalities, which estimated incomes exceed the lowest non-equalized margin of finance necessity or which estimated incomes are lower than the highest non-equalized margin of finance necessity, do not pay contributions to the local municipalities finance equalization fund and do not receive the subsidy from the fund [2].

Already in the second part of 1990-ies started the formation of five regions – Riga, Vidzeme, Kurzeme, Zemgale and Latgale. They were confirmed in the government in 2003. These regions were made to plan and coordinate regional development, as well as to provide cooperation of local municipalities. The most local municipalities are in Riga region (30), then follows Vidzeme region (26), Zemgale region (22), Latgale region (21) and Kurzeme regions (20).

In the beginning of 2011 the population of Latvia was 2 millions and 230 thousands, nearly half of them – 48,9%, lived in Riga region. In other four regions the population was about 10-15% from the total population of Latvia.

Riga city local municipality’s contributions to the local municipalities finance equalization fund are the biggest during all the years. In 2011 its contribution was 45,5 millions lats, it was 77,24% from total local municipalities contributions to the local municipalities equalization fund. Data about finance equalization at regional level show that in 2011 eighteen local municipalities paid contributions to the local municipalities equalization fund: five of nine Republic cities municipalities (Jelgava, Jurmala, Riga, Valmiera and Ventspils), and 13 counties municipalities. It is interesting, that all local municipalities, which pay contributions to the fund, are from Riga region, it means, that they are located in the economically active area of Latvia.

11 local municipalities do not pay contributions to the fund and also do not receive subsidies from this fund. One of them is Republic city
municipality (Liepaja) and others are counties municipalities. Seven of them are from Riga region, two are from Zemgale region (Aizkraukle county and Ozolnieku county) and one is from Vidzeme region (Cesu county).

90 local municipalities receive subsidies from the local municipalities’ equalization fund. Three of them are Republic cities municipalities (Daugavpils, Jekabpils and Rezekne), 8 county municipalities from Riga region, almost all county municipalities from Vidzeme and Zemgale regions, and quite all county municipalities from Kurzeme and Latgale regions. The data are summarized in the Table 1.

Table. 1. Latvia’s local municipalities financial relations to the local municipalities equalization fund in 2011 / made by authors after [1]

<table>
<thead>
<tr>
<th>Local municipalities</th>
<th>Pay contributions</th>
<th>Do not pay contributions and do not receive subsidies</th>
<th>Receive subsidies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Republic cities</td>
<td>5</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Riga region</td>
<td>13</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Vidzeme region</td>
<td>-</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>Kurzeme region</td>
<td>-</td>
<td>-</td>
<td>18</td>
</tr>
<tr>
<td>Zemgale region</td>
<td>-</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>Latgale region</td>
<td>-</td>
<td>-</td>
<td>19</td>
</tr>
</tbody>
</table>

These data show that local municipalities finance equalization system is necessary for Latvia. Thanks to this system all local municipalities will be able to provide, that in the democratic state all people, paying similar taxes, in their living place can receive similar state and local government services.

Despite of necessity to support economically weaker local municipalities, the most important problem is to promote development of all regions. Therefore it is necessary to revise and improve the existing finance equalization system in Latvia. In the article there will be offered and analyzed new and radical models of local municipalities finance equalization system, as well as evaluated their strengths and weaknesses and made a conclusion about the introduction effectiveness of those models in the existing economical situation in Latvia.

2. The possible models of local municipalities finance equalization system

One of the most important local municipalities incomes are personal income tax revenues. They make more than a half of local municipalities incomes. And local municipalities by themselves can make decisions how to spend this money. Personal income tax revenues are included in the budget of the local municipality of payer place of residence and in the national budget according to the distribution, which is defined in the annual law of national budget. In 2011 82% of personal income tax goes to the local municipality budget and 18% - to the national budget [3]. The main essence of the calculation algorithm of radically new local municipalities finance equalization model is to change the distribution procedure of personal income tax among local municipalities. It can be explained by the fact, that due to different socio-economical development of local municipalities, distribution of personal income tax among them is very unequal.

At present criterion used to distribute personal income tax revenues among local municipalities, is base of the tax – revenues of taxable incomes of population declared in local municipalities. Revenues of personal income tax in local municipalities’ budget are very dependent on the location of the municipality – is it located in the economically active area with high population density or is it located in the economically passive area with considerably low population density. In 2011 personal income tax revenues among Republic cities municipalities varied from 5,7 millions lats in Jekabpils to 245.1 millions lats in Riga. The difference is more than 43 times. In the counties municipalities group personal income tax revenues varied from 0,2 millions lats in Baltinava county to 10,8 millions lats in Ogre county. The difference is 54 times. These differences are shown in the Table 2.

Table. 2. Differences of personal income tax revenues in local municipalities budgets in 2011 (made by authors after [1])

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Republic cities</th>
<th>Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td>The highest, millions lats</td>
<td>245.1</td>
<td>10.8</td>
</tr>
<tr>
<td>The lowest, millions lats</td>
<td>5.7</td>
<td>0.2</td>
</tr>
<tr>
<td>Differences in times</td>
<td>43</td>
<td>54</td>
</tr>
</tbody>
</table>

To decrease so drastic differences of personal income tax revenues in local municipalities’ budgets, the new algorithm is offered. It would provide to change the distribution of personal income tax revenues among local municipalities.

According to the new algorithm one part of personal income tax revenues would be distributed using the existing mechanism (using base
of tax), but the other part would be distributed as following: based on the natural values of local municipalities’ expenditures criterion the part of each local municipalities’ expenses as share of total state government expenses is defined. At present in the same way proportion of each local municipality’s finance necessity is defined. In this case there is no local municipalities finance equalization fund with local municipalities’ contributions to it. The goal of national budget subsidy would be the second stage equalization – extra subsidy to those local municipalities, in which incomes from personal income tax are considerably less then the average of the country. If the real estate tax is also included in this finance equalization system, this will substantially complicate the system. To realize such algorithm of financial equalization system, there would be necessary to change the law “About personal income tax” and the law “About local municipalities’ finance equalization”.

The authors of the article have a view, that it would be necessary to evaluate and analyze one more possible algorithm of the model of local municipalities’ finance equalization system. It provides to pay part of personal income tax revenues not in the local municipalities budgets, but directly to the local municipalities finance equalization fund. In the next stage the local municipalities finance equalization fund, on the bases of the current data about the population of local municipalities from the Office of citizenship and migration affairs, would maximally objective and well-founded distribute personal income tax revenues among local municipalities. The goal of subsidy from national budget, like in the previous algorithm, would be the second stage equalization. And to introduce this algorithm there will also be necessary to make changes in several normative documents.

The advantages of both local municipalities finance equalization models - they do not provide donors and distribution of personal income tax revenues is simply.

The most significant disadvantages are:
- local municipalities can not accept the algorithms of the models, because they considerably differ from the existing model of local municipalities finance equalization. Local municipalities have used it during the long time;
- local municipalities from economically active areas can not accept the new models, because they provide, that part of the existing main revenues will not be available in the future;
- there is very high sensitiveness of the models to the changes of personal income tax rates;
- the importance of real estate tax in the local municipalities finance equalization system is decreased or totally excluded;
- if the real estate tax will be included in the models and for each model their own equalization mechanism will be made, then the models would be very complicated.

So this is very important to consider and evaluate the compliance of the both offered models of local municipalities finance equalization system to the economical situation of Latvia, to analyze advantages of each model, as well as provide the transition period for introduction of the chosen new local municipalities finance equalization system model.

3. Characteristic of the possible local municipalities finance equalization system models

The improvement of local municipalities finance equalization system using new algorithms, like in the existing algorithm, is made in the context with the development processes of local municipalities system. Only, the new algorithm provides to use various current data, for example, the current data about population of local municipalities. The existing local municipalities finance equalization system needs to verify data, but it is still not done.

In the new local municipalities finance equalization system, like in the existing system, the subsidy from national budget is provided. It can be explained by the fact, that after administrative territorial reform still there are counties with very different number of population in Latvia. Because personal income tax revenues are included in the budget of the local municipality, in which the payer has declared his place of residence [4], the local municipalities’ incomes differs a much. For example, in data, which were used to calculate local municipalities finance equalization in 2011, there were the following differences in population of counties – 26 468 people in Jekabpils and 709 145 people in Riga in the group of Republic cities municipalities, 1 365 people in Baltinava and 38 944 people in Ogre in the county group. Obviously, the differences in the number of population are more than
26 times in the Republic cities group and more than 28 times in the counties group.

The goal of local municipalities finance equalization system is at least partly compensate differences of local municipalities finance capability, thereby to increase revenues of financially weaker local municipalities. In the same time to decrease differences of their expenses, providing more revenues to those municipalities, which have more or extra responsibilities or to those municipalities, which have bigger expenses to provide their responsibilities due to their geographical location, demographical situation or other reasons. Therefore, the local municipalities finance equalization system must make equalization, taking into consideration revenues and expenses. This principle is included in the existing algorithms and will be left in the new algorithms, too.

One more common feature of the existing algorithm of local municipalities finance equalization system and new algorithms is the fact, that both models take into consideration only objective parameters, that do not depend on the local municipality activity, because local municipalities finance equalization system need not to compensate differences of the local government work efficiency, as well as differences of those costs, that appear in the result of local governments realized functions of local politics.

The offered new local municipalities finance equalization system, like the existing system, is maximally objective, because the calculation algorithm and data sources, necessary for local municipalities finance equalization precisely will be defined in the law.

The existing finance equalization system in Latvia is also positively evaluated abroad, because there are important role of negotiations of central government and local governments, in which both sides talk about the results of the previous year finance equalization system and about main directions of the next year activities, as well as they come to the agreement about necessary amount of national budget subsidy. And also in the new local municipalities finance equalization system is provided such discussions directly about the amount of national budget subsidy.

As mentioned before, model of local municipalities finance equalization system and calculations must be simply, understandable and transparent. The existing model does not always meet these requirements, but it is used for a long time and is well-known and habitual. The new model, even if it is transparent, could be unacceptable and difficult, because it provides separate equalization mechanism for personal income tax and real estate tax. The attention must be paid to the fact, that the new model is very sensitive to the changes of the personal income tax rates. Radical decrease of personal income tax rate can lead to the crash of the system.

The existing model and the new model provide not only horizontal, but also vertical equalization, because they provide not only redistribution of local municipalities' incomes, but also subsidy from the national budget.

The important positive feature of the new model of local municipalities finance equalization system is, that it is necessary to provide in the legislation regular increase of subsidy from the national budget. For example, by indexing it with some indicator, which is used to determine national budget increase – increase of GDP, increase of tax revenues, determining minimal increase of national budget subsidy, compared with the previous year, the same as the forecasted level of inflation. The existing model of local municipalities finance equalization system is notorious, because during 2001 till 2010 the subsidy from the national budget did not change and it was 7,2 millions lats. During 10 years in the negotiations between Ministry of Finance and Latvian Association of local and regional governments the tradition was to take into consideration the above mentioned amount of subsidy in the determining the amount of estimated incomes and total financial necessity. It must be evaluated negatively.

The local municipalities finance equalization system must be made in such way, that the sum, which is paid by local municipalities – donors in the horizontal income redistribution, will not be so large, that could keep back them from the growth of local municipalities income base. The local municipalities’ equalization mechanism must not to turn down motivation to increase tax revenues. In the existing local municipalities finance equalization system the local municipalities – donors have no reason to say, that it is not necessary to strive to improve their activity and to promote increase of incomes, if in such way there are larger contributions in the local municipalities finance equalization fund. Such expressions are not well-founded, because the contributions to the local municipalities finance equalization fund are calculated taking into con-
sideration only incomes from two taxes. It means that increase in all other revenues is local government disposable income. The differently situation is with local municipalities, that receive subsidies. They have not financial motivation to increase tax revenues. In the new local municipalities finance equalization model the local municipalities – donors have no reason to be dissatisfied, because in the result of the changes in the distribution of personal income tax revenues among local municipalities, the inside equalization is happening. Concerning the local municipalities, which receive subsidies from the fund, the subsidy distribution mechanism must be connected with the motivation. If it will be like the existing mechanism and will provide the local municipalities incomes till the definite level, then also in the new model local municipalities – receivers will not have motivation to increase their revenues.

In the local municipalities finance equalization system, in the equalization process of local municipalities expenses, it would be necessary maximally to take into consideration functions of local municipalities, especially those, that are very important, or those, that are obligatory and are defined by law. In the existing local municipalities finance equalization system are taken into consideration only demographical parameters, which, unfortunately, do not solve different features of all functions [2]. In the new model the wider parameter range is worked out, which meet the requirements of European Council. The European requirements define, that it is necessary to characterize not only demographical differences, like in the existing model, but also geographical, socio-economical or infrastructural differences among local municipalities [5].

The expenses of local municipalities must be evaluated mainly based on objective and measurable parameters, which are not directly controlled by local municipalities. There must be few parameters in the local government finance equalization calculation formulas to guarantee, that they will be easy understandable and will provide transparency, but in the same time the formulas must be all-inclusive and detailed. The relative weights, used in the formulas, must be well-founded. In the existing local municipalities finance equalization system the relative weights for parameters, that characterize demographical differences, are defined in the law “About local municipalities finance equalization”. In the new model, to make it more all-inclusive and more objective, the number of parameters must be increased, the relative weights of the parameters must be based on structure of local municipalities expenses, the expert evaluation and political corrections must be include.

The existing local municipalities finance equalization system has not been changed more than 10 years and it has some features of stagnation. The local governments also recognize that it is necessary to make fundamental changes in the existing system. It would be optimal to make the improved local municipalities finance equalization model for period of 4-5 years, to guarantee regular supervision and evaluation, as well as response mechanism for unexpected crisis. It is also important to foresee and develop activities for the transition period of introduction of the new local municipalities finance equalization model. It is necessary to furnish local municipalities with information about the new local municipalities finance equalization system, because local governments do not want to introduce the system, which is understandable.

Conclusions

Considerable local municipalities finance equalization system is precondition for the success of finance decentralization and stable local municipalities, as well as economical stability and success of balanced sustainable regional development policy. The objectivity of local municipalities finance equalization system will be increased by its regular evaluation accordingly to the real situation, as well as regular verification of used data.

In the process of improvement of local municipalities finance equalization system it is necessary to avoid from unclear formulations, the most important must be principles of simplicity and objectivity. At present in Latvia as the equalization parameters are used only demographical indicators, which are one-sided. The new local municipalities finance equalization model provides improved and more connected to the real situation local municipalities finance equalization system, in which there will be indicators, that characterize not only demographical, but also geographical, socio-economical differences and differences in infrastructure expenses among local municipalities.

If we evaluate local municipalities finance equalization system from the aspect of regional development, it is possible to conclude, that this system provides the decrease of regional dispari-
ties, because within the framework of this system the support is given to those local municipalities, which are less developed. But, at present, together with local municipalities system improvement, urgent problem is revision of the existing local municipalities finance equalization system and introducing of new model, because, despite necessity to support less developed local municipalities, the most important is to promote development of all regions.

References
DEVELOPMENT STRATEGY OF INTERNATIONAL TRANSPORTATION IN LATVIA

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Abstract

Transport services play an important role in the economics of Latvia. International transport takes the major part of it. The most important kinds of the international transport are transit cargoes transport and transit traffic. One of the most important quality indicators of transportation is its duration. It refers both the freight transport and passenger traffic. The duration of delivery depends on time needed both for transport and transhipment. Arrangements are being held to decrease the outgoing transportation queues on eastern border. Efforts are being made for solving issues concerning the establishment of a united railway system between West and East.

Keywords: transport; transport infrastructure; international transport, the duration of delivery, infrastructure of logistics.

Transporting is a service to be bought by its user. Unlike the manufacturing of goods, transportation entails the combination of location and time. It means that if the supply is delayed, the demand can disappear. Cargoes should be delivered from the customer to the receiver. One of the most important quality indicators of the process of transportation is its duration. This matters both the freight transport and passenger traffic, because time is money, but usually the time spent in transportation cannot be used to the best advantage. It should be stressed that keeping to the schedule is a must in rendering transportation services. That is the reason why the modes of transportation, which can provide conveyance in smaller amounts of goods or passengers in shorter time, are more expensive than relatively cheap modes of transportation, which can transfer big loads. Transporting is a service which is connected with the use of other services – logistics, procurement and other intermediary activities. Main problems of transporting and storage are the decrease of costs and time of delivery. The duration of delivery depends on time needed both for transport and transhipment.

Practical solutions of these problems are quite connected with the choice of the type of transport and storage location. Nowadays besides issues which deal with raising effectiveness of transport, there are some dealing with the actual impairment of transport services. This last issue is connected with overload of transport infrastructure, high expenses and essential investment of new infrastructure facilities (roads, hubs and parking places) thus being related to passenger delivery and delivery of goods. The solution for passenger delivery might be found by increasing density of public transport and not affecting the distance between the living and working places, but by bringing nearer shops and entertainment places to inhabited territory. Refinement of supplies, production of goods, traffic and trade components should be arranged optimally between output of supplies and trade as this is solution for cargo transport.

The approach of the task requests to find the most beneficial geographical point, where refinement of supplies or wholesale companies could be disposed, in order to gain minimal transport expenses and the highest quality of goods when delivering them to market, in such way increasing demand of goods. Several theories exist on arrangement optimization of these facilities.

So called intermodal transport and agents of transporting process are used. These types of transporting are widely applied in international systems of transport technologies, because it allows using road transport and railroad transport advantages. It is important that during transportation the whole responsibility for the cargo is taken by the driver of the truck, but railroad is just carrying transport units from one station to another. Railroad also manages reloading operations in the territory of stations.

In the recent decades the pattern of the usage of different modes of transport has changed. Transport is linked with global logistics circumstances. Uneven division of the resources of production in the world, climate peculiarities and heritage of production traditions is the basis of international division of labour. Firstly, it pertains to natural and power resources without which the economics of the country is inconceivable. Secondly, countries differ in scientific and technological potential. Thirdly, the qualifications of
workers differ. Moreover, there are significant differences in the economic level of development of countries, efficiency of economic activities and productivity of labour. Finally, there are also differences as to the level of requirements, structure, purchasing capacity and certain demand.

International division of labour is typical for the modern economy. Consequently, in many countries division of labour is becoming more detailed and is turning into new quality – specialization.

A typical feature of economic development is that in some countries the final product is manufactured, while accessory equipment, materials or semi-finished products are delivered by specialized companies from other countries. Stabile international cooperation connections are characteristic of the modern world economy, serving the international trade, the origin of which is to be found in ancient times, but it is of vital importance today and will be in the future. Tendencies to reduce manufacturing within one country and expanding international specialization is hidden in the consideration that product development, technologies and assembling are accomplished by domestic labour. A huge amount of accessory

hardware, units and components are brought from other companies trying to attain maximum quality and minimum expenses on the world scale. As a result, associations of production originate on the world scale, but local companies can offer modifications of the final output, while producing the necessary components by local workforce is not real. Supplies of units and components for local companies decrease, because they receive them in small amounts and at the right time. Transport services play an important role in the economics of Latvia. Effective and competitive transport system is one of the most important preconditions for securing economic and social development. Latvia has a relatively balanced transport net that on the whole ensures the transportation of cargo and traffic of passengers. International transport takes the major part of it.

The geographical location of Latvia on the east coast of Baltic Sea with its unfreezing harbours and infrastructure of roads and railroad serves as a condition for insuring effective transit services and increase of Latvia’s services export, giving large investment in the country’s outer trading balance counterpoising (see Fig. 1).

![Fig. 1. Latvian transport infrastructure [5]](image)

66
The traditional modes of transport in Latvia include road transport, railroad transport, air transport, water transport and pipeline transport. In the international cargo transport there are however three main traditional transportation types in Latvia (see Table 1).

Table 1. Cargo transportation by types in 2010, Latvia

<table>
<thead>
<tr>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner water transport</td>
</tr>
<tr>
<td>Railroad transport</td>
</tr>
<tr>
<td>Road transport</td>
</tr>
<tr>
<td>Pipeline transport</td>
</tr>
<tr>
<td>Air transport</td>
</tr>
</tbody>
</table>

The water transportation prevails because the reloading takes place in 10 harbours (see Fig. 2).

The water transportation prevails because the reloading takes place in 10 harbours (see Table 2).

Table 2. Cargoes turnover indices in 2011 (th. tones) [2]

<table>
<thead>
<tr>
<th></th>
<th>Riga</th>
<th>Ventspils</th>
<th>Liepaja</th>
<th>7 small harbours</th>
<th>In total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sent</td>
<td>29806,9</td>
<td>26189,9</td>
<td>3659,7</td>
<td>1371,8</td>
<td>61028,3</td>
</tr>
<tr>
<td>Received</td>
<td>4246,7</td>
<td>2261,8</td>
<td>1197,2</td>
<td>87,0</td>
<td>7792,7</td>
</tr>
<tr>
<td>Total turnover</td>
<td>34053,6</td>
<td>28451,7</td>
<td>4856,9</td>
<td>1458,8</td>
<td>68821,0</td>
</tr>
<tr>
<td>Proportion(%)</td>
<td>49,5</td>
<td>41,3</td>
<td>7,1</td>
<td>2,1</td>
<td>100</td>
</tr>
</tbody>
</table>

In the small harbours the small ships are operated and the delivery is organized only by road transportation because these harbours are not connected with railway lines. The range of transport services includes harbour, railroad, road traffic, custom storage, broker and shipping or forwarding agents services. International transport takes the major part of it.

They work in circumstances of international competition and mostly competing with other Baltic States, Finland and Russia (see Fig. 3).

As the limiting factor is the rail system, unlike many EU countries railway systems and the system shortage Latvian.

Because of the geographical position Latvia has already for a long time served as a country through which international trading is held [3]. However this advantage is not unique. International transport is provided by unimodal or combined transportation. The most important kinds of the international transport are transit cargoes transport and transit traffic. Transit in Latvia is often considered as a branch. That is because with the processing of transit loads work most of the companies of transport. Each 10th million tonnes of goods in transit services gives at least 1% of the GDP (Gross Domestic Product) growth [4]. Therefore it is in Latvia’s interests to retain the lost amounts of loads and to gain new. According to the trends of last few years in the transport field in Eurasia particular attention should be paid to the development of new services and to the discovery of new markets, by raising qualification of logistic specialists and developing new possibilities to make logistics and distribution services and infrastructure, which gives considerably bigger investment in Latvian economical development.
Transit development is based on two major markets - the European Union and the CIS and Asian markets service. Undoubtedly a major role in the development of transit plays cooperation with the CIS countries. Latvia to the CIS countries linked by common rail system (1520 mm gauge) and a single rail freight system of the organization. At the same time this means that Latvia lacks proper cooperation with Western European countries as regards to railway.

There are two types of action that are considered as transit – the vehicles carrying transit loads through country and cargos transported and reloaded in transit. In the latter case there are two or more modes of transport vehicles used. These operations are of high value-added and the main transportation direction is east-west, mostly reloading at ports. Unlike the transit type in which loads are only transported through country, if reloading takes place, transit state may gain extra added value from the reloading services.

Effective and competitive transport system is one of the most important preconditions to guarantee economical and social development. One of the most important quality indicators of transportation is its duration. It refers both the freight transport and passenger traffic. The duration of delivery depends on time needed both for transport and transhipment.

In Latvia there has been made a relatively balanced transport net that in the whole insures the transportation of cargo and traffic of passengers. A sharp change in transport infrastructure usually follows economical activities and in many cases also the increase or decrease of population’s living standard. In the last few years the transport field shows several trends: the deterioration of road and railroad quality, increase of the load to roads, the territorial decrease of the infrastructure of railroads, rapid increase of the flow of passengers in the International Airport of Riga.

Despite the stable increase of transportation amount there is a chain of different problems, which interfere with development of transportation in Latvia. These problems for railroad mostly are connected with maintenance of infrastructure, which makes the main part of railroad expenses. Despite the transportation amount in 1990th decreased, the expenses of infrastructure stayed on the same level. Infrastructure is the main problem in road transportation because of small carrying capacity of roads and streets. This significantly limits the road capacity and leads to a reduction of transit. The most beneficial situation is for Latvian harbours, which have collided with fewer problems than railroad and road transport. On May 1st, 2004 Latvia became a member state of European Union. Transport legislation is completely coordinated through the requirements of European Union. Latvian Transport system has joined Trans Europe Transport Net (TEN-T), the resources of EU are used actively to develop transport infrastructure.

As the Latvian-Russian border became the eastern border of EU, the amount of vehicles on roads rapidly increased. Due to insufficient capacity of penetrability of border-crossing also queues of vehicles on border increased. As an important precondition in transit development is considered the simplifying of border crossing procedures. Arrangements are being held to decrease the outgoing transportation queues on eastern border. Besides, the development of transit cannot be imagined without active cooperation with abroad partners in both – private and country sector, and also active participation in international organizations.

Today’s aim of transit development is to gain steady and stable increase of transit cargo amount and maximally increase transit cargo value-added. This is rather cautious aim. Nevertheless, it fits the real situation in the region, real forecasts worked out by international experts, development of tendencies in modern technologies and sharply growing competition conditions. In last years as a relatively new member state of EU Latvia has a possibility to take part in making European Union’s politics and join into EU international trading activities.

There has been done a lot in the transit development recently. The demands of legislation in Latvia are completely harmonized with demands of European Union. The central objects of infrastructure are included in the TEN where also the main investments are placed, including most of the financial supply from European Union.

Latvia has joined INOGATE umbrella agreement, regularly takes part in workout of Europe Energetic charter Transit protocol, and actively cooperates in North dimension where Latvian transport specialists have applied certain projects for developing transit. There has been created investment appealing tax regime in Latvian harbours. Container train has been made to join Baltic States’ harbours with Russia, Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan. This is a
unique possibility for Latvia to operate in the biggest fields of transit – harbours. Also important is to gain leading positions among Baltic States in creating logistic centre and for that there are all needed logistic preconditions. Besides transport development tendencies in EU, appealing combined transport system should be created. This is connected with both legislation and infrastructure. Active cooperation with Eastern countries has been started in order to draw in transit cargos for Latvian harbours.

Following the situation in the global transportation business and politics, Latvia’s top priority today is the use of containers in transportation. Container train “ZUBR” (the Baltic States, Belarus) route has been extended to Ukraine and the Ukrainian ports of Odessa and Illichivsk with the opportunity to further deliver the goods to Turkey and other Black Sea ports and return them to the Baltic States and Scandinavia. In near future it is planned to sign an agreement with People’s Republic of China for cooperation in railroad sphere, to be more precise – to lengthen container train “Baltika-Tranzit” up to China.

The perspective of the development of the transit of Latvia depends a lot on the development of cooperating states. Transport corridors crosses the territory of Latvia both from East to West through harbours of Latvia, and from North to South connecting Russia, the Commonwealth of Independent States (CIS) and Asian States not just with Western Europe but with the whole World. Transit in Latvia is perceived as a sphere which contains wide range of service – cargo operations, cargo storing, dealing with custom formalities etc. Latvian international road cargo transporters mostly work for transit. No doubt that stable transit cargo amount increase, cargo value added tax increase, development of product distribution and logistic centers is the main priority in Latvian national economy. The biggest investments in transport infrastructure are given to harbours, roads and railroad in the directions which serve for transit cargo flow.

The Trans-European railway Rail Baltica, linking Helsinki – Tallinn – Riga – Kaunas – Warsaw and continuing on to Berlin, is to be developed within the territories of the cooperating EU Member States (see Figure 4).

Rail Baltica will support the wider EU goals of parity of Access to services and infrastructure of EU Member States and development of sustainable modes of transportation, improved balance and interoperability between different means of transportation and the establishment of links with the rest of the EU rail network. The current version of the project allows decreasing significantly the total time of delivery for the whole route, however small lose of time is to be anticipated for the tours to Riga because the route is meant to be located in a short distance from Riga. Due to this reason the option of creating a branch of the route to the airport and harbour is considered, which is in accordance with the White Paper’s of 2011 policy of connecting the airport and harbours with the railway system till year 2050th. Meanwhile the authors of this project points out that the project has a relative rivalry to operators that are acting in other markets. Carrying out the project will allow developing the operations of logistic centers, which will ensure connections between current and the new system of provision. For the purpose of decreasing the delivery time, projects of infrastructure on the current railway and road transportation routes are being carried out.

Finally, as the main problems of transport development in Latvian might be named these:

- poor quality of roads on the main transport directions;
- disordered-crossing formalities for EU-Russian border;
- underdeveloped transportation facilities by rail in international traffic; EU countries’ rail systems lack in Latvia and inefficient connection with EU railway system.

These matters haven’t lost their topicality even today. The aim of transport and transit policy still remains – to create and maintain effective, safe, multimodal, balanced, environmental friendly and competitive transport system. Therefore it is significant to find solutions for the said problems.

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 ROLE OF AIRPORTS IN THE DEVELOPMENT OF LATVIAN CITIES, TOWNS AND REGIONS

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Abstract

One of the most significant issues for ensuring successful development of cities not only in Latvia, but also in the whole world is its accessibility. Therefore, well organized transport infrastructure is one of the most important prerequisites for increasing the competitiveness of a city. In urban and regional development city’s accessibility is ensured not only by developed road, rail or sea transport infrastructure, but also by a well-developed air transport infrastructure. Although the Latvian government from time to time has emphasized and set in its transport development guidelines how significant development of regional airports is for equal development of Latvian regions, in practice, public support for the development of regional airports has so far been confined to including the future vision of the development of these airports in several important policy and planning documents.

Key words: city, town, urban and regional development, transport, regional airports.

Introduction

The aim of this paper is to assess the role of Latvian regional airports in the urban and regional development since the improvement of transport infrastructure leaves a positive impact on the development of economic activities, which results in an increased demand for transportations due to increased production volumes. In countries, whose economies are at an early or middle stage of development, businesses related to air transportations are poorly developed, thus facing difficulties in the socio-economic development of the region and integration of its population. Under these conditions, the principles for building transport infrastructure and support facilities are most frequently associated with short-term planning and poor use of economic instruments (management, profit, financial resources). In developing the urban and regional infrastructure, first of all, long-term gains associated with social benefits and perspective optimization of transport infrastructure should be taken into consideration [1].

1. Role of regional airports in urban and regional development

Development of regional airports plays a significant role in further development of the closest cities and surrounding areas. When assessing the impact of scheduled air transportations on regional development, it may be defined as direct, indirect and related.

Direct impact means that airports together with the air carriers and air traffic control services ensure successful operation of air transportations. Consequently, successful development of air transportations contributes to the growth of airports and its related businesses.

Taking into consideration the breakdown of employment in the aviation sector (see Figure 1), the sector of air transportation and airport supply leave the greatest impact on creation of new jobs. Air carriers alongside with airport service personnel may constitute up to 79% of the workplaces in the airport infrastructure [2].

![Fig. 1. Breakdown of personnel directly employed in the aviation sector](image)

Thus, due to further development of scheduled inland flights:
- New workplaces are created.
- It also contributes to businesses related to aviation technology supplies (aviation fuel delivery, handling services, aircraft maintenance, communications, supplies, etc.).
- It also contributes to the airport land remediation and restoration, resulting in a significant increase in airport land added value.

2. Indirect impact

Although the relationship between infrastructure, connectivity and regional economic development is very complex, many researchers be-
lieve that under conditions of global competition the
presence of a good infrastructure and good access to regions, can play a very important role, when choosing a favourable place for the location of a business. The infrastructure is one of the factors which investors take into account when looking for a new place. In order to ensure the competitive environment for businesses, the accessibility is of vital importance.

Indirect effect of the air transportation industry is indicative, and it is most difficult to be expressed in financial estimates. However, taking into consideration the experience of the regional transport network development and the results of the EU comparative statistical analysis, the regions with developed aviation infrastructure have experienced a 20% increase in the investment environment competitiveness, a 30% increase of innovative technology businesses and up to 40% increase of employment in tourism and public services sector [2].

In Europe, the aviation industry on average contributes 2.4% to the total annual GDP [3]. It is possible to apply these calculations in assessing the indirect impact of the regional air transportation for the Latvian situation, as well. However, it should be emphasized that such an impact of the regional air transportation on GDP is to be expected in the long run, in case the air transportation industry is sufficiently stable, reliable and gain consumers’ loyalty.

Thus:
- It also contributes to the investment environment in cities, towns and regions.
- In the long term, due to the availability of air transportation, it is possible to increase the GDP on the basis of the regional businesses.

3. Related income

As a result of the airport operation and availability of regular traffic, the demand for a wide range of services and goods, is generated, which in turn is essential for small and medium business development in the regions, including the demand for construction services, staff training, IT technologies, retail trade availability, communications, utilities and public transport services.

An important factor in accessibility of the regional aviation infrastructure objects is the provision of national aviation operations and supplies for fulfilling the functions of aviation search and rescue services and state external border patrol [4].

European regional and structural policies are aimed at increasing social cohesion among member states and at reducing disparities between levels of development in different regions. Accessibility of the regional air transportation contributes to the population movement and the consumption needs increase, thus:
- Creating the demand for development of new businesses.
- Reducing arterial road congestion and improving regional accessibility.
- Providing support for fulfillment of national aviation functions.
- Accessibility of air transportation facilitates migration of population and increase of the consumption needs [5].

Understanding the significance of further airport development in urban and regional development, so far only some of the Latvian self-governments have been able to make substantial investments in the existing infrastructure of the regional airports, as well as, all these years, cover the airport operating costs, however, due to insufficient self-government budget resources and the changing political environment, without financial aid from the state and unified infrastructure development programme, viability of regional air transportation and airport infrastructure is not possible.

International experience shows that regional airports around the world are in a less favourable situation than the big airports. While small regional airports may not have reached the required capacity, it is difficult, if not impossible, without an initial state aid, to attract airlines, which would be ready to launch regular flights, because when starting such operations, the airlines for the first three to five years would suffer losses [6].

The airports play an important role in reaching the most distant regions, e.g., in Greece, Scandinavia, Scotland and Spain. This has had a positive impact and contributed to successful economic development, improving local services, such as medicine and education, as well as promoting cultural and sporting links. Similarly, it should be emphasized that the accessibility of air services has been essential and has left a positive impact on the competitiveness of such regions as northern Sweden and Puglia in Italy [2].

The accessibility of the regions may prove to be a major attraction of skilled labor, as in remote areas far from the capital city, the unemployment rate is often higher. This could become
an impeding factor for growth of the entire economy. For this reason, a significant part of air services, connecting the periphery with major cities and towns, is classified as “the public service obligation”, which means that the aviation operations are financially supported by regional and national governments. As a justification, commonly cited are the significant connections to capital cities or regional centres or the accessibility of such services as hospitals and schools.

Taking into account the significance of the development of regional airports in regional development, the European Commission addressed this problem and changed its previous position regarding the issue of supporting the regional airport development by issuing on 9 December 2005 the Communication entitled “Community guidelines on financing of airports and start-up aid for airlines departing from regional airports”.

In the future, availability of air transportation as an alternative solution to the increasing loads on the Latvian trunk roads may be used as a sufficient justification that this mode of transport becomes more popular and eventually will be able to provide economically substantiated airline traffic occupancy [6].

Table 1. Advantages and disadvantages of air transportation (compiled by authors)

<table>
<thead>
<tr>
<th>DISADVANTAGES</th>
<th>ADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>- High transportation costs</td>
<td>+ Speed</td>
</tr>
<tr>
<td>- Great time consumption for ancillary operations</td>
<td>+ Possibility to reach distant regions</td>
</tr>
<tr>
<td>- Geographic accessibility</td>
<td></td>
</tr>
<tr>
<td>- Booking process</td>
<td></td>
</tr>
</tbody>
</table>

In accordance with data of Civil Aviation Agency, in Latvia at present there are 9 certified airfields and airports:

- Riga International airport - the main international airport certified for regular passenger, mail and freight traffic;
- Liepaja and Ventspils airports - international regional airports certified for general aviation;
- Tukums airfield/airport – certified for occasional passenger, mail and freight traffic;
- General aviation airfields – “Ikskile”, “Cesis”, “Adazi” and “Daugavpils” from which air transportations are not made and which are envisaged for aircraft with maximum take off weight up to 5,700 kg;
- Heliport - National Armed Force Base airfield Lielvarde (general aviation heliport “Sola M”) [7].

We understand scheduled air transport of passengers here as air traffic on fixed routes on a regular schedule. Non-scheduled air transport company “Latvian air”, which in their work uses modern communication and radar navigation tools and appropriate procedures conforming to the European Union standards [7].

Changes in the Latvian economy and society affect the demand of transport services and its satisfaction. The criteria that identify the choice of the passenger or cargo carrier are different, e.g., availability and performance of other modes of transport, price, speed of delivery, etc. Under conditions of economic crisis, the transport choice is largely determined by its price. When making assessments within a region (in this case, within a country), air transport, unlike the rest of the modes of transport, has most disadvantages, number and significance of which do not outperform its advantages (see Table 1).
means transport by air, which is not provided on a fixed schedule, as well as regular charter flights [8]. General aviation airfields, under no circumstances, may be used for air transport [9]. Thus, opportunities for passenger transport within the region are limited.

Although Liepaja and Ventspils airports have made attempts to operate scheduled passenger services, currently, Riga International Airport is the only scheduled air traffic airport in Latvia providing 100% of scheduled air services operated in Latvia. The number of regular flight passengers at Latvian airports is shown in Table 2.

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riga</td>
<td>2 495 020</td>
<td>3 160 945</td>
<td>3 690 549</td>
<td>4 066 854</td>
<td>4 663 647</td>
<td>5 106 926</td>
</tr>
<tr>
<td>Liepaja</td>
<td>1201</td>
<td>31 375</td>
<td>42 269</td>
<td>458</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ventspils</td>
<td>0</td>
<td>0</td>
<td>6 607</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

In Liepaja airport regular passenger services were performed from 2005 to 2009, but in Ventspils airport only in 2008. Accordingly, the services provided by regional airports refer to the passengers of occasional tourist and business trips, as well as passengers of the flights performed by border guards. Freight turnover at the Riga airport is shown in Table 3.

<table>
<thead>
<tr>
<th>Year</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cargo loaded, t</td>
<td>2020</td>
<td>2273</td>
<td>2312</td>
<td>2658</td>
<td>3790</td>
<td>5299</td>
</tr>
<tr>
<td>Cargo unloaded, t</td>
<td>13943</td>
<td>10334</td>
<td>5811</td>
<td>4900</td>
<td>5560</td>
<td>6994</td>
</tr>
</tbody>
</table>

As shown, in Table 3, the quantities of cargo loaded and unloaded in the Riga airport tend to change drastically. In addition to the above mentioned certified airfields and airports, in Latvia there are several uncertified short runway airfields (about 400-500m), which were once used for agricultural aviation purposes, but now they are mainly used by local aero clubs and private aircraft owners [7]. For example, in Jelgava district there is a helicopter field “Centre Jaunzemj”; in Limbaži a general airfield “Langači”; in Riga - airport “Spilve”; in Talsi - grass airfield; as well as hard surface airfields in Rezekne, Jekabpils, Vaiņode, Slampe, Mālpils, Skrunda, Cirava and Irlava and many other small Latvian towns. These airfields satisfy neither the requirements of general aviation, nor any type of commercial flight requirements. To adapt these airfields for regular air traffic, they should be first certified to conform to the regulatory requirements. Taking into account that, for the most part, in these airfields only some pieces of asphalt concrete surface in poor technical condition are to be found, significant financial investments would be required, to accommodate the airfield infrastructure, which would be equal to building a new airfield.

5. Opportunities for the development of regional airports

It is not really possible to identify, explore and analyze the priorities for functional and economic development of airports separately from the regional and urban development plans. Tukums airport case has even proven not only the essential role the self-government plays for the development of the airport, located in its territory, but also, in accordance with the existing legal framework, the importance of the adjoining area of the airport impact zone and its ownership. In case the town of Tukums imposes restrictions on airport operation in the airfield takeoff or landing sector, the airport development will be further blurred. If these restrictions are lifted, the position of the nearby Riga Airport would play an important role, as from the global perspective, the primary aim of air carriers is the capital city or other developed regional centres. In Tukums case, the primary destination of airlines, as well as passengers destined for Riga, is, of course, Riga. And, if the Riga airport capacity is not overloaded, it is unlikely, that the Riga airport would be interested in shifting one part of its traffic flow, and, hence, the potential revenue to the airport in Tukums.

According to the authors, the city of Ventspils has the greatest potential attractive-
ness of the region. The city is positioning itself as advanced, business and tourist-oriented environment. When making the cost-benefit analysis for Ventspils airport development project, we have come to a conclusion that one of the most essential risks for further development of the airport is whether the state aid to the airport and airlines would or would not be granted, which is aimed at developing domestic flights and launching of new international flights outside Latvia.

Air transport industry compared to other industries is faced with increasing political influence and regulatory efforts. This situation affects the investment climate in the transport sector, which is particularly sensitive to political processes in the regions and countries. It directly affects the development of airports, because in this case the invested resources are contributed to a specific geographic location and are dependent on the associated political decisions [10, 12].

There are some differences between the methodology of forecasting the development of country’s national airport passenger flow, and regional airport passenger traffic development, as well as the methodology for the development of an airport, operating long term, and a new airport, which is still under construction, in the planning stage. During the implementation stage of the methodology, the developed countries use air traffic parameters, which are derived from the relationships of different national indicators - gross domestic product, sales, price fluctuations, etc. The future forecast may be obtained by inserting separate forecasted values into the respective functions. However, this model can be fully used only in the developed countries [12].

Considering that the historical data that could help and explain the future business model and development of Ventspils, Daugavpils, or Tukums airport operation do not exist, or are not of significant importance (Ventspils airport case), when making the forecasts, mathematical approach (such as trend and regression methods) cannot be used. In Liepaja, where regular passenger services were practiced during the period between 2005 and 2009, the forecast may be made on the basis of historical data.

Overall, the forecasts for Latvian regional airports can be made using the conclusion and judgment methods, based on the available information and assumptions. The general development scenarios that apply to all airports, include the following directions:

- General aviation traffic;
- Local traffic;
- Regional and international traffic;
- Cargo transportation;
- The State Border Guard;
- Search and Rescue Service.

Making analysis of the potential demand in general aviation, the assumptions show that, in the coming years, number of business and corporate flights in Europe and especially in the Central Europe and Russia, could significantly increase [11].

In a longer period of time, it might be possible that some general aviation aircraft would be deployed at airports. It would become possible if, for example, two, three, or four local entrepreneurs would like to use aircraft according to the so-called “shared ownership program” principle, which is based on flight time distribution principle.

Local traffic is largely related to the connections with the capital city of Riga which competes with about a 3 hour journey by road. If such a route were successful, it would be like providing direct service in the morning and in the evening between Riga and regional cities. It would provide quick transportation of business people and other travelers who have tight time schedule back and forth. In addition, such a route could be used as an access road from the international flights to and from Riga. Initially, this domestic flight could be operated by a relatively small size aircraft such as Beech 1900, Jetstream 31 or Saab 340, to try and test the possibilities of this route, but later, the routes could be also operated by a larger turboprop aircraft. At this stage, frequency and regularity of flights, as well as aircraft size and capacity are important. This service could be realized and offered by any EU aircraft company, but it is more likely that only the Baltic and Scandinavian air carriers would show an interest in these transportation options. In this case, local routes would combine with regional flights in the Baltic and Scandinavian countries, in order to ensure maximum flight fulfillment and profitability.

The main rival of any Latvian regional airport is the Riga airport. Its geographic location provides its zone of influence within all the territory of Latvia (the zone of influence is the distance to be reached in 2 hours), so most part of the passengers of each regional airport or primary passengers will be the inhabitants of towns, while the potential passengers will come from the sec-
ondary zones and will use the airport, in case it would offer flights to such destinations that Riga airport or a competing airport do not offer. (In case of Liepaja, competing airports could be in Ventspils or Palanga, in case of Ventspils - Liepaja airport).

It should also be noted that the flight destinations are not chosen only by the airport itself, but in most cases it depends on the potential Latvian and international carriers, who mainly look for the good profit opportunities in the region. Thus, in the planning stage it is almost impossible to determine the potential number of passengers at each airport, because it is not known, how many passengers could be attracted from the zone of influence of Riga.

Thus, the regional airport zone of influence and impact strength will depend on the following factors:
- Designated geographical area;
- Purchasing power of population;
- Structure of industry;
- International relations;
- Tourist attraction;
- Airport services and classification;
- Proposed flights and their frequency;
- Another airport located at a distance to be easily covered by road transport;
- Competition consisting of roads which may be overloaded.

The true meaning and importance of mutual interaction between different parameters is unpredictable in absolute terms, but it is important to identify these factors when planning airport development [12].

When making forecasts about potential airport destinations, it should be taken into consideration that most of scheduled flights from the Riga International Airport (also from the Palanga Airport) are made to the airports of the major European cities, at the same time, there are no flights to small regional airports in Scandinavian and Baltic countries. However, as it has already been mentioned, the airlines and not the airports make decisions about the choice of the destinations and development of new routes, regardless of the wishes of the airport. This means that the regional airports can only focus on providing good, high-quality promotion and marketing activities, but where, when and how many flights will be made depend only on the operators’ own decisions.

The main task of the airport is to create conditions which are favorable enough to attract airlines.

In all the adjoining territories of the regional airports, the towns, when planning the strategic development of the airport, have already chosen and set up commercial and industrial zones (or in the case of Daugavpils, they plan to do it in the near future). Towns try to attract producers of electrical goods, or high-quality textile producers, or producers of similar goods that might also turn out to be a good basis for the development of transportation. Freight transport quite often is being replaced by the so-called package freight being carried on passenger aircrafts, which does not increase the number of flights and airport revenues. Larger scale freight transportation can be carried out by special aircraft, which will require airfields with high allowable takeoff or landing weight of the aircraft weight ratio.

Conclusion

With the increase of people’s standard of living and changes in the aviation transportation market, all over the world the number of air passenger flights and air freight traffic is growing, which in turn creates the need to constantly develop the airports, fostering their growth and making them into major centres with a wide range of service offerings.

Assessing the factors essential for promoting airport development and air service system in Latvia, we may state that, at present the biggest problem of the Latvian regional airports is the shortage of passengers and air carriers, as well as lack of airport capacity, or poor technical condition of the airports. It may not be unambiguously alleged that the problems of development in all airports are equal. In terms of their development potential and opportunities, they have some common features, however, on the whole they are different.

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MARKETING AS A TOOL FOR TOURISM SUSTAINABLE DEVELOPMENT

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Abstract

Tourism is a rapidly growing phenomenon and has become one of the largest industries in the world. The impact of tourism is extremely varied. The attitudinal behaviour and approaches of tourists and service providers have undergone significant changes during the closing decades of the twentieth century and beginning of the third millennium from the viewpoint of tourism marketing. Tourism has emerged as a globally popular human activity with considerable social, cultural, political and economic consequences. Mass tourism bringing with it diversity and conflicting perceptions and expectations has dramatically expanded the scope and nature of tourism. This has subsequently raised several critical issues related to marketing. These issues invite tourism planners and practitioners as well as academicians and researchers to systematically consider emerging issues and propose a more viable approach to marketing tourism products and services. One such major issue is the need to keep the concept of sustainability in clear focus consideration. Tourism and hospitality marketing can play a more responsible part in tourism sustainability that meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future. The proposed research focuses on how tourism marketing activities can contribute to the development of sustainable tourism.

Key words: marketing, tourism, sustainable development.

Introduction

Tourism is one of the largest and steadily growing economic sectors world-wide, as well as being a sector in which developing nations have a considerable stake.

International tourism, with its emphasis on the exploitation of “free” resources (sea, mountains, friendly people), became an attractive option for many countries. Tourism, unlike other development options such as manufacturing, mining, forestry etc., was widely perceived to be a clean and renewable industry. Because it drew upon “free” natural, historical, social and cultural resources it was thought to be less capital intensive in its requirements for development. Tourism was seen to have potential to be a major driving force for economic development in many countries [1]. By the early 1970s it became apparent that the “smokeless industry” of tourism was not as benign as first thought.

Early critiques of tourism as a development tool focused primarily on the negative socio-cultural impacts [2], but as international tourism continued to grow exponentially, it became apparent that negative impacts affected the environment and economies as well. The initial response to those negative impacts involved a series of initiatives undertaken by public sector bodies to attempt to manage tourism through visitor management techniques. These initiatives were designed to ameliorate the worst of the impacts in the short-term. Overall, these were small-scale, localized initiatives that did not attempt to change the nature of tourism as a whole [3]. They were however, the precursors of consideration of sustainable tourism development.

Since the Earth Summit, the concept of sustainable development came under increasing attention from both tourism theorists and practitioners. Its basic premise has received widespread acceptance as a desirable outcome of tourism development.

These issues invite tourism planners and practitioners as well as academicians and researchers to systematically consider emerging issues and propose a more viable approach to marketing tourism products and services. In this case, marketing can play a more responsible role in tourism sustainability. “Marketing is a social and managerial process by which individuals and groups obtain what they need and want through creating and exchanging products and value with others” [4]. It is concerned with determining consumer needs and preferences, creating appropriate products to consumers and advertising their benefits, is a sustainable manner. The knowledge, ethics and attitudes of stakeholders can have a major effect on the achievement of sustainable tourism objectives within individual business and within the boarder tourism destination.

For tourism development to have sustainable outcomes, business operations must be sustain-
Sustainable development for business means “adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining and enhancing the human and natural resources that will be needed in the future” [5].

1. Tourism Sustainable Development: Definition

There are different ways of understanding the meaning of sustainable tourism. According to the United Nations World Tourism Organization (UNWTO), “sustainable tourism development meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future. Sustainable tourism is envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity, and life support systems” [6].

In other words, sustainable tourism development is ecologically sustainable, economically viable as well as ethically and socially equitable.

Sustainable tourism development requires the informed participation of all relevant stakeholders, as well as strong political leadership to ensure wide participation and consensus building. Achieving sustainable tourism is a continuous process and it requires constant monitoring of impacts, introducing the necessary preventive and/or corrective measures whenever necessary. Sustainable tourism should also maintain a high level of tourist satisfaction and ensure a meaningful experience to the tourists, raising their awareness about sustainability issues and promoting sustainable tourism practices amongst them [7].

2. Marketing Sustainable Tourism

“In marketing terms, sustainability is primarily an issue of product quality. There is no clear evidence in the developed world that more than a small minority of visitors understands concepts of sustainability and environmental good practice and draw on them when choosing products. There is even less evidence that the great majority of visitors are willing to pay premium prices for the products of tourism businesses operating to high environmental standards. But there is convincing evidence that customers turn away from what they consider to be overcrowded, polluted destinations which have allowed their environmental quality to become eroded through over development. This is especially true where health risks, as from air and water pollution, are perceived as problems. There is also convincing evidence that customers become more experienced in travel, more demanding, and searching for a combination of quality and good value for money which they are increasingly able to recognize” [8].

In recent years one of the key problems has been the narrow perspective of marketing adopted by the travel and tourism sector. Many organizations continue to equate marketing with promotion and to concentrate solely on the expansion of overall visitor numbers [9]. As Wheeler [10] puts it, authorities and companies have had an unbalanced view of marketing, only using promotional techniques and viewing price as supplementary to the target of attracting additional numbers. This in turn has caused visible effects on the environment. Overzealous marketing by tourism organizations can result in attracting of potentially harmful numbers of visitors, who by their very presence alone can erode coastal paths, displace local wildlife and generate additional levels of both noise and vehicular pollution [9]. Promoters and developers are less inclined towards promoting tourism as a social activity but tend to consider it as a source of quick financial advantage. Rapid growths in some destinations seem to accelerate the declining stage without holding on to introduction, growth and maturity stages. In the 1990s Kotler refined and broadened the remit of marketing, especially in terms of sustainability, stating that “the organization’s task is to determine the needs, wants and interests of target markets and to deliver the desired satisfaction more effectively and efficiently than competitors in a way that preserves or enhances the customers’ and the society’s well-being” [4].

Sustainable marketing should contribute to finding feasible trade-offs between business and environmental concerns. Sustainable marketing is, among other things, an appeal to lengthen corporate time horizons and to value continuity over profit [11].

Implementation of the marketing concept in tourism can be achieved through the use of a variety of marketing tools and techniques. The overriding goal of tourism marketing within the context of sustainable tourism development is to achieve an appropriate balance between supply and demand.

This involves:
- Managing tourism demand (the type and number of tourists targeted and their associated activities and timing of visits, duration of stay); and
- Managing tourism supply (the provision of quality tourism products, services, experiences and infrastructure within the resource capacity of the tourist destination) [5].

The appropriate management of these variables should lead to the maximization of tourism development benefits for the relevant stakeholders including tourism industry operators, government organizations, tourists and the host community while minimizing the negative impacts on the socio-cultural and natural environments in which tourism operates. What constitutes an appropriate balance will vary from one destination to another and will be dependent on the goals of the local community and the unique characteristics of individual destinations.

Several stages can be underlined:
1. The first stage is analysis of the market, resources, competitors and the business environment.
2. The second stage is to decide on the strategic choices of how to segment markets, to determine the markets to be targeted, and to plan an appropriate product positioning.
3. The latter part is to determine the marketing mix, which in its most basic sense means how the product will be offered to tourists, the price that will be charged, how the product will be communicated, and how it will be distributed. It is through examining the requirements of these promotions and distribution channels that projects and firms face the reality check of what the market wants.

Successful market segmentation and targeting involve the appropriate matching of tourist needs with the experience being offered, and, in the case of sustainable tourism, the need for this match is particularly important [12]. Tourism organizations need to give greater consideration to segmenting their market with a view to concentrating on those categories of visitor that are not only economically attractive, but are also likely to be susceptible to messages aimed at encouraging them to adopt sustainable behaviours [9]. The targeting of inappropriate tourists not only jeopardizes business objectives because the needs of inappropriate tourists will not be met, but also may cause environmental damage or act insensitively towards a local culture [12]. The Republic of Cyprus’ demarketing strategy has had remarkable success. The market segment decisions made 25 years ago to concentrate on certain sub-groups (older high and middle income groups) to the exclusion of other groups normally associated with mass tourism. This is how Cyprus intended to position itself in the eyes of the tourist population; this vision was a product of an audit of natural resources, aspects of tourist interest, the need for minimal disruption to the indigenous population, levels of per capita spending and a recognition of limited space for a tourist industry [13]. It is necessary to be aware of the profiles of tourists attracted to a destination. This information is needed so that the marketing strategy can target those groups of tourists most likely to be interested in visiting the destination. Thereafter that profile can be projected into the future (using environmental scanning techniques); and balance the long-run requirements of sustaining the asset base (the quality of the environment at destinations) with short-run needs to satisfy customers (the potential range of products and services available) and generate profits.

3. Marketing Mix – Product, Price, Place and Promotion

The marketing management practices of tourism organizations can influence progress towards the attainment of sustainable tourism objectives in a number of ways. The traditional 4Ps of product, price, place and promotion, also known as the “marketing mix”, are the tools marketers use to target their chosen markets. Marketing is a powerful influence on tourist behaviour through the products and services produced and distributed, the pricing strategies employed, and the images and messages conveyed through advertising and promotion. The marketing mix is often manipulated by management so as to target the greatest number of visitors and associated spending, with little regard given to the wider socio-cultural and environmental impacts on the host community [5].

While the continued growth of tourism is inevitable as international tourist numbers continue to increase, a better alternative for all nations where the lifestyle, culture and natural environment are felt to be under threat may be focus on quality rather than quantity. This could be achieved by providing high-quality tourism facilities and experiences aimed at attracting high spending tourists [14].
3.1. Product

Tourism products and services are often designed only after considering the needs and wants of the visitors and the key competences of the business, with little consideration being given to the overall goals, values and wishes of the host community. In many cases this has resulted in tourism business inevitably destroying the very resources that attracted tourists in the first place [5].

The product dimension to achieve more sustainable tourism involves:

a) developing products which are more sustainable in nature:
   - conservation holidays;
   - vacation packages using public transport rather than private cars;
   - small-scale rural community-based tourism initiatives;

b) moving away from offering products which are intrinsically not sustainable:
   - hunting trips;
   - holidays on which tourists consume too many local resources which may be in short supply, such as water, wood etc. [15].

The concept of a “sustainable tourism product” is understood broadly as meaning those that use resources in an environmentally responsible, socially fair and economically viable way, so that users of the product can meet their current needs without compromising future generations from being able to use the same resources. Measuring sustainability is a complex issue and the criteria vary according to the product type and local conditions. Deciding what is ultimately sustainable for a particular community is a balance between local circumstances and expectations and best practice in technology and environmental management.

3.2. Price

Pricing structures have often been based on maximizing visitor numbers to an area and associated revenue without factoring in the cost of protecting and maintaining a high-quality environment and without consideration of the carrying capacity of the destination. This practice can result in overcrowding place pressure on the natural and cultural recourses in the host community and in some cases can result in resentment from the local residents who begin to experience more of the negative social and cultural impacts of tourism [5].

In general, the public sector has little influence on prices (except in cases of public ownership and through taxes, fees and the like) but is a most influential tool in the hands of the commercial sector to influence demand. Price is inversely related to demand [16]. For sustainable tourism development, the price paid by the tourist should cover the full cost of their holiday. The cost must also be high enough to:

- ensure a satisfactory experience for the tourist;
- provide a satisfactory level of profit for the tourism industry;
- generate an appropriate level of benefits for the host community;
- cover costs involved in putting right any damage caused by the tourist to the environment;
- pay for the resources consumed by the tourist;
- allow employees to be paid a reasonable salary [3];
- automatically discourage large numbers of visitors [13];
- present an image of exclusivity; a positive factor in image building [13].

The principles of sustainability also mean ensuring that the tourists feel they have received value for money, rather than leaving them with the idea that they have been exploited [15].

3.3. Place

Place includes the location of the business and the distribution channels used by the business to get the product to the customer. An emphasis on securing the most attractive location for the business often means tourism operators seek out pristine fragile environments with obvious appeal to tourists such as beachfront and alpine locations. However, it is these sites that are often more susceptible to negative environmental impacts that come with tourism development such as the destruction of flora and fauna [5].

Therefore,

- encourage trends towards direct selling, leaving out the marketing intermediaries, as this often results in a better price for the consumer [3].
- where an agent is used, action should be taken to ensure that the way they sell a product is ethical and does not raise unrealistic expectations in the minds of tourists [3].
3.4. Promotion
The promotion of many traditional tourism products has resulted in the degradation of the cultural and physical environment at the destination and the economic sustainability of the destination as it loses its appeal to tourists. Tourism advertising and promotion are often aimed at conveying a certain type of image to relevant target segments so as to maximize visitor numbers rather than portraying an accurate image of a destination. This promotion is a key influence in establishing consumer perceptions of a destination and indicating acceptable types of behaviours. Portraying unsustainable activities in advertisements, such as luxury tourism in national parks, may lead to such behaviours becoming the norm by visitors once at the destination.

Promotional techniques (the specific presentation of objects, stories and themes, and all the forms of display provided for visitors) can be a vital element in creating more sustainable forms of tourism. Sustainable promotion should reflect the manner in which a tourist site is promoted and advertised, and such promotion must accurately reflect the unique characteristics of the area in order not to cause disappointment and frustration among tourists. It is important that the industry, in its brochures and advertisements, does not create expectations that the product cannot live up to. Tourism organizations and destinations can also use literature and advertisements to raise tourist awareness of key issues relating to sustainability. They can undertake “green marketing” and communication of information explaining and interpreting the nature of the attraction/resource and its significance, for example, by promoting „soft“ tourism that minimizes adverse environmental and cultural impacts (e.g. nature tourism) as well as informing tourists of the impacts of their presence [15].

3.5. People
Tourism marketers often include a fifth “P” in their marketing mix: “People”. Tourism and hospitality is a people industry and involves relationships among a range of stakeholders, including the tourism operators, the tourists, the public sector and the host community. Traditionally there has been a lack of cooperation and partnerships among tourism organizations and a lack of liaison and cooperation with local communities to ensure that their goals and the goals of individual tourism, which suggests that all tourism stakeholders including the local community, should be actively involved in working towards sustainable tourism [5].

Conclusions
In today’s world is difficult to imagine any destination in all forms to be a “model destination”. Even de-marketing efforts cannot prevent people to travel as they need all kinds of assistance from tourism service providers to make their trip not only hassle free, but also a lifelong experience.

In today’s rapidly changing business environment, it is imperative, that business remain alert to emerging market trends and change their business practices accordingly, if they are to remain competitive. As tourists are becoming more educated and increasingly sophisticated in their consumption patterns and as they demand better quality tourism products and experiences, travel and tourism firms need to respond with more creative marketing approaches based on better quality products and more informative and trustworthy advertising messages.

Those firms that are proactive in responding to this demand for quality tourism products will be more competitive than those firms that are reactive and only respond to environmental concerns when faced with regulatory pressure. Destination marketing organizations and individual travel and tourism firms can capitalize on this new wave of sophisticated travellers by formulating marketing strategies that are in accordance with the sustainable tourism goals of the destination in which they operate.

Along with this, the continuous educational programs are to be provided, more sensitive environmentally aware attitudes and the adoption of long-term perspectives towards tourism resources exploitation implemented.

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INDICATORS OF TOURIST ENTERPRISES MARKETING MANAGEMENT EFFICIENCY AND SUSTAINABLE DEVELOPMENT

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Abstract

New public policy encourages tourism development and provides tourist enterprises (regardless of ownership) with opportunities to improve management efficiency, expand market proposition to meet the needs of domestic and foreign tourists. In this regard, the practical use by tourist enterprises of the modern management techniques becomes especially important. In the transition to the market, most businesses are in a state of transformation of the existing systems. Application of certain management method is dictated by the overall market situation, the level of competitiveness, enterprises’ purpose, as well as internal company performance. Analysis of recent studies and publications demonstrated that tourist company’s choice of management methods is determined by the latter belonging to one of the categories (large, medium, small to smallest) depending on staffing levels and market shares of selling tours. So for the vast majority of tourist enterprises relevant are the results of research on efficiency of tourist enterprise management, what helps to increase its performance results. The purpose of the article is to present the results of marketing research conducted by authors the aim of which was to identify and analyze the main indicators that determine marketing management efficiency of tourist enterprises in Ukraine and Georgia.

Key words: marketing management, tourist enterprises, integral indicator, matrix indicator.

Introduction

Monitoring of marketing environment of tourist enterprises in Ukraine and Georgia on modern stage of their functioning in complex with diagnostics of management processes between them have testified to little efficiency of the examined processes, and therefore, their incompatibility with tourist service market conditions. We have found out that the main reasons for existing state include failure to consider by employees of tourist enterprises the objective reality with its fundamental changes, and namely: in the level, type and structure of competition; in the change of impact of separate components of resources on final result, in particular, rapid growth of role of informational, innovation and intellectual elements; in increase of relevance to implement concept of marketing cooperation with its principles of customer orientation, social ethics, adaptability etc.

Latest publications [1-5] and researching practice of tourist enterprises evidence that the most part of it has been groundlessly limiting itself to analysis of economic indexes. As we view it such an assessment cannot claim objectivity as economic indexes characterize only the measure of success/failure of relations of tourist enterprise with consumers of the last stage of taking decision to purchase. We emphasize that the mentioned indexes cannot (and should not) characterize such important stages of customer behaviour as awareness, knowledge, convictions and etc. At the same time, in order to assess marketing aspects of tourist enterprise there is a complex of respective indexes (which have not been virtually used in researched market) which include: “reputation–remembering” (level of prominence), remembered when needed which contributes to its selection: “knowing–recognition” (level of remembering), when reputation of tourist enterprise brand overpasses the need, it is recognized in selling points and is selected; “prioritized knowledge” – when tourist enterprise brand is remembered first and etc.

Only in case of conducting the specialized marketing research that the analysis of characteristics of head and team and their cooperation is performed. Virtually there is no analysis of a degree of performance of marketing and management functions, no reasons for insufficient quality of performance are cleared up. Failure to apply the said index groups (marketing and management) is accounted for their underestimation on the part of entrepreneurs, lack of understanding of the necessity to carry out deep analysis of situation and various processes which undergo inside and outside the enterprise.

Purpose of article is to highlight results of research conducted by us and mathematical justification of relevance of use of combined expert
and integral method as suggested by us. The said method has been offered for mathematical justification of selecting complex of measures considering belonging of tourist enterprises to groups defined by us ("traditionalists", "start-ups of marketing management", "marketing management followers" and "marketing management leaders") based on determination of expert assessment of tourist enterprises activity and parallel calculation of integral index of management, marketing and economic activity of tourist enterprise which will allow for selecting the most optimal complex of measures to strengthen its competition position.

Results
The analysis undertaken by us has proved that level of tourist enterprises marketing management efficiency, except for external conditions, has been influenced by characteristics of the head and the team, extent of their performance of marketing and management functions which, in general, has been determined by us as degree of marketing principle implementation and can be identified by complex of economic, marketing and management indexes.

Consideration in the course of tourist enterprise activity of the above-mentioned factors allows for fuller assessment of internal capabilities of enterprise and to choose relevant measures to adjust to market situation and, as a consequence, to raise tourist enterprise competitiveness level. Therefore, efficiency of marketing management (EmM) in a generalized form can be represented as main factors (processes) function (1):

$$\text{EmM} = f(x_1; x_2; x_3), \quad (1)$$

where $x_1; x_2; x_3$ – management, marketing and economic factors.

However, each group of factors (processes), alternatively, is composed of considerable number of sub-processes and, therefore, can be measured through a number of indexes $(X = f(a, b, c ...))$, whose failure to determine complicates or makes it impossible to form efficient marketing management due its limitedness of the following: data systemization, interdependence of indexes research, integral outlook on the situation, etc.

Complication of analysis of all three factor groups confirms multidimensionality of the researched processes. Additionally, the considerable share of human factor is a determinant which is important for assessment and defines specification of tourist product. On the basis of foregoing, the efficiency level of tourist enterprise marketing management can be determined with help of suggested order of complex research which includes two stages.

First stage is conducted by method of expert assessment and, in its turn, has three steps. First step of the first stage: assessment, from one part, of characteristics of a head and team of tourist enterprise, and from the other – the level of performance of marketing and management functions by them. On the basis of results of conducted analysis the efficient tourist enterprise marketing management must take into account such elements as: presence of marketing department/marketing manager at the enterprise, marketing plan, management style, training and customer orientation of the staff, establishing contacts with consumers and partners, existence of customer and informational databases etc.

As the second step of the first stage of research the analysis and assessment of characteristic of tourist enterprise head and partner team must be performed; the process and functional factors of internal environment of tourist enterprise partners must be evaluated. The third step of this stage – customer evaluation of tourist enterprise which is inseparable from partners (Fig. 1).

In our opinion it is relevant to supplement the realization of the described part of assessment by conducting additional research of competitors and namely the internal environment by characteristics of the head and the team, level of performance of functions, level of cooperation and communication with researched tourist enterprise.

Tourist enterprises consumer evaluation provides for assessment by consumers of enterprise activity through their perception of complex tourist products (including level of service) price-quality relationship, marketing communications, loyalty programs etc.

The second stage of research is necessary for highlighting results of tourist enterprise activity by means of calculation of complex indexes: managerial, marketing and economic (first step). Second step of the second stage is devoted to identification of tourist enterprise as relevant group according to marketing management implementation level: traditionalists, marketing management start-ups, marketing management followers, marketing management leaders.
The final step of this stage is implementation of complex of measures depending on pertaining to determined enterprise group in order to strengthen tourist enterprises competitive position.

In order to identify certain tourist enterprises group according to criteria of level of implementation of marketing management and elaboration on this basis of most efficient complex of measures to strengthening of its competitive position the matrix has been worked out and such designations have been introduced: (Fig. 2).

For assessment of the said factors and their interconnections we suggest using such indexes:

1) $\overline{A}_{PFFj}$ – average assessment of process and functional factors of internal environment of the j-th tourist enterprises to be determined on the basis of researching of process and functional factors of internal environment of this tourist enterprises and calculated according to formula (2):

$$\overline{A}_{PFFj} = \frac{\sum PFF_{IEj}}{k},$$

where

$\sum PFF_{IEj}$ – total of expert assessments of process and functional factors of internal environment of the j-th tourist enterprise; k – number of process and functional factors of internal environment of the j-th tourist enterprise.

2) $A_{IEj}$ – internal environment assessment of the j-th tourist enterprise which is composed of assessment index of characteristics of the tourist enterprise head and the team and process and functional factors of internal environment. The data received allow for determining total assessment of tourist enterprise internal environment (3):

$$A_{IEj} = \sqrt{A_{HR} \cdot \overline{A}_{PFFj}},$$

where

$A_{HR}$ – resulting assessment of characteristics of the head and the team; 
$\overline{A}_{PFFj}$ – assessment of process and functional factors of internal environment of j-th tourist enterprise.
### Process and functional factors of tourist enterprise internal environment PFFIEj

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### Tourist enterprise’s partner (competitor’s) internal environment process and functional factors PFFPIEg

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<th>Team (te)</th>
<th>Assessment partner’s of head and team (APhte)</th>
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### Legend:
- **AMEA**: Total assessment of tourist enterprise.
- **APHT**: Resulting assessment of head and the team of i-th tourist enterprise.
- **AIII**: Internal environment assessment.
- **APFF**: Process and functional factors assessment.
- **CAc**: Customer assessment.
- **PFFIE**: Process and functional factors of internal environment.
- **PFFIIEg**: Process and functional factors of partner’s internal environment.
- **PFFEPI**: Process and functional factors of partner’s internal environment.
- **TAS**: Total assessment of service.

**Formula:**

\[
\text{AP}_{PFF} = \frac{\sum_{g=1}^{k} \text{PFF}_{P} \text{AP}_{Eg}}{k}
\]

3) Average assessment of process and functional factors of partners of the j-th tourist enterprise to be determined on the basis of research of process and functional factors of internal environment of tourist enterprise partners and calculated according to formula (4):
where
\[
\sum_{g} P_{FFP_{Eg}} \text{ – amount of expert assessments of process and functional factors of internal environment of the } g\text{-th partner enterprises of the } j\text{-th tourist enterprise;}
\]
k – number of process and functional factors of internal environment of the \( g \)-th tourist enterprise.

4) AP_{Eeq} – assessment of internal environment of the \( g \)-th partners of the \( j \)-th tourist enterprise which is composed of indexes of characteristics of partner’s head and team and assessment of process and functional factors of partner’s internal environment. Assessment of internal environment of the \( g \)-th partners of the \( j \)-th tourist enterprise is calculated similarly to assessment of internal environment the \( j \)-th tourist enterprise (5):
\[
AP_{Eeq} = \sqrt{AH_{te} \cdot AP_{FFg}},
\]
where
\( AH_{te} \) – resulting assessment of characteristics of partner’s head and team;
\( AP_{FFg} \) – average assessment of process and functional factors of internal environment of the \( g \)-th partners of the \( j \)-th tourist enterprise.

5) CA_{c} – customer assessment of the \( c \)-th tourist enterprise activity.

Therefore, we have obtained expert assessment of tourist enterprise activity which indicates its level of preparation to implementation of marketing management. From other viewpoint, the same level is evidenced by integral efficiency index of tourist enterprise marketing management – \( \int MME \), calculated by us by means of quantitative economic, marketing and managerial indexes (7).
\[
\int MME = \sqrt{\bar{M} \cdot \bar{M} \cdot \bar{E}},
\]
where
\( \bar{M} \) – average coefficient of tourist enterprise marketing activity;
\( \bar{M} \) – average coefficient of tourist enterprise managerial activity;
\( \bar{E} \) – average coefficient of tourist enterprise economic activity.

All above-mentioned coefficients have been obtained by us through conversion of growth rate of the indexes in the system as selected by us into coefficients and receipt of average value out of it.

Data in Table 1 convince in the relevance of use of integral index as the one which has highest level of objectivity as compared to separately taken economic, managerial and marketing indexes.

Thus, in leader group the integral index has higher value as compared to economic index of rate of increase of sale volumes as it considers the results of tourist enterprise successful marketing activity, evidences the growth of tourist enterprise competitive power as well as enterprises potential to grow and to develop its activity. On the contrary the values of integral index of enterprises belonging to “traditionalist’s” group are lower than their economic index. In our opinion, it indicates that all tourist enterprise’s efforts are directed at quick profit receipt and do not take into account its strategic development which, in the future, can negatively tell on its market position.
Table 1. Summarized table of tourist enterprise activity integral indexes in Ukraine and Georgia, 2011/2010

<table>
<thead>
<tr>
<th>Index</th>
<th>“Marketing management leaders”</th>
<th>“Marketing management followers”</th>
<th>“Marketing management start-ups”</th>
<th>“Traditionalists”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of increase of sale volumes</td>
<td>TEZ Tourism, Kyiv</td>
<td>Caucasus Travel, Tbilisi</td>
<td>Pilgrim, Kyiv</td>
<td>Calypso Travel, Tbilisi</td>
</tr>
<tr>
<td>Integral index</td>
<td>0.210</td>
<td>0.141</td>
<td>0.110</td>
<td>0.076</td>
</tr>
<tr>
<td>[\text{({\text{MME})}]</td>
<td>0.258</td>
<td>0.208</td>
<td>0.174</td>
<td>0.195</td>
</tr>
</tbody>
</table>

Orientation for determination of desired integral group is rate of growth of the branch in the country: a) if \[\text{\(\{\text{MME}\)} > \text{branch growth rate}\] – tourist enterprise belongs to marketing management leaders; b) if \[\text{\(\{\text{MME}\)} \text{equals to branch growth rate}\] – to follower’s group, and if less – to start-ups or traditionalists. Grouping of the last ones is carried out by way of expert assessment.

Conclusions

It has been proved that level of tourist enterprise market management efficiency can be determined by means of proposed expert and integral method which provides for assessment of: characteristics of a head and a team of tourist enterprise’s partners; process and functional factors of tourist enterprise’s partner internal environment; tourist enterprise activity which is inseparable from partners’ activity (customer assessment). Calculations of tourist enterprises integral indexes have evidenced its high level of objectivity and relevance for adopting justified decisions. We consider it perspective to conduct further researches to define more exactly the meanings of integral indexes for each of the allocated tourist enterprises groups.

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RISK MANAGEMENT OF INVESTMENT PROJECTS

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Abstract

The article is devoted to the questions of risk management. The necessity of investment projects risk analysis is conditioned by the fact, that cash flows, built during the investment project creation, apply to future periods, and, therefore, have predictive character. Hence, the importance of investment projects risk-management is increasing, as just comprehensive risk management will make it possible to implement the project with minimum costs and maximum effectiveness. In the article the definition of the category “risk”, “investment”, “risk management” is given. The authors consider components of the risk management process and the risk classification of investment projects. The main methods and tools for risk management of investment projects are identified.

Key words: risk, risk management, investment project, investment.

Introduction

Experience of market relations development showed, that investment is one of the most significant economic growth sources. However, it is necessary to use science-based investment management techniques that provide all influential risks registration, undertaken measures effectiveness analysis and optimal decision making during the investment projects implementation. Against the limited resources background, responsibility during investment decision making is increasing, which requires creation of effective risk-management system, based on principles of complexity and continuity.

1. Sense of categories “investment”, “risk”, “uncertainty”

Considerable quantity of scientific studies describes risk-management issues. Some of them discover theoretical management problems and give definition to categories “risk”, “investment”, etc. Others are dedicated to practical aspects of risk management, notably they examine mathematical models creation issues, risk analysis, presence of uncertainty quantitative characteristics, however, issues of risk-management system adoption, risks map forming, risk-management methods are not practically studied.

Risk-management is connected with examination of a particular object – investment or investment project therefore it is necessary to give its distinct definition. There are a great number of category “investment” definitions. Thus, W. Sharpe, G. Alexander and J. Bailey interpret investment, as refusal of certain value at present for (possibly, uncertain) value in future [1]. According to “Investment Code of the Republic of Belarus” investment means any property, including cash assets, securities, equipment and intellectual activities results, which belong to an investor in the capacity of ownership or other real right, and proprietary interests, that investor puts into objects of investment activities on purpose of receiving profit (income) and (or) obtaining other significant result [2]. On the basis of analysis of the category “investment” definitions it is possible to conclude, that presence of time lag between investment moment and moment of probable cash assets return, is one of the essential investment features.

Any investment project is implemented in uncertainty conditions. Shapkin A. S. gives the following definition: “uncertainty is incomplete or inexact notion about the meaning of different parameters in future, engendered by various reasons, and, first of all, by incomplete or inexact information about decision implementation conditions, including costs and results, connected with them” [3]. Uncertainty appearance can be connected with economic, political, natural, temporal and other sources. It can be generated by external and internal environment, conflict situations, interest divergence, etc. Results of uncertainty display can be:

- positive (profit, income, other benefits);
- negative (loss, overhead, damage);
- zero or neutral (break-even).

Uncertainty factors influence in the investment project process leads to:

- non-fulfilment of assigned project purposes;
- change in scheduled terms;
- deviation from project results.

Uncertainty, connected with possibility of deviation from purpose, for which subjective decision is made, is characterized by the term “risk”.

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Thereby, risk is subjectively estimated uncertainty. Risk can be evaluated with the help of terms “risk level” и “risk measure” [4].

Risk level is evaluation of possible consequences of considered decision, which in aggregate form reflects possibility level of occurrence of either favourable, or unfavourable consequences, as well as size of loss or benefits, that can appear.

Risk measure is risk level quantification according to a certain number scale, determined with the help of rules.

The scheme of risk factors impact on the investment project is shown in figure 1.

Methodical base for solving such problems as investment risks identification and evaluation is risks classification. Classification means grouping risks into concrete divisions according to a particular characteristic that underlines the classification. There is no unanimity of classification criteria definitions in economic literature, devoted to risk problems. It is connected with the existence of specific risks, which are inherent in particular projects. In literature the most widespread risk classification criteria are: project scale, investment type, loss extent, sphere of demonstration, appearance sources. Possible classification according to given criteria is shown in table 1.

<table>
<thead>
<tr>
<th>Classification criterion</th>
<th>Risk types</th>
</tr>
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</table>
| According to appearance sources                | 1. External (market, exogenous, systematic) are risks, which aren’t connected with a particular enterprise or project activity, all participants of investment activity are influenced by them. Particular examples of this type are risks, connected with political, legal and regulatory, market, environmental and climatic circumstances of project implementation.  
2. Internal (endogenous, unsystematic) are risks, which are connected with project participant’s activity. Such risks can be connected with insufficient personnel competence, mistakes in construction documents and other factors, which can be averted with the help of effective risk-management. |
| According to loss extent (financial losses level): | 1. Acceptable project risk is risk, financial losses of which will influence project implementation insignificantly.  
2. Critical project risk is risk, financial losses of which will influence project implementation significantly, that can dispute positive financial results.  
3. Disastrous project risk is risk, threatening project implementation. |
| According to investment type                    | 1. Financial risks  
2. Investment projects risks |
According to spheres of demonstration:
1. Economic, connected with economic factors change
2. Political, connected with country policy change
3. Social, connected with social complications
4. Ecological, connected with environmental disasters, calamities
5. Regulatory, connected with legislation and regulatory framework changes

2. Theory of investment projects risk-management

Risk analysis is connected with an approach, which determines risk not as static, invariable parameter, but as manageable, level of which can and must be influenced.

Investment projects risk-management is a complex of management processes, which are connected with identification, risk analysis and decision-making, leading to negative consequences minimization and its positive influence maximization if risk event comes. Risk-management means identification of potential deviations from predesigned results and management of these deviations in order to heighten prospect, reduce loss and improve validity of made decisions. To manage risks means to determine prospects and defect opportunities for activity improvement, as well as to eliminate or reduce the probability of undesirable development of events. In order to minimize project investment risks during the process of its implementation, investment project manager must constantly identify (determine) investment risks and develop methods of reaction to them. Primary risk-management function is to develop measures for reduction of unfavourable risk consequences and to manage risk on purpose to receive strategic advantages.

According to Project Management Institute researches, risk-management system includes six procedures:
1. Risk-management planning;
2. Risk identification;
3. Risk qualitative evaluation;
4. Quantitative evaluation;
5. Risk reaction planning;
6. Risks monitoring and control [5].

In risk-management planning stage investor decides on methodology, makes decisions concerning organization, people ware for project risk management procedures, data source for risk identification, etc. This stage can be considered as preparatory.

Risks, which can influence the project significantly, are detected (identified) within the scope of risk identification procedure. Maximally complete list of risks, which influence project results, must be made, as a result of identification procedures. It should be noted, that it is necessary to carry out risk identification regularly over a period of project implementation. It is connected with continuous changes of both, external and internal project environments. As a result, some risks can be excluded from consideration and others can be included in it.

Risk qualitative evaluation involves identified risks analysis from the position of their appearance sources and their possible influence on the project. Different methods and means are used for this analysis implementation. They depend on the risk peculiarity. Major task of qualitative evaluation is risks gradation according to their importance degree and decision-making concerning methods of reaction to each particular risk.

Risk quantitative evaluation involves identification of risks appearance possibility and risks consequences influence on the project. Quantitative evaluation is closely connected with qualitative evaluation, and can be considered as its element. Moreover, risk quantitative evaluation must be continually reviewed, considering changes of both external and internal project factors.

Identification, investment risks qualitative and quantitative evaluations provide risk-manager with necessary information for making rational decision about influence measures on project risks.

Risk reaction planning means to identify and develop methods and instruments of risk reaction on purpose to reduce its negative influence on the project. Planning is one of the most significant risk-management functions. The lack of clear procedures formalization and defense mechanism leads to management quality deterioration and negative consequences for project financial results. It should be noted, that if the external environment of the project changes continually, only dynamic risk reaction planning can be effective.

Risks monitoring and control procedure allows tracking identified risks regularly, providing implementation of defensive measures from identified risks and evaluating their effectiveness. The result of monitoring and control procedure is ac-
cumulation of information, which is necessary for alternative strategies implementation. This information must be continually evaluated with the help of qualitative and quantitative methods. The project can be amended in order to achieve assigned goals. As project external environment changes continually, monitoring and control must be conducted over the whole period of project implementation.

According to [6], there are 7 risk-management stages, which are aggregated into 2 main groups: the group of risk analysis stages and the group of management stages. Risk-management schematic circuit is shown in figure 2.

<table>
<thead>
<tr>
<th>Target setting of decision-making</th>
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<tr>
<td>Complex of alternative solutions</td>
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<tr>
<td>Risk factors identification for each alternative solution</td>
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<td>Risk factors consequences (environmental conditions)</td>
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<td>Alternative solutions consequences in consideration of risk factors demonstration</td>
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<tr>
<td>Analysis of possible risk-management measures and their costs estimation</td>
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<tr>
<td>Alternative solutions effectiveness evaluation in consideration of risk-management</td>
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<td>Choice and implementation of a solution and risk-management measures</td>
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</table>

**Fig. 2. Risk-management common scheme**

Risk mitigation means reduction of either risk event probability, or risk event loss to acceptable level. In case of risk mitigation it is necessary to estimate costs of risk mitigation measures and measures, which eliminate undesired event consequences.

If risks can’t be completely excluded, or risk event loss will be too large and event probability is low, then risk acceptance strategy is used. Under this strategy both passive management (it means that no actions must be taken before risk event comes) and active management (for example, creation of money holding, float time, etc.) can be used.

On the basis of complex risk analysis, which includes both qualitative and quantitative analysis, complex of measures for reaction to identified risks must be elaborated. There are 4 alternative methods of risks reaction: risk avoidance, risk transference, risk mitigation, risk acceptance [5]. Each method has its own instruments and strategies.

Risk avoidance means change of the project plan in order to avoid risk negative consequences. Risk avoidance methods include renunciation of untrustworthy partners, rejection of risk projects, etc.

It should be noted, that risk identification and evaluation are base stages, which help to develop subsequent program of investment risk-management. Investment risks structure can be developed on the basis of a certain formalized list, while risk level analysis and decision-making about methods (ways) of investment risks reaction or avoidance in most cases are based on manager’s experience. System of risk influence evaluation can be based on different methods of investment risks analysis, such as:
- discount rate updating; it represents an analysis, which shows, how project’s sol-
vency criteria depend on discount rate changes;
- confidence factors method; it means future cash flows updating, by evaluation of reliable equivalents of the project’s uncertain cash flows, Mathematical expectation is used as reliable equivalent;
- sensitivity analysis; it evaluates changes of project’s possible finance indicators, and, therefore, advisability of participation in the project, taking into account uncertainty factors;
- scenarios; it means creation of several project development alternatives (as a rule, three scenarios are developed: optimistic, the most probable, pessimistic). Investment risks are evaluated under each of chosen alternatives;
- probability distributions of cash payments streams; it helps to receive useful information about expected values of client’s solvency measures and net earnings, as well as to conduct analysis of their probability distributions;
- decision trees method; it is used in order to analyze project investment risks, which have visible and reasonable number of possible outcomes. They are especially useful in such situations, when decisions, made at future moments, strongly depend on decisions, made previously, and by-turn determine further developments scenarios;
- Monte Carlo (simulation modeling); it represents a complex of numerical experiments. They must get empirical estimators that show how different factors (basic values) influence measures of investment project risk probability, etc. [7].

A particular method of risk reaction choice depends on the following circumstances:
- there are special analysis techniques for each type of risk, which is analyzed, and concrete peculiarities of their implementation;
- basic data volume and quality are of primary importance for risk analysis. Thus, the more information risk-manager has, the higher the opportunity to use simulation modeling is, if not, method of expert evaluations will be used (its accuracy depends on involved expert’s experience and intuition);
- evolution of measures, which influence investment risk, must be taken into account during risk analysis, as only continual risk-management can guarantee effectiveness of risk-management system;
- when analysis techniques are chosen, it is necessary to pay attention not only to design data, but also to prognostication level of measures, which influence investment risk level, as the farther prognostication level is, the lower calculation accuracy will be;
- analysis urgency and technical feasibilities are of great importance, because time float influences calculation accuracy directly.

Hence, it can be concluded, that a whole complex of methods must be used regularly and continually, as only in this case risk management system will be effective. Principal differences between traditional and effective risk-management systems are shown in table 2.

<table>
<thead>
<tr>
<th>Traditional risk-management system</th>
<th>Effective risk-management system</th>
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<tbody>
<tr>
<td>Influence on separate risk types</td>
<td>Influence on the whole risks complex</td>
</tr>
<tr>
<td>Fragmentary management</td>
<td>Regular and continual management</td>
</tr>
<tr>
<td>Established system isn’t changed</td>
<td>Management system is adopted to changes of external environment</td>
</tr>
<tr>
<td>Indicated and evaluated risks are not revised</td>
<td>Regular risk factors monitoring</td>
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</table>

Investment risk-management system must be able to modify with the use of management methods complex at each stage in compliance with processing data flows, notably to be adaptive to environmental changes, which appear in the course of investment activity.

Conclusions

Well-built risk-management system makes it possible to stabilize major strategic and tactical business activity measures (e.g. business value, profitability), to optimize resource placement and investment in compliance with risks evaluation, to prevent loss (e.g. by adoption of timely pro-
ject abandonment mechanism), to prepare business for operation in the critical juncture of things and to improve company’s reputation. Successful risk-management indicators influence business investment appeal; expand amount of sources and investment projects financing schemes by attraction of new investors; reduce capital formation costs as well as coasts, which are connected with projects implementation, favouring further development of industry.

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APPLICATION OF STATISTICAL MODELING IN INSURANCE PROCESS

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Abstract

Risk assessment is one of the major challenges that must be addressed by each insurance company. To assess risk we need to know the value of losses as well as the probability of losses, since the risk cost is the basic component in evaluating the insurance indemnity. Statistical methods should be used for objective evaluation of insurance processes, but because of complexity in real life processes of insurance, statistical modelling techniques would be preferable. It is particularly important to develop and practically apply these methods in Latvia as in recent years (starting from 1992) the insurance market in Latvia has experienced steady growth. To improve the competitiveness of the insurance companies, especially small companies, it is simply impossible to do without methods allowing us to estimate the parameters of the insurance process. Taking this into consideration it becomes important to study information systems related to the processes of insurance and to use modern information technologies for processing the available empirical information and the dynamic scenario forecasting performance of the insurance process taking into account different assumptions about the factors that could affect the insurance process. The article deals with the various statistical models that assess the risks and losses of the insurance company allowing us to simplify the calculation of insurance premiums, insurance reserves and assess the financial stability of the insurance company with a sufficiently wide range of parameters of the real process of insurance. At the present time transition from local information systems to corporate information systems based on network technologies is being accomplished in the Baltic countries. Therefore, in the future it is important to include such statistical models into the integrated European information system of processing insurance information.

Key words: risk, statistical modeling, insurance company, financial stability, training process.

Introduction

Risk assessment is one the basic tasks to be tackled by any insurance company that wants to remain stable in the insurance market. To assess the insurance risk it is necessary to know the value and the probability of losses since the value of the insurance risk is the key component in assessing the insurance indemnity. For objective evaluation of insurance risks mathematical statistical methods and methods of actuarial mathematics should be used. The complexity of real life processes of insurance substantiates the necessity to apply the statistical modelling methods which due to the development of computer technologies are being more widely used in modelling insurance processes at all levels, starting with small insurance companies and ending with modelling of insurance processes at the level of big insurance companies. The development and application of statistical methods is of particular importance in Latvia since in recent years (starting from 1992) the insurance market in Latvia has experienced steady growth.

In 2010 the volume of non-life insurance grew up to 315 million lats (448 million Euros). In 2010 insurance indemnities constituted 193,1 million lats (274,8 million Euros). However, during the first two months of 2011 the volume of gross premiums totalled up to 31,46 million lats (44,76 million euros) which is 35% less than during the same period in 2010. To a certain extent it may be explained by falling prices of the insurance policies as well as by the overall financial instability in Europe. In 2011 three-quarters of the insurance company was working with profit of 1,5 million lats (2,13 million euros). Insurance companies gross premiums written by the 2011th the first three quarters year-on-year increase of 27,7% and was 176,8 million. lats, as well as the amount of gross claims paid increased by 12,1% and was 95,3 million lats.

Further improvement of the competitiveness of the insurance companies cannot be realized without applying methods which could estimate the parameters of the insurance process to guarantee sufficiently accurate and adequate decision-making process. This research deals with the various statistical models that assess the risks and losses of the insurance company and allow us to accurately enough assess insurance premiums, insurance reserves and the financial stability of the insurance company for a sufficiently wide range of parameters of the real process of insurance.
Approach to task modelling

The first works on the mathematical theory of insurance were published by F. Lundberg and X. Cramer who proposed and investigated the so-called classical model of the insurance process. The classical model allows us to calculate the probability of ruin and survival of the insurance company, the principles of choice of premium load and analyzes the survival time, the probability of insured accident, insurance rates and insurance claims.

This paper focuses on the development of economic and mathematical models of non-life insurance and their statistical modelling to estimate the overall losses of the insurance company. Let us consider the model of individual risk, which can be schematically represented as follows (see Fig. 1).

Fig. 1. Scheme of structure of individual risk model

Legend: $n$ – number of contracts of insurance portfolio; $j$ – index of the client; $q$ – probability of the insured event; $N_j$ – index of the insured event $j$, in the simplest case $N_j = \begin{cases} 1 & q \\ 0 & 1-q \end{cases}$; $N$ – number of realized insurance events

\[ N = \sum_{j=1}^{n} N_j; \quad X_j - \text{losses of the client with an index } j, \quad X_j \sim \text{distribution function } F(x); \quad Y_j - \text{insurance indemnity for the client with an index } j \text{ losses}, \quad Y_j = N_j X_j; \quad Z - \text{total compensation (of losses) of the insurance portfolio}, \quad Z = \sum_{j=1}^{n} Y_j = \sum_{j=1}^{n} N_j X_j; \quad \gamma - \text{level of guarantees of the insurance company (usually in the range of 0,8 to 0,95); } U_0, U - \text{value of the initial insurance fund and after a certain period of time.}

It is assumed that for the insurance portfolio the following conditions are met:
- number of contracts in the portfolio is constant;
- risks to customers are independent of each other;
- all payments are made without delay;
- function $F(x)$ is equal for all clients.

Insurance portfolio modelling

Making use of the simplest Monte Carlo method when modelling the insurance portfolio with parameters: $n=1000$, $q=0,1$, $F(x)$ - function of a uniform distribution in the interval (0; 1000) when assessing the average losses, dispersion of losses and coefficient of variation of the insurance portfolio, the relative errors compared with the exact results are as follows: (see Table 1).
Insignificant relative errors (less than 2%) indicate the possibility of a sufficiently accurate analysis of the simplest insurance portfolio using the statistical Monte Carlo method. Further the possibility of using the statistical Monte Carlo method as an alternative to analytical methods for studying more complex insurance processes will be shown. To a large extent the insurance fund depends on how well the calculation of insurance premiums is done. To state the financial stability of the insurance company it is necessary to satisfy the following inequality:

\[
U - Z = U_0 + \sum_{i=1}^{n} p_i - \sum_{j=1}^{n} N_j \cdot X_j > 0
\]

with the given probability \( \gamma \) (usually \( \gamma = 0.1 \) or \( 0.05 \)). Since \( U_0 > 0 \), the inequality (1) will follow from the inequality:

\[
\sum_{i=1}^{n} p_i - \sum_{j=1}^{n} N_j \cdot X_j > 0
\]

Knowing the distribution \( F \) of the variable \( \sum_{j=1}^{n} X_j \), we may find such value \( C \) of the variable \( \sum_{i=1}^{n} p_i \), where with probability \( \gamma \), the inequality (2) as well as the inequality (1) hold. The value \( C \) shows the required level of aggregate premiums ensuring the stability of the insurance company with probability \( \gamma \).

C = F^{-1}(1 - \gamma) \quad (3)

In many real life situations the analytical solution of the equation (3) turns out to be a complex mathematical problem not always having precise or sufficiently precise solution. In this case, a good alternative is the Monte Carlo method.

Assume that it is necessary to evaluate the possibility of reducing the ruin, using the process of reinsurance in the following case: the insurance portfolio contains \( N \) insurance contracts for 1 year from which the insurance sum of \( N_1 \) contracts is \( S_1 \) and the insurance sum of \( N_2 \) contracts is \( S_2 \). The probability of a claim is equal to \( q \). We assume that the level of deductibles is \( C \). Let us compare the solution of this problem by a) analytical method and b) using the Monte Carlo methods:

a) where \( N = 8000, N_1 = 5000, N_2 = 3000, S_1 = 10000Ls, S_2 = 20000Ls, p = 0.02 \) due to reinsurance when \( C = 16000Ls \), the company seeks to reduce the probability of ruin from 0.14 to 0.13;

b) having applied for modelling the Monte Carlo method, we obtain a fairly accurate \((R^2 = 1.0)\) regression dependence of the probability of bankruptcy depending on the value of losses (see Fig. 2).

\[
\begin{align*}
\gamma &= -56,314,117.1 x^3 + 24,037,876.0 x^2 - 4,111,616.2 x + 2,664,028.8 \\
R^2 &= 1.0
\end{align*}
\]

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{fig2.png}
\caption{Ruin probability of the insurance portfolio without reinsurance – the dotted line and polynomial approximation – solid line}
\end{figure}
After the introduction of the reinsurance process the probability of bankruptcy decreased from 0.15 to 0.13 (see Fig. 3). This agrees well with the result obtained by the analytical method, which in this case is rather time-consuming and requires a good knowledge of actuarial mathematics. Comparing the two methods for solving this problem conclusion may be made that the application of the Monte Carlo method is simpler than using the analytical method. Modelling ensures quicker and easier adaptation to various changes in the insurance situations which is practically very difficult to reach using analytical methods.

Application of the modelling methods does not necessarily require knowledge of the analytical representation of the distribution functions, thus knowledge of the empirical distribution functions is quite sufficient (i.e., the existence of empirical information about the insurance situation in the country, about the values of insurance claims, etc.). If there is no empirical information about the losses of the insurance company which is typical at the initial stage, consider using benchmarking, finding and making comparison with a more or less similar insurance company in the given country or in the world. Experience shows that stable insurance companies in the same cluster of insurance (having approximately the same volume of services and providing the same kinds of insurance services, having the same insurance strategy) are similar and have very similar characteristic parameters.

The most complex subjects for the study of financial stability are the models of collective risk. The theory of collective risk was developed in 1909 by a small group of actuaries, mainly Scandinavian. In the theory of collective risk an insurance company is seen as a reservoir which produces a continuous stream of premiums and from which payments are made. The model consists of the following three elements:

1. The flow of premiums $P(t)$ - the total amount of premiums received during the period $(0, t)$;
2. $q(N, t)$ - the probability that the $n^{th}$ payment will be claimed during the period $(0, t)$;
3. $G(x)$ - probability with which the payments are made, and the amount paid does not exceed $x$.

From these three elements it may be derived that the probability for payment in the interval $(0, t)$ does not exceed $x$ what can be represented as a function $F(x, t)$:

$$F(x, t) = \sum_{n} q(n, t) G^{(n)}(x),$$

where $G^{(n)}(x)$ for $N>0$; $n^{th}$ convolution of the function $G(x)$ and $G^{(0)}=H(x)$ (Heaviside function).

For the statistical simulation of correlated random variables with distributions derived from empirical data, the authors used the method of copulas.

The copula for random values $X_1, X_2, \ldots, X_n$ can be described by equation:

$$C(u_1, u_2, \ldots, u_n) = \Phi(F_1^{-1}(x_1), F_2^{-1}(x_2), \ldots, F_n^{-1}(x_n)),$$
APPLICATION OF STATISTICAL MODELING IN INSURANCE PROCESS

where

\( F_i \) - marginal distribution for random value \( X_i \), \( i = 1, 2, \ldots, n \).

The algorithm of simulation of random \( n \)-dimensional vector \( X = (X_1, X_2, \ldots, X_n) \) is:

I. Simulate a variable \( X \) with distribution function \( G \) such that the Laplace transform of \( G \) is the inverse of the generator.

II. Simulate \( n \) independent variates \( V_1, \ldots, V_n \).

III. Return \( U = (\frac{1}{\theta}(-\log(V_1)/X), \ldots, \frac{1}{\theta}(-\log(V_n)/X)) \).

Frank, Clayton and the Gumbel copula can be simulated using this procedure. For example, for the Clayton copula simulation the algorithm is as follows:

I. Simulate a Gamma variate \( X \sim \text{Gamma}(1/\theta, 1) \).

II. Simulate \( n \) independent standard uniform variates \( U_1, \ldots, U_n \).

III. Return \( U = (\frac{1}{\theta}(-\log(V_1)/X), \ldots, \frac{1}{\theta}(-\log(V_n)/X)) \).

The modeling of random vector \( X = (X_1, X_2, X_3) \) has been realised by using of MatLab programme. The algorithm of simulation of random vector \( X = (X_1, X_2, X_3) \) with known \( \rho \) (Rho) correlation matrix is:

MatLab code:

```matlab
n=5000;
Rho=[1 -0.417 -0.522; -0.417 1 0.420; -0.522 0.42 1];
Z=mvnrnd([0 0 0], Rho, n);
U=normcdf(Z,0,1);
X=[logninv(U(:,1),4.75,1.32) logninv(U(:,2),2.53,0.55) wblinv(U(:,3),10.24,1.16)];
plot3(X(:,1),X(:,2),X(:,3),'.');
grid on; view([-50, 50]);xlabel('Izm'); ylabel('NorIzm'); zlabel('Laiks');
```

The illustration of the process of modeling of incidental value \( C = (C_1, C_2, C_3) \) is presented in Fig. 4.

Fig. 4 shows how different from the usual distribution the real joint distribution of three correlated random variables can be. In this case the nonparametric method of histograms is the most appropriate.

By means of a histogram, marginal distributions are represented for constructing a copula, presenting a common distribution of factors. In the simplest case, distribution of each incidental value may be represented by means of a non-parametric method – a block chart.

Conclusion

The research of the authors shows that unification of actuarial calculations after the creation of a software product that implements the application of Monte Carlo methods of statistical modeling to actuarial problems is possible. The application of Monte Carlo statistical methods is more natural and easier to deal with when solving urgent tasks of the insurance process. Setting objectives can be realized in a language close to the description of the real life insurance situation, which allows greater and more flexible practical application of methods of actuarial mathematics in real life. Methods for solving
problems considered in this research can be applied in the training process for students of economic and engineering specialties.

It is obvious that analytical study of insurance processes described by functions of such kind may be performed only under some specific assumptions. It should be noted that in the real life insurance process the character of distributions of random variables is often not described by any known closed analytical distributions. In this case the Monte Carlo method can also be used to investigate the collective risk. Researches of the collective risk models conducted for educational purposes showed good agreement with those obtained by analytical methods (with the number of 50000-100000 Monte Carlo trials the relative error constitutes <5% -10%).

References

A DESIGN OF OPTIMAL INTEREST RATE IS ON CREDIT FOR RECEIPT OF MAXIMAL PROFIT OF COMMERCIAL BANK

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Abstract

A commercial bank that has a sufficient property asset is considered, successfully to carry out exceptionally crediting real to the sector of economy. An optimal interest rate is got on a credit that allows getting a maximal profit at the sufficient property asset of commercial bank on the end of management period. It is certain maximal income and size of sufficient property asset for realization of effective management in the conditions of vagueness. A scientific tool that consists in formalization of suppositions in the stream model of bank is offered. The stream model of commercial bank takes into account credit activity and does not take into account delays in the terms of return of credits. They got results of research it can draw on as a model of credit activity of bank; as an example of paradox of Bertrana in bank activity. They got results of research are expedient for the maximal estimation of income and capital of bank depending on market conditions; for the analysis of market situation, when interest rates on a credit and volumes of the given out credits diminish simultaneously. They got results of research are expedient for development of models of bank activity and raising of administrative tasks, that take into account credit and deposit activity of bank, delay in the terms of return of credits, property asset of bank, a size of that can be insufficient for satisfaction of maximal demand on credits.

Key words: bank, loans, profit maximization, capital maximization, optimal control, bank’s flow model.

Introduction

One of the key functions of banks are raising funds of economic entities in deposits, placing them on his behalf and at its expense, as well as opening and maintaining bank accounts of individuals and entities. A special role is played by credit operations. A properly organized work, clearly articulated strategy and tactics of credit transactions determine both financial and competitive position of the bank under uncertainty. Central as of the position of financial forecasting, planning and management of credit operations is to develop mathematical models and programs of the bank credit, which involve not only the methodological support of their implementation, but also modelling of reserve bank, assessing income under the interest rates on loans. Significant importance assumes the application software, which allows simulation scenarios using different algorithms in conditions of uncertainty.

One approach to modelling of banks and banking activity is to use a flow model of the bank in which the financial flow is a certain amount of money per unit of time. Flow model of bank has a number of differences, namely, continuous flow in the model; funds, received by one of the input flows can be used to form the output flow of another type. That is, the money received by the bank, mixed in a single money supply, which can be used to form each of the outgoing flows in arbitrary proportions. Flow model of bank, in our view, is reasonable for considering of various problems in terms of control theory.

Purpose of the article is to determine the credit rate for commercial bank with sufficient equity to saturate the credit market to maximize profits and capital at the end of the period and the analysis of changes in this domain in accordance with the transformation of market conditions.

Research objectives: to describe the assumptions necessary to construct models of the bank to build a single-contour bank flow model without delay, on the basis of the proposed model to determine the optimal credit rate, maximum profit and maximum capital of the bank at the end of the control period, to analyze changes in the optimal interest rate, profit and capital depending on changes in market conditions.

Literature review

Concepts on the problems of banking credit complicated and differentiated simultaneously with the change of operating conditions and circulation of debt capital. Issues of lending formation in the structure of bank’s resource base in the context of managing capital are studied by Blackburn, Chambers, Felton, Garriga, Hellwig, Hodgson, Reinhart, Rogoff, Schlenzkauf, Wheelock [7, 10, 12, 16, 17, 25]. Among the most well-known behaviour of the bank-monopoly model can be attributed Monti-Klein [20, 22], in which the bank operates according to the
The classical microeconomic theory of monopoly. The concept of monopolistic competition was first presented in the work of Chamberlin [9]. One of the most common models of this class is Salop model, in which differentiation between products is on the basis of transportation costs.

Simulation without mediation goes back to work Benston, Bell and Murphy [2, 3]. According to them, deposits and loans are considered as output parameters of its activities and staff costs, investments, etc. - as input. Modelling including mediation, in contrast to the previous, involves accounting for substantial levels of performance of banks as financial intermediaries. At the conceptual level this approach adequately reflects the specific tasks that solve banks [3, 4, 19, 21, 23]. D. Hancock [15] offers a cost term use of financial resources that is to net losses. Model illustrating the mechanism of pools depositories, was proposed in work of Bryant [5].

Another approach to bank's modelling - bank regarded as an agent on market of information. It is believed that any market agent that has some information and wants receive income from it, faced with two fundamental problems. First, if he tries to sell this information, the buyer can not be sure of its reliability. Second, income derived from sales information can be negligible compared to the costs of obtaining. In a situation where pricing information is public, income may be zero. This phenomenon was named Grossman-Stiglitz paradox [14]. Campbell, Kracaw [8] and Allen [1] studied this problem and formulate methods of its solution in the face of financial intermediaries.

Gorton and Pennachi in [13] drew attention to some features banking activities on transformation of assets that are treated as financing risky projects by risk-free deposits. Under adverse selection, when some agents have private information about risky projects, risk-free deposits can be used by some agents that are not informed. At the same time under the proposed model it was shown that in the appropriate economic system participation of financial intermediaries an optional and risk-free bond that are issued directly by firms, may be replaced by deposits. Diamond [11] proposed interesting theoretical model that describe how to operate the bank as an institution of delegated monitoring.

Holmström and Tirole [18] also considered a model that examines the issue of choice between direct and banking (intermediary) funding. In it factor determining the benefits of direct funding is the amount of capital owned firm. The works of Sharpe and Rajan examined the question of relationship between banks and borrowers in the dynamics [24]. A key element contained in these models was the idea that banks seeking to establish “good” relationship with borrowers to get access to information about them. Also, as in the Diamond model, it is believed that successful in the past, firms are more likely to development of his success in the future. However, it is believed that banks possess reliable information only on those firms for which they were creditors of the previous stages; otherwise the banks should make audit procedures to the unknown firms. Several authors, namely - Bhattacharya and Chiesa [6] studied the problem of ownership of information. Its essence is that firm-borrowers may face losses if for competitors become available, some private information concerning their activities. Within this context can be concluded that the bilateral relations between the bank and the borrower may be more effective than multilateral lending.

Modelling of banking in the context of control theory and using the flow model implemented Gryshyn, Ivanenko, Kapustyan, Kozak, Kuts, Osipenko, Umryk. In particular, Grishin proposes to consider bank in terms of control theory, and described some incoming and outgoing bank flows. Osipenko describes the flow model, he calls it dynamic model of bank, with linear functions of loans and deposits and sets the problem of optimal control by credit and deposit rates, provided that all deposits are issued as loans. Ivanenko describes the flow model with a linear function of loans and deposits, which takes into account the uncertainty in the volume of deposits and loans. Kapustyan proposes to use software implementation of flow model for training of bank employees, and also adds to the flow model of bank advertising costs and inflow of deposits as a result of advertising.

However, scientific studies have not elaborated with proof to some degree the maximum value of profits and capital with optimal control. Insufficient study of issues related to modelling the situation of bank reserve and the assessment of interest income based on interest rates for loans in the banking system led to the urgency of further research in this direction.

Model

Single-contour flow model of bank without delay is describing the activity of commercial banks under the following assumptions.

Assumption A1. All profit is used to increase capital.

Since all income is used to increase capital, we offer a following formula (1):
A DESIGN OF OPTIMAL INTEREST RATE IS ON CREDIT FOR RECEIPT OF MAXIMAL PROFIT OF COMMERCIAL BANK

\[ x(t) = p(t), \quad 0 \leq t \leq T \]  

where  
\[ x(t) \]  - the capital of commercial banks at the moment \( t \);  
\[ x(t) \]  - capital gains at time \( t \);  
\[ p(t) \]  - profit of commercial bank at the moment \( t \);  
\( T \) - the final moment of controlling the bank.

Assumption A2. Bank’s only activity is lending.
Because the bank deals only with credit activity, the profits consist of interest income from lending activities and is the difference between the volume of returned loans with interest, and volume of lent loans in monetary units (formula 2):

\[ p(t) = K_{in}(t) - K_{out}(t), \quad 0 \leq t \leq T \]  

where  
\[ K_{in}(t) \]  - volume of returned loans with interest at the moment \( t \) in monetary units;  
\[ K_{out}(t) \]  - volume of lent loans at the moment \( t \).

Assumption A3. The volume of issued loans (in monetary units) at a given time depends on the credit rate at the moment, thus are exist reason in the credit rate controlling (formula 3):

\[ K_{out}(t) = f(u_k(t)), \quad 0 \leq t \leq T \]  

where  
\[ u_k(t) \]  - credit rate at the moment \( t \).

Assumption A4. Relationship between total credit and lending rate is the inverse, that is, the higher the credit rate for other things being equal, the smaller the total amount of loans the bank will issue. It logically corresponds to the function of demand for loans. With higher cost of goods (credit) - fewer buyers can afford to buy it.

Assumption A5. The amount of issued loans is in linear dependence from credit rate.

Assumption A6. Bank may meet the total demand for loans.

Assumption A7. The credit rate is non negative. Bank do not pays the interest to creditors, thus does not execute unprofitable activities.

Assumption A8. There is no differentiation of credit products, credit rate is single.

Assumption A9. The volume of loans issued is non negative (formula 4).

\[ K_{out}(t) \geq 0, \quad 0 \leq t \leq T \]  

Because the relationship between the volume of issued loans and credit rate is the inverse and linear, it coincides with the function of the demand for loans. It is therefore proposed to write it as (formula 5):

\[ K_{out}(t) = K - b.u_k(t), \quad 0 \leq t \leq T \]  

where  
\[ K, b \]  - coefficients of linear dependence. Although \( K \) and \( b \) enter only as coefficients, but we consider it appropriate to interpret them from an economic point of view.

Thus, with zero lending rate (the minimum permissible for the bank) the amount of outstanding loan will be \( K \). Given this, this coefficient can be interpreted as an investment market capacity, the maximum amount of demand for loans (it is not unlimited). To investigate further consider the case when \( K \geq 0 \), as at \( K < 0 \) the bank cannot lend \( K_{out}(t) < 0 \), with any credit rate, because in this case violated the assumption of A9.

From the coefficient \( b \) depends on which size will change the amount of issued loans, if you change a certain amount of credit rate. This coefficient can be interpreted as the elasticity of demand for loans. Note that to some extent, this indicator characterizes the level of competition, i.e. with increasing competition, it will be higher. Thus, the model implicitly takes into account the presence in the market other banking institutions. Assume: \( b > 0 \) for the assumption A4 of the inverse form of dependence between the volume of issued loans and credit rates. The combination of these indicators is market conditions.

It is considered that the bank has enough capital to give \( K \) loans if necessary. Since deposits are not involved, the bank must have sufficient capital for any (including maximum) amount of loans (formula 6), i.e.:

\[ x(t) \geq K, \quad 0 \leq t \leq T \]  

Volume of issued loans dependence from the credit rate is shown in Fig. 1.

Since \( x(0) = x_0 \), then \( x_0 \geq K \).

Assumption A10. Loans with interest returns back at the same time as issued.

Assumption A11. Loans with interest guaranteed returning on time and in full.

Therefore, the formula for the volume of returned loans with interest can be written as (formula 7):

\[ K_{in} = K_{out}(t)(1 + u_k(t)), \quad 0 \leq t \leq T \]  

or  
\[ K_{in} = (K - b.u_k(t))(1 + u_k(t)), \quad 0 \leq t \leq T \]
Dependence of returned loans with interest rates from credit rate is presented in Fig. 2.

Thus considered three (term, return, interest) of five (term, return, interest, differentiation, collateral) general principles of lending. Now increase of the bank’s capital can be written as (9):

\[ \dot{x}(t) = K_u u_k(t) - b u_k(t)^2, \]  

(9)

Dependence of increase in capital (profit at time \( t \)) is shown in Fig. 3.

So, the control problem is formulated as follows (formulas 10-14):

\[ x(t) \rightarrow \max u_k(t) \]  

(10)

\[ \dot{x}(t) = K_u u_k(t) - b u_k(t)^2 \]  

(11)

\[ x(0) = x_0 \geq K \]  

(12)

\[ u_k(t) \geq 0 \]  

(13)

\[ 0 \leq t \leq T \]  

(14)

Because increase of capital does not depend on the amount of capital in the current time, the maximum capital at the end of the period achieved when maximizing increase of capital at any moment of time during the period of control. Derived from capital gains on the lending rate is (formula 15):

\[ \frac{d\dot{x}(t)}{du_k(t)} = K - 2. b u_k(t) \]  

(15)

In a point of local extremum (maximum, because second derivative is negative), it will be zero (formula 16):

\[ K - 2. b u_k(t) = 0 \]  

(16)

It follows that the optimal credit rate equal to the (formula 17):

\[ u_k^*(t) = \frac{K}{2. b} \]  

(17)

The maximum capital increases (or profit) (formula 18):

\[ \dot{x}^*(t) = \frac{K}{4. b} \]  

(18)

Then the maximum capital of the bank at the end of control is (formula 19):

\[ x^*(T) = x_0 + \frac{K^2}{4. b} T \]  

(19)

Let’s analyze the results. If market conditions (\( K \) and \( b \)) do not change (which is likely in the short term), the volume of lent loans at the optimal lending rate at a time is constant and equals \( K^*_{\text{out}}(t) = \frac{K}{2} \), i.e. half of the maximum amount of demand for loans; profit at optimal credit rates at a time is constant and equals \( p(t)^* = \frac{K^2}{4. b} \); bank’s capital at the end of the control period at optimal lending rate is \( x^*(T) = x_0 + \frac{K^2 T}{4. b} \), the bank does not change interest rates for the period of control.

If market conditions change, the optimal credit
A design of optimal interest rate is on credit for receipt of maximal profit of commercial bank

rate determined by the same ratio \( \frac{K}{2b} \), with an increase in the maximum demand for loans \( K \) (with other things being equal) increases the optimal credit rate \( u^*_i(t) \), the optimal amount of credit granted \( K_{out}(t) \), maximal profit \( p(t) \), maximal capital of the bank at end of control period \( x^*(T) \), as shown in Fig. 4.

If the elasticity of demand for loans \( b \) (the angle of the dependence line of lent loans from credit rate or the level of competition) increases, the optimal credit rate \( u^*_i(t) \), the maximal profit \( p(t) \) and maximal capital of the bank at the end of the control period \( x^*(T) \) are reduced. Conversely, if the elasticity of demand for loans is reduced (less competitive fight), the optimal credit rate, the optimal profits and capital of the bank at the end of the period for optimal control increases. The optimal amount of credit granted \( K_{out}(t) \) remains unchanged regardless of changes in elasticity of demand for loans.

Under intense competition the bank forced to reduce interest rates and vice versa - in conditions closer to the monopoly bank will increase credit rate (Fig. 5). If the elasticity of demand for loans tends to infinity, the optimal credit rate tends to zero. This repeats the result of Bertrand paradox - in a perfect competition, producers of similar goods that compete solely on price, profits will be zero, and prices of goods (credit rate) will equal the cost. Since this is our own resources (the cost of this resources is zero) credit rate (price) tends to zero.

If the maximum demand for loans and the elasticity of demand for loans changes in the same number of times, the optimal credit rate will not change. Although model does not limit the maximum credit rate, it does not goes to infinity. When the maximum demand for loans is zero, there is no meaning in credit activity - the amount of credit granted will be equal to zero \( K_{out}(t) = \frac{K}{2} = \frac{0}{2} = 0 \).

**Conclusions**

Optimum credit rate, maximum profit and maximum capital at the end of control period for bank that has only credit activity with equity sufficient to meet maximum demand for loans and without delay in terms of repayment of loans were obtained.

Assumptions for the bank flow model with exclusively lending activities and without delays in terms of repayment of loans and the bank’s capital, sufficient to meet maximal demand for loans were formalized, model with such assumptions was constructed and analyzed, profit and capital at the end of control period maximization problem was stated and its analytic solution was obtained.

The results can be used, firstly, to illustrate the credit of the bank, secondly, to illustrate the paradox of Bertrand in banking activities, thirdly, to assess of maximum revenue and capital depending on market conditions, fourthly, to illustrate and analyze the market situation, when both credit rates, and volumes of issued loans (as in the situation of decline in production) are reduced, fifth, to
further develop banking models based on these results and to formalize optimal control problems of bank, that will take into account both credit and deposit activities of commercial banks, the delay in terms of repayment of loans and deposits, bank capital that is insufficient to meet maximal demand for loans.

References
ROLE OF THE PERSONAL INCOME TAX IN THE MUNICIPAL BUDGET MEDIUM TERM PLAN DEVELOPMENT

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Abstract

Main source of revenue for municipalities is revenue of personal income tax (PIT). In years 2001–2011 it specific weight was in average 46.62% of all municipal revenue. For forecasting PIT revenue in the municipal budget, analysis of correlation must be made, to make regression model. Main factor in this model is gross domestic product. Other factors, affecting revenue of PIT, can be grouped – factors of positive influence, e.g. average wage, and negative influence, e.g. shady economy. Each municipality is required to evaluate impact of factors to its revenue of PIT. Moreover, there can be added some specific factors or information, which is actual for this municipality. Forecasting of PIT income provide implement of medium term planning principles in municipal operation. That can also improve possession of information of municipalities and apply to them greater responsibility for achieved results.

Key words: municipality, medium term budget plan, personal income tax, Latvia.

Introduction

Performance of each organization can be improved relevantly by operation planning. After advancing objectives, it is important to study existing possibilities. That can be made by developing budget plans. This kind of plan is imposed for all municipalities. That means they need to evaluate amount of revenue in future. It is very important for assessing adequacy of resources for reaching the goals and possibilities of accomplishment of function. Also, extra volume of resources can be recognized.

The object of research is municipal budget. The goal of research is to analyze possibilities for realization of municipal budget medium term planning by using methods of personal income tax revenue forecasting.

Necessary information for research is legislative acts and official statistics of Republic of Latvia, also as researches in this field, made by experts.

Grouping, reflection of analytic data in figures and comparison methods are used. In various researches are discovered many problems, related with forecasting of municipal budget:

1. Forecasting is used less/ rarely at municipal budget level than at the state level (Reddick, 2004).
3. Municipalities are striving to make budget with surplus. That is related with uncertainly of revenue in future (Marlowe, 2006).
4. Forecasting of revenue is technocratic in nature. Moreover, many managers accept forecast without any perception and absorption (Wildavsky, 1986).
5. Quality of forecast of revenue is affected by educational level of staff, disposable software and size of territorial unit (Frank & McCollough, 1992; Reddick, 2004). Many experts in municipalities are of the opinion, that forecast, made by qualitative methods is more accurate, that those, made by quantitative methods and models [1].

So, using of quantitative methods for forecasting municipal budget is important to improve budget planning and performance.

1. Role of the personal income tax in structure of municipal budget revenue

Municipalities are local governments that manage the ensuring interests of state and local inhabitants, accordingly to law about municipalities. They have to realize different functions:

1. self-governing functions;
2. delegated state government functions;
3. given government tasks;
4. unrestrained initiatives [2].

For normal performance, each function requires financial resources. Municipal revenue is urgent for ensuring qualitative and complete services for native inhabitants. Main financial document about municipal finances is municipal budget. It consists of revenue, expenditure and funding parts. Municipal revenue is structured of allocation of state taxes and duties, municipal duties, state grants and
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earmarked subsidies, grants of the local government financial equalization fund, dealings with municipalities, charges for services, deductions from capital profits, revenue from property letting and selling and others [3].

Every municipality need to set clear objectives and priorities for its operation, to assess the budgetary actions according to their performance and achievement. Lack of goals is generally regarded as the main municipal management problem. To ensure sustainability and sustainable development, governments need to make financial resources planning (to prepare a budget plan) for a longer period of time (at least 3 years) [4].

Such an approach to planning (which may be regarded as medium-term planning) will ensure that government is not only “the mediator and the performer” between the state and citizens, but is entity that is capable of developing. And development opportunities, primarily, can be assessed by identifying the expected income. Without revenue municipality is unable to carry out its functions. Revenue planning can contribute to major projects realization or in addition to resource exploration, if it is shown that the projects initiated in the medium term may be running out of money.

In assessing the overall government revenues of 10 years period (from 2001 to 2010 the actual data and the 2011th year plan), shows that in the period from 2001 to 2008 municipal budget revenues tend to increase every year. Similar to the local government budget revenue, also revenue from personal income tax (hereinafter - PIT) in 7-year period increases, then in year 2008 are the maximum and then decreases (see Fig. 1).

![Fig. 1. Total revenue and revenue from PIT of municipalities, million LVL [Drawn by the author using source 5]](image)

Revenue of PIT in average is 46.62% of the total municipal budget revenue (if the calculation is carried out only on the actual data; if takes into account the 2011th year forecast, the share amount is 46.66%) (see Fig. 2).

![Fig. 2. Municipal revenue from PIT as % of total revenue of municipalities [Drawn by the author using source 5]](image)

Of course, assessing each individual municipality, there may be various constituent components of the revenue structure. For example, a large share of fiscal revenue for municipalities may draw up state earmarked subsidies. However, although earmarked subsidies and grants (e.g., grants of the local government financial equalization fund) promote regional development, to some extent they violate principle of municipal and local permanency. In addition, earmarked grants, however, is the income will be received in a certain period of time. By contrast, the PIT is a permanent source of revenue. That is why the PIT analysis is topical for every local government and the country as a whole.

2. Forecasting of PIT revenue in the municipal budget planning

Currently, the Ministry of Finance develop and provide PIT forecast for the next year for municipalities, and every year the state guarantees part of estimated PIT revenue (in the year 2012 – 98%). This approach is not conducive to full participation of municipalities in the development of PIT revenue forecast. In addition, assurance of revenue, on the one hand, provides a degree of stability, on the other hand, can contribute to lack of interest in promoting local business and more importantly – to allow the shadow economy (e.g. – envelope wages).

Active participation of municipalities in the development of PIT forecast for at least 3 years will allow more reasonably assess the covering of various projects in future. It also will put some responsibility on this matter to the local government, and may promote better work-style. This means that the budget planning, focused on re-
results will be introduced in. Such budgeting means that resources are allocated to activities/events where they can be used with the highest efficiency [6].

Recognizing that collected PIT amount is a complex value, which is formed of different factors, appropriate is forecasting by using correlation and regression analysis.

Revenue from PIT amount cannot be viewed separately from the overall economic situation in the country. Calculation of personal income tax revenue share in GDP (in current prices) during the year’s shows that in the estimation period it is approximately equal. On average, municipal revenue from PIT amount is 4.46% of GDP, but the actual amount varies from 4% in year 2002 to 5.1% in year 2008 (see Fig. 3).

Fig. 3. Municipal revenue from PIT as % of GDP
[Drawn by the author using sources 5 and 7]

So, growth of GDP (phase of economic growth) provides increase of the revenue from the PIT in municipal budgets. Decrease of GDP (the recession phase), provides the same process with the proceeds from the PIT. This is understandable and logical, because in the economic growth period, employment is increasing, income levels are raising. Long-term growth may result even increasing of population. Each of these processes makes a positive impact on revenue from PIT amount.

Analyzing municipal budget revenue from PIT, it is certainly to take into account that each year is determined PIT share to the municipal budget and PIT share that is transferred to the state budget. This is an indicator that can change the local government revenue from PIT, without any changes in total size of revenue from PIT and other variables. PIT revenue distribution between municipal and state budgets are different, the average municipal budget the share (years 2001–2011) is 76,2% of total PIT revenue (see Fig. 4).

Fig. 4. Share of PIT in the municipal budget, %
[Drawn by the author using source 8]

Changes of share of PIT in municipal budget may explain changes in the amount of PIT in municipal budget, but does not explain changes of the total revenue from PIT. It has not been fully explained also by the state economic cycle phase. This means that should be still determined other factors influencing amount of PIT revenue. In drawing up the state budget explanation and analysis of revenue, the Ministry of Finance offers a number of factors that influence the PIT revenue amount in state and municipal budgets (see Fig. 5).

Fig. 5. Factors influencing revenue of PIT
[Drawn by the author using source 5]

In Figure 5 is listed both – the quantitative factors and qualitative, and several of them affect the PIT revenues positively, but others – negative. The positive impact factors (i.e. which one increase also increases the amount of revenue from PIT) are:

1. wage – employees average wages and salaries (the greater is the base from which tax is calculated as the greater may be the amount of tax due);
2. number of employees (as more people are employed, the greater is the taxable range of subjects);
3. minimum wage (applied to all economic subjects);
4. improvement of the tax administration (it is qualitative factor and it can be evaluated only at national level).

In addition, this list should include impact of the economic development phase, as well as the effect of the size of PIT rate. But relationship with the size of the PIT rate is very, very weak (correlation coefficient -0.06 [author performed calculation using the sources 5 and 8]).

The negative impact factors (which one increase can decrease the amount of revenue from PIT) are:
1. rate of compulsory state social insurance contribution (contributions are calculated from the gross wages and reduces the amount of taxable income for PIT);
2. tax repayment procedure (amount of eligible expenditure on education and health services reduces the amount PIT);
3. the untaxed minimum (an amount is exempt from PIT);
4. exemptions for a dependent person (for each dependent person is applied allowance);
5. tax debts (worsening of economic situation or it can be intentionally);
6. the shadow economy (evasion of duty).

Factor that is not transferred to any drafted pressure groups, is clarification of the Labour Law norms, because its impact on the PIT revenues can be both positive and negative.

To determine the influence of factors (to check if the qualitative conclusions are supported), a correlation analysis must be carried out (see Table. 1).

Table 1. Factors influencing amount of municipal budget revenue from PIT [The author’s calculation using sources 5, 8–13]

<table>
<thead>
<tr>
<th>Factors</th>
<th>Coefficient of correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>0.99</td>
</tr>
<tr>
<td>Part of the PIT in municipal budget</td>
<td>0.87</td>
</tr>
<tr>
<td>Wages and salaries</td>
<td>0.96</td>
</tr>
<tr>
<td>The number of employed, thousands</td>
<td>0.51</td>
</tr>
<tr>
<td>Rate of PIT</td>
<td>-0.06</td>
</tr>
<tr>
<td>Rate of SCSIC of employee’s</td>
<td>-0.53</td>
</tr>
<tr>
<td>The minimum wage</td>
<td>0.81</td>
</tr>
<tr>
<td>Allowance for dependents</td>
<td>0.82</td>
</tr>
<tr>
<td>The untaxed minimum</td>
<td>0.89</td>
</tr>
</tbody>
</table>

So, as a factor with a small impact, rate of PIT can be switched off. But in the project of Tax and fee system development guidelines for the years 2011 – 2016, developed by the Ministry of Finance [14] it is expected to reduce rate of PIT to 21% until year 2016 (Latvia, compared with Lithuania and Estonia have the highest PIT rate [15]). This means that in future, at such rate changes this small effect can be felt.

The results of the correlation analysis shows that the allowance for dependents and non-taxable minimum are factors which have a positive impact on PIT revenues, although they were previously referred as the factors of negative effect. This can be explained by the fact that these two values increases in the economic growth stage, but then also GDP increases, resulting in significant personal income tax revenue growth. Thus, an incorrect mathematical interpretation is resulting.

The analytical results show that GDP correlates closely with almost all the factors – this can be explained by the fact that GDP includes impact of all these indicators. Correlation is observed also between factors non-taxable minimum, the minimum wage, allowances for dependents and wages. The connection between first three factors can be explained by changes in the legislative package, the fourth – by the impact of higher minimum wage to average wage.

Table 2. Coefficients of the regression equation [The author’s calculation using sources 5, 8–13]

<table>
<thead>
<tr>
<th>Factors</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>607.14</td>
</tr>
<tr>
<td>GDP</td>
<td>0.02</td>
</tr>
<tr>
<td>Part of the PIT in municipal budget</td>
<td>-15.83</td>
</tr>
<tr>
<td>Wages and salaries</td>
<td>1.41</td>
</tr>
<tr>
<td>The number of employed, thousands</td>
<td>0.36</td>
</tr>
</tbody>
</table>

The coefficient of determination for the obtained regression equation is 99.12%. This means that the indicators used in equation are not explaining only 0.88% of PIT revenue in municipal budget changes. With these coefficients regression equation can be made to forecast revenue of PIT amount, if value of the factors in future is known.

In the analysis also qualitative factors can be used by applying an appropriate figure for each possible situation. But this significantly complicates the process as is necessary to describe, for example, each of the potential legislative changes. And, as shown, only with quantitative factors also it possible to draw up a qualitative model.

In order for each municipality to carry out PIT revenue forecast, it needs to be performed the calculations on their PIT revenue, to assess
which factors are relevant. In addition, for drawing up forecasts, municipalities need information on the expected future performance of state (such as minimal wage, part of the PIT in municipal budget etc.). This means that public institutions, in developing concrete action plans and scenarios at least for the medium term, must provide exchange of information with municipalities.

Municipalities receive limited political and bureaucratic information, which could contribute to more accurate forecasting [1].

A better model drafting can be provided on the basis of specific indicators for particular municipality. In addition, local governments (especially the small, but not only) may include in a forecast model specific data that is known only to them. Perhaps, for many municipalities such detailed analysis of the situation can provide essential information for better decision-making in other areas (e.g., costs to social security).

Conclusions

According to research, following conclusions can be made:

1. to qualitative performance of the municipal functions and voluntary initiatives it is necessary to amount needed financial resources, i.e. – revenue;
2. the main source of revenue for municipalities is income from PIT, which represents (during the covered period) in average about 46.62% of total municipal revenue;
3. a relatively large proportion of municipal revenue forms grants and subsidies from the state budget, but it may not be a stable source of revenue;
4. forecast of PIT revenue in municipal budget shall be predicted by using correlation and regression analysis, because it is an indicator, affected by many factors;
5. as a major factor, influencing revenue of PIT amount is the rate of GDP;
6. depending on the available information and the required quality of the model, the regression model can be created by using the different number of factors, as there is correlation between the factors.

Also some proposals can be given:

1. municipalities need to set targets for its operation and according to them to carry out a medium-term budget planning;
2. during the planning and developing scenarios of future situation, public authorities must ensure municipalities with the necessary information;
3. each municipality should assess effect of factors on its revenue from PIT. In addition, it is possible to use information and specific indicators, representative for a particular municipality.

In general, it can be concluded that the municipal revenue from PIT amount is impossible to predict, and it can not only provide medium-term planning principles to municipalities, but also can improve awareness of municipalities and impose greater responsibility on the results.

Reference

ROLE OF FOREIGN LANGUAGE EDUCATION IN FORMATION OF COMPANY INTELLECTUAL CAPITAL

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Abstract

Transformation of economy, in which intellectual capital is becoming a key factor, means the transition to a new structure of product and service cost. At present one of the peculiarities containing in every product and service is presence of knowledge component. It means that intellectual work, knowledge, skills and cross-cultural communication skills are becoming factors of creating extra cost, competitiveness and economic development of a company.

Key words: intellectual capital, human capital, foreign language education.

Introduction

Modern activity of a company is an activity of its managers, economists, design engineers, accountants, engineers, designers, HR specialists, marketing specialists, IT specialists, etc. Success of this activity on domestic and foreign markets depends on effective use of knowledge, experience, capabilities, and skills of employees, their education and training, competent communications with partners and clients. All these compose intellectual capital.

The term intellectual capital spread widely at the end of 20th century. The main expert in this sphere is considered Tomas A. Stuart. He was the first who researched the nature of intellectual capital. He developed his concept in articles made him world - famous. In his book “Intellectual capital” Tomas A. Stuart writes that knowledge is considered to be of greater value and possess larger power than natural recourses, giant enterprises or trustworthy bank account. Wall-Mart, Microsoft and Toyota became leaders not because they were richer than Sears, IBM or General Motors, vice versa. But they had something more valuable than tangible or financial assets. They had intellectual capital [4]. According to Tomas A. Stuart’s opinion intellectual capital means knowledge of employees that ensures competitiveness of a company on the market [4].

Intellectual capital is a term for identification of intangible assets of a company which are necessary for its successful activity and strengthening competitive advantage. There is no a common view of the essence and structure of intellectual capital, nevertheless the majority of researchers single out three components of it. They are human capital, consumer (market, client, partner) capital and organizational (internal, structural) capital of a company. Human capital is a part of intellectual capital which has relevance to staff. It includes knowledge, practical skills, experience, creative and intellect capability of employees, their moral values, labour culture and cross-cultural communication skills.

Organizational (internal, structural) capital of a company has relevance to the organization of a company activity. Organizational (internal, structural) capital of a company is responsible for the use of intellectual capital. Its sphere is technologies, procedures, management systems, hardware and software, organizational structure and corporate culture.

Consumer (market, client, partner) capital is assembled from connections and stable relations with clients and consumers. Trademark is a bright example of one of the forms of consumer (market, client, partner) capital which with the help of its reputation brings allowance to the consumer (market, client, partner) capital. It means that popular trademark brings revenue to the company.

All these components of intellectual capital: human capital, consumer (market, client, partner) capital and organizational (internal, structural) capital of a company are closely connected. Tomas A. Stuart investigated the nature of intellectual capital gives bright examples of importance of human capital personified in all employees of a company. In 1996 the company AT&T decided to cut down 40 hundred employees. The consultant Tom De Mapco calculated that such mass cutting down would bring from 4 to 8 billions of written off human capital. This is absolute equal with the loss of more than 1/3 cost of...
all company property, including plants and equipment [4, 6]. Robert Zemsky, professor of University of Pennsylvania and co-director of the national center on the Educational Quality of the Workforce – EQW with the economist Lisa Lynch from the Fletcher Business School at Tufts University and with Peter Cappelli, management professor, investigated labour productivity dependence on education [5]. They analyzed more than three thousand one hundred workers places, studied annual reports for 1995, repulsing industry name, equipment age and number of staff. At the end of the study they came to the conclusion that 10% improvement of education standard increased productivity by 8.6%. Tomas A. Stuart compared labour productivity after 10% improvement of education standard with the same increase of basic assets, it increased only by 3.4%. Thereby we can come to the conclusion that revenue after investment into human capital is almost tripled than revenue after investment into basic assets [4]. The idea that human capital is becoming more important in the period of economy transformation is traced in papers of other scientists too.

V. Skvortsova writes that in the 50s of 20 century technologies and products were considered to be science intensive and research scientific work in them ranked only 7-10%, at the end of 20 century percentage ratio increased to 50%; and in capital structure of a firm a growth of intellectual assets unit weight was traced which reached 40-60% [3]. There exist a lot of evidences of human assets value for a company. Key goal of a company is to increase capital. One of the ways to achieve the goal is to invite talented University graduates, who are well-educated, creative, good decision-makers, are able to be of great benefit to a company.

1. Language education concept

Human capital increases if a company has a great number of well-educated employees and a company makes the most out of the knowledge of its employees. Young people become competent and skilled studying at Universities. They should not only possess the generic competences that will help them to adapt to change, they should develop up-to-date job-related competences that contribute to the motivation, innovation, productivity, competitiveness, job satisfaction and affect the quality of work. Professional competences include knowledge and skills that help employees to analyse a situation, to formulate problems leaking from created situation, to make right decision, to develop plans to handle problems in professional activity successfully.

A foreign language is a means of knowledge, a means of communication, and a tool of development and upbringing [1]. That is why Business English teachers can contribute in development and education of students who are going to work in business sphere. They must develop the competences to the level that equips students for further learning and working life.

Every language is closely connected with the culture of the country. On the one hand a language is a product of culture, a means of communication and a means for expressing culture; on the other hand a language is a part of culture [2]. Hence, the content of linguistic education is culture; the aim of linguistic education is education of a man as an individual and a personality, development of his spiritual forces, capabilities, skills; upbringing of a person morally responsible and socially well-suited [1]. The founder of this language education concept is Lipetsk methodological school, headed by professor Passov, who leads Russian linguistic education center. This concept considers a linguistic education in the content of cross-cultural dialogue. The school offers a new way of mastering skills of cross-cultural communication: culture through language and language through culture [1].

If we think by economical categories, linguistic education and the most significant component of it - cross-cultural communication competence is a product acquired by a student in the process of education, development, upbringing and learning [1]. Mechanism of mastering a cross-cultural communication can be presented in the following way.

![Mechanism of linguistic education](image)
In Fig. 1, we see that the aim of linguistic education is a formation of homo moralis [1]. Homo moralis is a person who is able to communicate successfully with a person speaking another language, thanks to understanding all cross-cultural nuances and following traditions and peculiarities of intercultural communications. No doubt it can come true through culture awareness. A language in this case is considered to be a part of culture and a means of culture learning.

Education in this mechanism is directed at developing student’s personality. A student is an active subject of the process of education through another culture. He can develop his skills of communication and educational activities himself.

This concept connects closely upbringing with culture because the process of upbringing perfects and enriches student’s spiritual world by means of culture knowledge.

In the process of learning a student improves his skills of speech such as listening, speaking, reading and writing as means of communication. In other words a student gets different competences. Following the mechanism of linguistic education a student is becoming homo moralis, a person, able to communicate successfully with a person speaking another language, and a person, respecting a representative of another culture. This perfectibility can be formed only through culture awareness.

2. Methodological basis of a new up- to-date linguistic educational concept

Methodological basis of this concept is communicative interaction. It means that a content of linguistic education is based on discussion of actual vital problems. By means of this concept a student gets a possibility to use learned and mastered vocabulary and grammar material for expressing his thoughts and attitudes to the actual vital problems, for substantiating and upholding one’s opinion.

In the process of communicative interaction students assimilate technique of communication, etiquette, strategy and tactics of communication. They practise in solving communicative problems. When being deep in an actual vital situation students forget about psychological fear to make mistakes in their speech, their strengths are directed at the expression of thoughts. Thanks to this quality communicating methodology allows students to overcome language difficulties, to get rid of fear to speak a foreign language. It is a perfect tactics for removing cross-cultural communication barriers.

Communicative interaction creates conditions for increasing the level of communication culture. The higher level of people’s interaction communication is the more successful they communicate in any sphere of activity. Day by day students begin to understand the dependence of success in their activity on communication skills.

Moreover a student is a key in the process of education instead of a teacher as it was some years ago. Up-to-date linguistic education must be based on an activity approach, learner – centered approach and competence approach. An activity approach means that education of managers is realized through activity that imitates professional sphere. A learner – centered approach means that a student is an active subject of the process of education and education is directed at developing his personality. A competence approach means a formation of key and professional competences of future managers and a cross-cultural communication competence.

3. Special method used for improving cross-cultural communication skills

In order to form students’ cross-cultural communicative skills and to lead students to adequate understanding a native speaker, teachers can apply a case-study method in their activity. This method is very popular in education of managers. It is realized through activity that imitates professional sphere. This method allows teachers to make the process of developing cross-cultural communication closer to reality by plunging students into the atmosphere of their future profession.

The essence of this method is presenting the main aspects of an economic problem. After studying analytical and statistic materials students get involved in the process of searching different decision-making strategies of the suggested economic problem. All the actions done by students are driven by the desire to participate in the activity and to improve their knowledge and skills.

Case-method gives opportunities to integrate and apply all theoretical knowledge of economic subjects, allows students to get experience in solving real problems in the sphere of management, improves professional competence and cross-cultural communication competence, de-
Alla Sorokina develops the culture of business communication, teaches to work in a team, forms management capabilities.

Cross-cultural communication in professional spheres is realized through case-method in different forms: monologue (presentation, public speaking), dialogue (business talk, discussion, interview, phone talk), polilogue (negotiations, meeting, business game, seminar, conference, symposium). In real communication all these forms are interconnected.

On the advanced level of improving cross-cultural communication in professional spheres students’ statements can be regarded as a mixture of prepared speech (search for information, thinking of decision-making strategy, making a plan of the statement, writing theses, etc.) and unprepared speech because in the process of business communication students will have to solve the tasks, using the covered language material, both in familiar and unfamiliar situations, relying on the knowledge of economic subjects that have been acquired earlier.

Moreover analysis of the situations connected with actual life economical problems and solving these problems develop students’ professionalism and forms students’ skills
- ability to express thoughts clearly, confidently, logically and correctly;
- ability to generate opinion based on the comprehension of information;
- ability to solve problems offered in the situation successfully;
- ability to cooperate with colleagues for achieving a target;
- ability to build constructive interaction with partners in the process of communication;
- skills of cross-cultural communication taking into account sociocultural norms of behaviour;
- ability to self-educate for successful decision-making of communicative tasks;
- ability to analyze and estimate learning, speech and communicative activity.

Case-method allows students to demonstrate knowledge by means of integration of all subjects and all kind of activities. It develops key and professional competences of future managers and forms cross-cultural communication competence. Thus, case-method equips future managers for further successful working activity, making them competitive on the labour market.

4. Evidence of given recommendations

In the process of forming cross-cultural communication competence in professional spheres the following skills are necessary for getting professional cross-cultural communicative competence. The key elements of professional cross-cultural communicative competence are:

1. communicative (speech) skills, which are formed on the bases of language knowledge and skills, and linguistic aspect of cross-cultural studies:
   a) in speaking: ability to start and keep up business conversation, to defend your point of view, to persuade, to win your partners over, to estimate advantages and disadvantages of the received suggestions, to give arguments;
   b) in writing: ability to record the statement of business partners, to write down the main points of a presentation, fax, business letter;
   c) in reading: ability to read economic articles in newspapers and magazines for complete understanding or finding the necessary information;
   d) in listening: ability to understand authentic speech at a normal pace in real communication with business partners;

2. strategic skills: to participate in professional communication, using different speech strategies (negotiations, public speaking, discussion, report); to lead your own strategy; to adhere to earlier expressed way of behaviour; to build a clear and logical structure of the statement; to establish connections between facts in the process of discussing business matters; to single out the most valuable information.

Experiment and analysis of the research work prove the reliability of the concept “culture through language and language through culture”, described in the article. The only condition of this concept is the right methodological basis. By means of the application of the set of approaches: learner-centered, activity, communicative, integrated, and communicative method (case-study) plunging students into the atmosphere of their future profession, we can upgrade the process of education, form successfully the communicative skills of students, encourage stu-
dents to improve cross-cultural communication competence.

On Fig. 2 and 3 you can see the results of the analysis of cross-cultural communication skills of students after using and not using the above recommendations. 20 students were tested, 10 students the concept mentioned above and 10 students followed traditional methodology. On Fig. 2 the results of the first group of students are reflected, the data on Fig. 3 illustrate the results of the second group of students.

![Graphs showing results](image)

**Fig. 2.** The results of the criteria “Communicative skills in speaking and strategic skills” of the first group of students before (light column) and after (dark column) the application of the author’s recommendations

**Fig. 3.** The results of the criteria “Communicative skills in speaking and strategic skills” of the second group of students before (light column) and at the end (dark column) of the process of traditional education

**Conclusions**

Human capital is one of the components of intellectual capital. It can increase competitive advantage of a company on the market. That is why it is necessary to start the formation of human capital at the University where professional competences of future business are formed. Business English teachers can contribute in development and education of students. The concept of linguistic education “culture through language and language through culture” and communicative methodology can help Business English teachers to form students’ progressive thinking. They are tools for intellectual and professional development of individuals.

Learning cross-cultural communicative behaviour, cultural and sociolinguistic peculiarities of representatives of another speaking culture contributes to shortening a cross-cultural distance and readiness to adapt to another culture. The results of research prove reliability of the concept “culture through language and language through culture” based on communicative methodology. The only aim of Business English teachers is to comprehend this concept, to work out adequate strategy of communication and to master more productive methods of work with students in order to make graduates well-educated, good decision-makers, competitive on the labour market and able to be of great benefit to a company.

**References**

IT–CLEFT SENTENCES DISAMBIGUATION: A LOCAL GRAMMAR PROJECT

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Abstract

The aim of this paper is to write a local grammar to disambiguate it-cleft sentences. In order to do this, the ambiguity of the structure has been established: the pronoun it is used both with referential meaning in sentences with anaphoric or situational reference, and with non-referential meaning in sentences with dummy it subjects denoting time, distance, weather conditions, sentences with extraposition and it-cleft sentences. On the basis of the internal structure of the focused element of it-clefts, disambiguation rules have been written. The environment of it-clefts and, in particular, the sentence elements preceding them, has been studied with the aim of more successful disambiguation. The rules’ precision has been evaluated using examples obtained from the British National Corpus, and the respective disambiguation failures have been analyzed.

Key words: local grammar, disambiguation, it-cleft sentences, English.

Introduction

The aim of this term paper is to write a local grammar to disambiguate it-cleft sentences. It-cleft sentences are defined by Quirk et al (1985) as “devices for giving prominence” comprising the subject pronoun it as an empty theme, followed by the verb be, which introduces the focused element. In example [1] below the dummy it and the focused element are underlined:

[1] In her shock and grief, it was my mother whom Deborah turned to, calling and weeping into the phone.

It-cleft sentences contain the ambiguous construction “it + be [sg]”. The aim of this study is to analyze to what extent the disambiguation will be successful, if possible at all. Therefore, let us first identify the ambiguity of the construction “it + be [sg]”.

1. Ambiguity of it be[sg]

It followed by a verb form of be, in its most straightforward case, is a pronoun which stands for an object in reality as in example [2]:

[2] Desperado. …/ It was a film from the early eighties, and it co-starred Alex Rivers.

In a less obvious case, “it” does not refer to an object in reality, but to a situation, but it still has referential meaning and can be substituted by the demonstrative pronouns this/that. In example [3] such substitution is possible, and is shown in the curly brackets:

[3] As the sun dropped behind the edge of the distant hills, he leaned over and kissed me. It [This] was not the way he had kissed me before—not quiet, not gentle, not testing.

In contrast to the referential it-subjects, there are also syntactically similar structures with dummy it-subjects:

a) in “expressions denoting time, distance, or atmospheric conditions” [Quirk et al, 1985: 348];

[4] It was nearly five in the morning when we arrived, and /…/.

b) in sentences with extraposition;

[5] It was nice to see her thinking of Alex as an ally instead of an enemy, but /…/.

c) in it-cleft sentences.

[6] It was only in his closing that he acknowledged any personal connection between them.

The examples 2-6 all contain “it + be [sg]”, and the task is to write local rules that will disambiguate example [6] as an example of a cleft sentence. Sound local rules are written on the basis of markers such as morphemes, words, POS tags, punctuation marks, sentence borders.

2. Disambiguation rules

2.1. Marker: punctuation

Let us start with the big picture delimiting the borders of a cleft sentence by formulating the following Rule 1: If it be[sg] is followed by a sentence-end punctuation or direct speech punctuation i.e. a comma and inverted commas, then this is not an it-cleft sentence.

IF it be[sg] Punct {sentence-end/direct speech} → not it-cleft

1 The sources of the examples are given in Appendix 1.
2 The abbreviations and symbols used in the rules are given in Appendix 2.
This rule would successfully disambiguate example [7] obtained from the British National Corpus, if the sentence had the expected punctuation.

[7] It wasn’t a repeat oh yeah it was she said I’m going to be sick when, so

2.2. Marker: focused element realized by a personal pronoun or proper noun

The following Rule 2 can be written for it-clefts disambiguation: If it be[sg] is followed by a pronoun in the nominative or the oblique case, or a proper noun followed by who/that, then this is an it-cleft sentence.

IF it be[sg] PronNom/PronObl/NProper, who/that \rightarrow it-cleft

Examples of Rule 2 disambiguation:

[8] When her younger brother was being bullied it was she who leapt to his defence and up-ended his tormentor in a matter of seconds.

[9] It was she that was responsible for the trashing of so much British manufacturing, with the appreciating pound very much part of this.

[10] Janet shared the stage with the pop group Slade, but next day it was her who made all the headlines.

[11] Her mother was a fighter and had a graceful attitude all throughout her illness, and it was her that gave Jaime the determination to beat cancer.

[12] The story told her unconscious that to follow Hansel’s lead led her back, not forward, and it was also meaningful that although Hansel was the leader at the story’s beginning, it was Gretel who in the end achieved freedom and independence for both, because it was she who defeated the witch.

Quirk et al. (1985) remarks that the use of a personal pronoun in the objective case when it is the subject of the subordinate relative clause is “widely condemned”. Another tendency in the examples provided by Quirk et al. (1985) below is the tendency in familiar English the omission of the relativizer when the focused element is also the subject or an adjunct in the relative subordinate clause [13-14]:

[13] It was the President himself spoke to me.
[14] It is Chelsea (that) he lives in.

The omission of the relativizer requires a new rule. Rule 3: If it be[sg] is followed by a pronoun in the nominative or the oblique case, or a proper noun, then this is an it-cleft sentence, unless it is preceded by what, who, when, where, why, how, whatever, whoever, wherever, whenever.

IF it be[sg] PronNom/PronObl/NProper, unless {what, who, when, where, why, how, whatever, whoever, wherever, whenever} it \rightarrow it-cleft

Examples of Rule 3 disambiguation:

[15] We asked who we talked to and when pressed that it was her we spoke to, she adamantly denied this.

[16] On Monday, Feb. 1, 2010, ECU Joyner Library’s dear colleague Cynthia Jones, who was our Human Resources point person and Administrative Assistant Director, died suddenly on her way to work. It was she we would have sought solace with when this kind of tragedy occurs.

[17] No one ever knew where it was she hoped to go.

It should be noted that Rule 2 will disambiguate sentences as [18] in which the relativizer is not omitted, but is placed at some distance from the focused element:

[18] It was she, it seemed, not Quentin, who might somehow blow hope into hopelessness.

Sentences as in [18] accounted for 14% (7 instances) of the 50 randomly generated examples for the query “it was she” by the British National Corpus. Together Rule 1 (if the sentence had punctuation), Rule 2 and Rule 3 disambiguate 96%, or 48 of the generated sentences. In the two remaining sentences [19, 20] the it subjects can be substituted by this, and the verb be bears its existential meaning.

[19] He accused her of blaming him for his failure to return with Oreste when, if anyone was to be blamed other than her sister Ellen, it was she herself.

[19a] Обвини я, че хвърли върху него вината, че не се е върнал с Оресте, когато, ако някой изобщо беше виновен, освен сестра й Елън, това беше самата тя.

[20] She had a little mole above her pretty upper lip, so I knew it was she.

[20a] Имахме малка бенка над красивата си горна устна, тая че беше сигурен, че това е тя.

Although the sentence translation in Bulgarian shows that the optional use of an emphatic adverb does not change the meaning, sentences [19, 20] are not emphatic it-clefts. In the exchange: “Who is there? It’s me.” it is not possible, without a shift in meaning, to use either a demonstrative or an emphatic adverb when translating it into Bulgarian. Therefore, though accepting 4% disambiguation failure, further re-
search is necessary to study such sentences (the British National Corpus generates only 14 sentences for the query “it was her.” with a full stop at the end).

2.3. Marker: adjunct

a) because of as marker

Rule 4: If it be[sg] is followed by because of, followed by that in position (+1), (+2) or (+3), then this is an it-cleft sentence, unless that is followed by a finite verb:

\[ \text{IF } \text{it be[sg] because of that}(of +1)/(of +2)/(of +3) \rightarrow \text{it-cleft} \]

unless
\[ \text{IF } \text{it be[sg] because of that}(of +1)/(of +2)/(of +3) \text{ V[fin]} \]

Examples of Rule 4 disambiguation:

[21] It was because of this that he finally chose medicine over law as his career goal.

[22] It was because of this interest that he was awarded a Red Cross medal for services rendered to the sick and wounded during the Franco-Prussian war.

[23] It was because of that meagre income that she became incensed at her tutor, Maurice Greiffenhagen, who had a habit of sitting down at his students’ drawings and paintings and finishing them off.

[24] If they did, however, it was because of family feuds that might occur.

To establish the disambiguation precision of this rule, a sample of 100 random results for the queries “it is because of” and “it was because of” was obtained from the British National Corpus. The analysis of the sample shows that rule 4 limits the recall in at least two ways:

- that can be distanced from because of by as many as 42 positions as in example 25

[25] It was, then, peace or truce which threatened their existence, and it was because of the termination of hostilities between England and France which resulted from the treaty of Bré-tigny in 1360, followed as this was in 1364 by the ending of the Navarrese challenge to the royal authority in Normandy and the war of Breton succession, that France, Italy and Spain were to be hosts to the Companies in the 1360s.

- the cleft sentences contain it be[sg] because of can occur without that as in example 26:

[26] She wanted to stay in Harlem and be with Edith for it was because of Edith she was still alive and she finally knew that their relationship was genuine.

In this sample of 100 sentences there are four it-cleft sentences without that. They contain either a pronoun in the oblique case or a proper name. Rule 5 can be written to disambiguate these: If it be[sg] is followed by a pronoun in the oblique case, or a proper noun, then this is an it-cleft sentence.

\[ \text{IF } \text{it be[sg] because of PronObl/NProper} \rightarrow \text{it-cleft} \]

Table 1 shows the summary of the results for the sample after analyzing the sentences it contains. As 100 sentences were analyzed, the number and percentages have the same values, but are given for clarity.

<table>
<thead>
<tr>
<th>Occurrences</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Disambiguated clefts using rule 4</td>
<td>32</td>
</tr>
<tr>
<td>2 Clefts with no that (after pronoun/name) using rule 5</td>
<td>4</td>
</tr>
<tr>
<td>3 Discarded non-clefts using rule 4</td>
<td>34</td>
</tr>
<tr>
<td>4 Clefts containing that distanced at more than 3 positions</td>
<td>22</td>
</tr>
<tr>
<td>5 Non-clefts containing that distanced at more than 3 positions</td>
<td>8</td>
</tr>
<tr>
<td>Sample total</td>
<td>100</td>
</tr>
</tbody>
</table>

Using Rule 4 and 5 will make possible to correctly identify 70% of the sentences: 36% are correctly disambiguated cleft sentences (lines 1 and 2), and 42% correctly discarded non-clefts (line 3 and 5). The rules fail to disambiguate 22% cleft sentences (lines 3) in which that is place at a distance of up to 42 positions from because of. The recall can be increased, by changing the that position range, to include the 22 sentences which rule 4 fails to disambiguate. However, this increased recall will also include the non-clefts containing that in the new range (line 5), and therefore this needs to be considered by the modified rule.

Rule 4 (modified): If it be[sg] is followed by because of, followed by that in any position from one position after of (of +1) to two position before sentence-end (@@-2), then this is an it-cleft...
sentence, unless that is followed by a finite verb, or unless in this range that occurs as a determiner:

IF\{it be[sg] because of that[of+1]/...../(@$@-2)\} \rightarrow \text{it-cleft}

unless

IF\{it be[sg] because of that[of+1]/...../(@$@-2)\} V[fin]
or unless

IF\{it be[sg] because of that[of+1]/...../(@$@-2)\}

Examples of Rule 4 (modified) disambiguation include all the 22 clefts in line 4 (table 1) as well as two [27, 28] of the 8 non-cleft sentences containing that as determiner.

[27] Probably it was because of what had happened in the play at that point on the previous night.

[28] The first time I murdered it was because of rabbits meeting a fiery death, and meeting that fiery death from the nozzle of a Flamethrower virtually identical to the one I had used to exact my revenge on the warren.

Using Rule 4 (modified) and rule 5, the disambiguation precision is 94%; 6 non-cleft sentences which contain it be[sg] followed by because of, and that within 2 positions of the sentence end will not be discarded. Solutions may be sought in the environment of it be[sg], and this will be attempted later in the study.

b) not until as marker: 100% disambiguation precision of it-cleft sentences

It can be expected that the disambiguation of it-cleft sentences is not easy considering the other syntactically similar constructions involving “it + be [sg]”. However, the rule below will disambiguate all it-cleft sentences of its type without any error:

IF\{it be[sg] not until\} \rightarrow \text{it-cleft}

To test this rule, a search was conducted in the BNC. All the 50 random solutions generated for “it was not until” were it-cleft sentences. Of the 36 solutions generated for “it is not until” only one is not a cleft sentence, but it is also not a grammatically correct sentence [29].

[29] Sir Daniel Fleming was certainly interested in the formerly productive mines in his fells around Coniston, but it is not until 1658 is there further note of mines and then not for copper viz.

The it-cleft sentences under this rule contain either a foregrounded PP [30] or an adjunct clause [31], and in all cases but one the relativizer “that” is used; it should be noted that its omission seems to be due to a grammatical error [32].

[30] However it is not until this twentieth century that variable space has become a conceptual reality.

[31] It was not until I wandered back to the harbour that I realised the wind had freshened.

[32] I had been taught not to cry till I was really hurt, and so it was not until about eleven o’clock I really began to be noticed and I went into the theatre.

Conclusions

1. It is possible to establish rules for successful disambiguation of it-cleft sentences.
2. The disambiguation precision of the established rules is realiable.

It should be noted that this study is limited in its scope and does not account for the wide diversity of it-cleft sentences. Further research is necessary in order to estimate the degree to which successful disambiguation is possible.

References


Appendix 1: Example sources
The British National Corpus, random searches: for examples 7, 8, 10, 12, 17, 18, 19, 20, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32
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http://thinkingliberal.co.uk/?p=346: for example 9
http://www.yelp.com/biz/mangrove-veterinary-hospital-chico: for example 15
http://en.wikipedia.org/wiki/Jonas_Salk: for example 21
http://www.ocf.berkeley.edu/~kennyk/oc/early.html: for example 24
http://www.against-the-grain.com/2010/02/personal-strategic-planning-in-honor-of-cynthia-jones/: for example 16

Appendix 2: Abbreviations and symbols used in the rules

( ) – optional component
/ - or
→ - then
@@ - sentence end

AdjP – adjective phrase
AdvP – adverb phrase
Conj – conjunction
det - determiner
fin - finite
NP – noun phrase
NProper – proper noun
PM – post-modifier
PP – prepositional phrase
PronNom – pronoun (nominative)
PronObl – pronoun (oblique)
Punct - punctuation
sg - singular
VP – verb phrase
XP – any type of phrase
SYSTEM CAPABILITIES OF “ALUMNI NETWORK” IN UNIVERSITY OF FORESTRY FOR MONITORING AND EVALUATION OF THE INDICATORS OF GROUPS 5 AND 6 OF UNIVERSITY RANKING SYSTEM

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Abstract

This article presents the system “Alumni Network” of the University of Forestry. It gives a view of the possibility for development as a mechanism for monitoring and analysis of indicators of the Group 5 Prestige and Group 6 Professional and career realization from University ranking system developed and maintained by Ministry of Education, Youth and Science. The obtained results of this analysis will help taking timely measures for improvement and sustainability of the values of these indicators and this way increase the rating of University of Forestry.

Key words: University ranking system, educational and scientific product, “Alumni Network”.

Introduction

Implementation of mechanisms of University ranking system developed and maintained by the Ministry of Education, Youth and Science creates real prerequisites for valuation of the efforts of the universities in terms of their educational and scientific product.

With most weight (35%) in University ranking system is Group 6 Professional and career realization. The indicators in it are:
- Graduates’ insurance income;
- Unemployment among university graduates;
- Professional development and career in the chosen field of study;
- I gained confidence that I will succeed in life;
- I created important contacts and friendships;
- Employers’ preferences.

Group 5 Prestige is weighted 10% in University ranking system. The indicators in it are:
- Secondary education diploma GPA;
- Prestige among students;
- First choice;
- Foreign students.

The indicators in these two groups actually show real assessment from all users for quality educational and scientific product of the university and its acceptance as an educational and research institution in the community. The establishment of mechanisms for their reporting and analysis would help to achieve high values of the indicators and their resistance.

Some of the indicators in Group 6 Professional development and career in the chosen field of study; I gained confidence that I will succeed in life and I created important contacts and friendships, somehow are included in the developed and already are in use in the system “Alumni Network” of University of Forestry.

In the system there are 444 registered graduated users and 6 present students in the University of Forestry in the period from the beginning of 2011 to mid-2012.

Of all registered graduated students 260 have filled what position they occupy now or have occupied in the past. Total “occupy now or have occupied in the past” positions are 354.

Of these 354 positions:
- 92% (327 positions) of occupied positions are related to acquired qualification degree;
- 8% (27 positions) of occupied positions are NOT related to acquired qualification degree.

They inputted information containing address, email address and phone number, allowing feedback with them.

What is the “Alumni Network” of University of Forestry?

To continue the relationship of graduates’ students, The University of Forestry created a web-based system “Alumni Network”. The fact is that many of the graduated students of the university are realized employees in prestigious public institutions and private companies. The system “Alumni Network” was created to help make it easier to inform members about the life of the University and to promote their active participation in it. Anyone who is a current or former stu-
dent of the University of Forestry can become a part of this mini-society.

Alumni database is created to achieve goals such as:
- to provide to the university real statistical data for graduates students and their professional realization;
- to promote the realization of active contact between graduates, present and future students, to maintain relations and cooperation between them and to provide opportunities to develop their careers;
- to promote the exchange of experience between members of the system, whose knowledge and capabilities can be useful for the others;
- to assist the employers in the recruitment and selection of staff in the specific occupational areas in which the university offers educational and scientific product;
- to assist the academia structures in organizing and conducting seminars and conferences;
- to provide public support for university, to assist in the mission, goals and objectives of the University of Forestry.

**Used technologies**

For development of the system are used PHP technologies and MySQL database. PHP is a free open source software. Its syntax is friendly to people and easy to analyze. It is built-in HTML, i.e. “switch” PHP mode when necessary. PHP is cross-platform. PHP software is stable and does not change radically and incompatible between two successive versions. PHP is fast - when PHP is compiled as a module of Apache, it is significantly faster than the use of other scripts. PHP facilitates communication with other programs and protocols.

MySQL is a simple, not complicated database where there is no need of complex business solutions, but of good performance. It presents opportunities for searching in databases and for service of Web requests because it is fast and reliable. MySQL is free. Data can be of any type - from simple text lists to complex structured corporate information. MySQL organize data in tables, allowing quick access to them.

System “Alumni Network” is optimized for search engines like Google.com, Yahoo.com, Bing.com, Yandex.ru, Ask.com, Dir.bg and others by:
- implemented appropriate metadata on the pages;
- appropriate usage of alternative texts of graphics and links;
- registration in popular search engines and catalogues.

**Implemented modules in “Alumni Network”**

In the system are implemented modules, extracting data for former alumni:
- module “**database alumni**” - retrieves information about former alumni, which are filled in, in the database (information about the education and information about the professional status), divided by faculties and sorted by year of completion and names of registered users;
- module “**number of registered students**” - presents information on the number of registered users in the system and reports the number of “active users”, filled in a year of completing the UF and the number of “passive users” - made its registration but not filled the field for year of completion;
- module “**statistics**” - presents graphically ratio percentage of students who noted that occupy position and those who do not occupy position associated with the acquired qualification degree;
- module “**newly alumni**” - outputs a report of the graduates students and their registration date by months.
- module “**statistics by faculties**” - graphically represents the percentage of students, divided by faculties, who responded positively and negatively to the question “Is your position linked up with the acquired qualification degree”;
- module “**present students**” - outputs a report of the current registered students and their registration date by months.

**Used functions**

**JpGraph library**

JpGraph is an object-oriented library for creating graphics for PHP. The library is completely written in PHP. At the present application this library is used for the graphical representation of statistical data for registration thru pie chart.

**Functions**

There are many functions. The function is the name which is given to a block of code that can
be implemented by calling the function by name. For example: The function `this_profstatus_exists` checks if registered users have filled in professional status in the database.

```php
function this_profstatus_exists($user_id, $date1, $date2, $rabotodatel, $profsector,.......){
  $q=mysql_query("SELECT * FROM profstatus WHERE fromdate='$date1' AND .............' ")or die(mysql_error());
  if(mysql_num_rows($q)>0){
    return true;
  }else return false;
}
```

We give the function variables that check whether they are equivalent to those in the base. The function (mysql_num_rows($q)>0 from row 6 allows to understand whether the query returns valid, real, positive records from the database. Therefore, returning a positive result > 0, return true, therefore the user has recorded data for professional status in the database.

Conclusions

The system “Alumni Network” has the potential to be developed to become a tool for regular feedback from current and former students of the University, allowing monitoring of indicators of Group 6 and Group 5 of University ranking system, developed and maintained by MEYS.

This can be achieved through:
- development of corresponding modules for extraction and statistical processing of this data;
- developing and carrying out regular surveys of registered members.

The results obtained by the analysis of the data will give the possibility of taking timely actions for improvement and resistance of the values of these indicators to be taken and thus raise the rating of University of Forestry.

ВЪЗМОЖНОСТИТЕ НА СИСТЕМАТА „ALUMNI NETWORK“ НА ЛЕСОТЕХНИЧЕСКИЯ УНИВЕРСИТЕТ ЗА МОНИТОРИНГ И ОЦЕНКА НА ИНДИКАТОРИТЕ ОТ ГРУПИ 5 И 6 НА РЕЙТИНГОВАТА СИСТЕМА ЗА ВИШИТЕ УЧЛИЩА

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Резюме

В настоящата статия се представя системата „Alumni Network“ на Лесотехническия университет. Дискутира се възможността за развитието като механизъм за мониторинг и анализ на индикаторите от Група 5 „Пrestиж“ и Група 6 „Реализация и връзка с пазара на труда“ от Рейтинговата система на висшите училища разработена и поддържана от МОНМ. Получените при този анализ резултати ще дадат възможност за предприемане на своевременни действия за подобряване и устойчивост на стойностите на тези индикатори и по-този начин повишаване на рейтинга на Лесотехническия университет.

Ключови думи: Рейтингова система на висшите училища, образователен и научен продукт, „Alumni Network“.
BIDDING STRATEGY SELECTION VIA DIRECT AGGREGATION OF FUZZY NUMBERS

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Abstract

This paper proposes a new method for bidding strategy selection in multi-agent systems for electronic auctions. The described method suggests the implementation of an algorithm for multi-criterion ordering with direct fuzzy numbers aggregation called ARAKRI2. In classical Decision Theory, alternative/criterion matrix and weighted coefficients both with real values are used in multi-criterion selection. In a software system of agent participants, however, it is difficult to find quantitative indicators of strategy evaluation criteria on individual level as well as on collective level. For this reason, in practice, in evaluating bidding strategies, fuzzy agent attitude matrices for each given strategy are used. Fuzzy logic enables agents to cope with uncertainty, inaccuracy and incompleteness of available information.

Key words: electronic commerce, software bidding agents, bidding strategy selection, fuzzy numbers.

Introduction

This paper suggests a bidding strategy selection method for online auctions via direct aggregation of fuzzy numbers ARAKRI2 which uses the Gamma operator. This method is applicable to multi-agent systems (MAS) for modeling online auctions. In continuous double auction (CDA), when generating their next bid/ask, agent buyers/sellers use pre-defined bidding selection. In this case, participants solve many times the task of choosing an appropriate bidding strategy. Firstly, before the start of an auction and afterwards, during bids, when auction conditions are changed, agents look for the most fitting strategy. The explored multi-criterion selection algorithm imitates the behavior of a group of experts in the researched field. A distinction from classical multi-criterion algorithms here is that weighted coefficients are not needed. In order for the applicability of ARAKRI2 to be determined, a series of experiments with different parameters of the task in question were conducted. The results obtained in the course of experimenting were compared to those of previous studies via the MaxMin and MinAvg operators of the ARAKRI2 algorithm. As a benchmark, the results obtained by another strategy selection algorithm with fuzzy numbers – Fuzzy Techniques and Negotiable Attitude (FTNA) [1] were used. Advantages and disadvantages of using this method were analyzed together with possibilities of its realization in MAS MASECA [2] and future direction of research has been outlined.

1. The task of multi-criterion ordering and its solution via direct aggregation of fuzzy numbers

The assessments of $n$ bidding strategies by $m$ criteria have been summarized in Table 1. The task is finding a decreasing ordering of alternatives according to the algorithm of direct aggregation of fuzzy assessments of alternatives ARAKRI2 via the Gamma operator [3,4,5]. Each assessment in Table 1 is a fuzzy trapezoidal number:

$$\tilde{A}_i = (a_{i1}^1, a_{i2}^1, a_{i3}^1, a_{i4}^1), a_{ij}^1 = a_{ij}^2, i = 1,\ldots,n, j = 1,\ldots,k.$$ 

<table>
<thead>
<tr>
<th>$A_i$</th>
<th>$C_1$</th>
<th>$C_2$</th>
<th>$C_3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A_1$</td>
<td>1.4</td>
<td>2.1</td>
<td>2.8</td>
</tr>
<tr>
<td>$A_2$</td>
<td>0.2</td>
<td>0.6</td>
<td>1.3</td>
</tr>
<tr>
<td>$A_3$</td>
<td>0.7</td>
<td>1.5</td>
<td>2.5</td>
</tr>
<tr>
<td>$A_4$</td>
<td>1.0</td>
<td>1.9</td>
<td>2.9</td>
</tr>
<tr>
<td>$A_5$</td>
<td>1.4</td>
<td>2.3</td>
<td>3.3</td>
</tr>
<tr>
<td>$A_6$</td>
<td>1.9</td>
<td>2.9</td>
<td>3.8</td>
</tr>
<tr>
<td>$A_7$</td>
<td>2.5</td>
<td>3.4</td>
<td>4.2</td>
</tr>
<tr>
<td>$A_8$</td>
<td>1.9</td>
<td>2.9</td>
<td>3.8</td>
</tr>
<tr>
<td>$A_9$</td>
<td>1.8</td>
<td>2.7</td>
<td>3.6</td>
</tr>
<tr>
<td>$A_{10}$</td>
<td>1.8</td>
<td>2.6</td>
<td>3.5</td>
</tr>
</tbody>
</table>

In this example, the number of alternatives is $n = 10$, and the criteria are $m = 3$.

Step 1. If assessments are scaled differently and are not in the interval $[0, 1]$, then the fuzzy numbers are made uniform and normalized. Let

$$a_{ij}^{\text{min}} = \min\{a_{ij}\}, a_{ij}^{\text{max}} = \max\{a_{ij}\}, da = a_{ij}^{\text{max}} - a_{ij}^{\text{min}},$$

then the uniform and normalized fuzzy number is calculated as per the following formula:

$$\tilde{Z}_i = (\tilde{A}_i - a_{ij}^{\text{min}})/da, i = 1,\ldots,n, j = 1,\ldots,m.$$
For example, for fuzzy number
$$\tilde{A}_{51} = (1,8,2,7;3,5),$$
\[a_{i}^{\text{max}} = 5,0,a_{i}^{\text{min}} = 0,0,\text{da} = 5,0,\]
$$\overline{Z}_{52} = (\overline{A}_{52} - a_{5}^{\text{min}}) / \text{da}, \text{i.e.}$$
\[Z_{52} = (18-0)/50 = 0.36, Z_{52} = Z_{52} = (27-0)/50 = 0.54,\]
\[Z_{52} = (53-0)/50 = 0.70, \text{i.e. } \overline{Z}_{52} = (0.36,0.54,0.70).\]
Table 2 is thus obtained and it is comprised of the new assessments.

### Table 2. Normalized alternative-criterion matrix

<table>
<thead>
<tr>
<th></th>
<th>c1</th>
<th>c2</th>
<th>c3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>0.30</td>
<td>0.48</td>
<td>0.65</td>
</tr>
<tr>
<td>A2</td>
<td>0.00</td>
<td>0.10</td>
<td>0.28</td>
</tr>
<tr>
<td>A3</td>
<td>0.13</td>
<td>0.33</td>
<td>0.58</td>
</tr>
<tr>
<td>A4</td>
<td>0.20</td>
<td>0.43</td>
<td>0.68</td>
</tr>
<tr>
<td>A5</td>
<td>0.30</td>
<td>0.53</td>
<td>0.78</td>
</tr>
<tr>
<td>A6</td>
<td>0.43</td>
<td>0.68</td>
<td>0.90</td>
</tr>
<tr>
<td>A7</td>
<td>0.58</td>
<td>0.80</td>
<td>1.00</td>
</tr>
<tr>
<td>A8</td>
<td>0.40</td>
<td>0.63</td>
<td>0.85</td>
</tr>
<tr>
<td>A9</td>
<td>0.40</td>
<td>0.60</td>
<td>0.83</td>
</tr>
<tr>
<td>A10</td>
<td>0.40</td>
<td>0.60</td>
<td>0.83</td>
</tr>
</tbody>
</table>

**Step 2.** If criteria are of the same type, i.e. they are all maximizing then it can be proceeded to Step 3. If a part of the criteria is maximizing and another part is minimizing, or all are minimizing, then for the minimizing criteria, the complements of the fuzzy numbers to the fuzzy number (1, 1, 1, 1) will have to be calculated so that the criteria be of the same type. For this purpose, the definition of a difference between two fuzzy numbers is used, i.e.

$$\tilde{A} - \tilde{B} = \tilde{A} + (-1)\tilde{B},$$

where

$$\tilde{A} = (1,1,1,1),(-1)\tilde{B} = (-a_{1},-a_{2},-a_{3},-a_{4}).$$

In this example, all three criteria are maximizing and there is no need for the calculation of the complements of the fuzzy numbers to the unit fuzzy number.

**Step 3.** Fuzzy assessments aggregation is performed and the calculations are done using the Gamma operator without weight coefficients. The mathematical model of the operator is given by the formula:

$$\mu_{\gamma}(a_{i},a_{j}) = \left[ \prod_{k=1}^{m} \mu_{k}(a_{i},a_{j}) \right]^{1-\gamma} \left[ 1 - \prod_{k=1}^{m} (1 - \mu_{k}(a_{i},a_{j})) \right],$$

where \(\mu_{k}(a_{i},a_{j})\) are degrees of membership of aggregated alternatives by the criteria and \(\gamma\) is a coefficient in the interval [0, 1].

As the model has a multiplication operation of fuzzy numbers, the aggregated assessment will not always be a fuzzy number from the same type. For this reason, the calculations for this operator are performed according to the steps of an algorithm described in [3]. In the example, the algorithm has been applied to the following values:

1) For \(kk=5\) we have:
\[\alpha_{0} = 0,\alpha_{4} = 1,\alpha_{0} < \alpha_{1} < \alpha_{0} < \ldots < \alpha_{4}, \alpha_{1} - \alpha_{0} = \alpha_{2} - \alpha_{1} = \alpha_{3} - \alpha_{2} = \alpha_{4} - \alpha_{3} = 0.25\]

2) \(\mu_{t}(t_{i}) = \mu_{j}(t_{j}) = \alpha_{i}\) are calculated, for example, for

\[t = 3 \rightarrow \mu_{t}(t_{i}) = \frac{t_{i} - a_{t}}{a_{2} - a_{1}} = \frac{a_{4} - t_{i}}{a_{4} - a_{3}} = \alpha_{3} = 0.75\]

Consequently, for fuzzy number (0.3, 0.525, 0.775), which corresponds to the assessment of alternative \(A_{5}\) by criterion \(c_{1}\), the following \(\alpha\)-intervals are obtained:

- for \(\alpha_{0} = 0 \rightarrow [t_{0}^{1},t_{0}^{1}] = [0.3,0.775],\)
- for \(\alpha_{1} = 0.25 \rightarrow [t_{1}^{1},t_{1}^{1}] = [0.3575,0.7175],\)
- for \(\alpha_{2} = 0.75 \rightarrow [t_{2}^{1},t_{2}^{1}] = [0.415,0.655],\)
- for \(\alpha_{3} = 0.75 \rightarrow [t_{3}^{1},t_{3}^{1}] = [0.4725,0.5925],\)
- for \(\alpha_{4} = 1.00 \rightarrow [t_{4}^{1},t_{4}^{1}] = [0.53,0.53].\)

For assessing alternative \(A_{5}\) by criterion \(c_{2}\) the following \(\alpha\)-intervals are obtained:
for $\alpha_0 = 0 \rightarrow [l^0, r^0] = [0.36, 0.7]$
for $\alpha_1 = 0.25 \rightarrow [l^1, r^1] = [0.405, 0.66]$
for $\alpha_2 = 0.75 \rightarrow [l^2, r^2] = [0.45, 0.62]$
for $\alpha_3 = 0.75 \rightarrow [l^3, r^3] = [0.495, 0.58]$
for $\alpha_4 = 100 \rightarrow [l^4, r^4] = [0.54, 0.54]$

For assessing alternative $A_5$ by criterion $c_3$ the following $\alpha$-intervals are obtained:
for $\alpha_0 = 0 \rightarrow [l^0, r^0] = [0.02, 0.26]$
for $\alpha_1 = 0.25 \rightarrow [l^1, r^1] = [0.04, 0.22]$
for $\alpha_2 = 0.75 \rightarrow [l^2, r^2] = [0.06, 0.18]$
for $\alpha_3 = 0.75 \rightarrow [l^3, r^3] = [0.08, 0.14]$
for $\alpha_4 = 100 \rightarrow [l^4, r^4] = [0.10, 0.10]$

3) Aggregated intervals $[l^j, r^j], t = 0, 1, ..., kk$ are calculated via the $\textbf{Gamma}$ operator defined as every $i = 1, ..., n, \gamma \in [0,1]$ via

\[
[l^j, r^j] = \left[ \prod_{k=1}^{m} \left[ l^k, r^k \right]^{-\gamma} \left[ 1 - \prod_{k=1}^{m} (1 - l^k, r^k) \right] \right] \text{ if } [l^j, r^j] \neq (0,0).
\]

For alternative $A_5$, in case $\gamma = 0.6$, $m = 3$:

\[
l^j = \left[ \prod_{k=1}^{3} \left[ l^k, r^k \right]^{-0.4} \left[ 1 - \prod_{k=1}^{3} (1 - l^k) \right] \right]^{0.6}.
\]

\[
r^j = \left[ \prod_{k=1}^{3} \left[ l^k, r^k \right]^{-0.4} \left[ 1 - \prod_{k=1}^{3} (1 - r^k) \right] \right]^{0.6}.
\]

The calculated aggregated intervals are:

$[l_{5.1}, r_{5.1}] = [0.0610, 0.442]$, $[l_{5.2}, r_{5.2}] = [0.0970, 0.385]$

$[l_{5.3}, r_{5.3}] = [0.1330, 0.326]$, $[l_{5.4}, r_{5.4}] = [0.1710, 0.269]$

$[l_{5.5}, r_{5.5}] = [0.2110, 0.211]$

4) These intervals determine an aggregated fuzzy number, corresponding to this alternative. For $kk \rightarrow \infty$ the areas of the fuzzy number, constrained between two neighboring intervals $[l^j, r^j]$ and $[l^{j-1}, r^{j-1}], t = 0, 1, ..., kk$ look like trapezoids with height $1/(kk - 1)$. Consequently, an aggregated number is presented as $kk$-1 trapezoid areas, which approximate the membership function of that fuzzy number. Then the $G$-index of every aggregated number can be calculated, taking into consideration expressions (1), (2) and (3).

\[
F_1(A) = a_i + S_A \sin[Rg(x)] = \frac{1}{2} \left( a_i - a_j + (a_k - a_j) \right)
\]

\[
= a_i + \frac{(a_k - a_j) + (a_j - a_j)}{2} \frac{1}{\sqrt{[(a_k - a_j)^2 + 1]}}
\]

(2)

\[
F_2(A) = a_i + S_A \sin[Rf(x)] = \frac{1}{2} \left( a_i - a_j + (a_k - a_j) \right)
\]

\[
= a_i + \frac{(a_k - a_j) + (a_j - a_j)}{2} \frac{1}{\sqrt{[(a_k - a_j)^2 + 1]}}
\]

As an index of the fuzzy number $\tilde{A}$, a linear combination of the two indices (1) and (2):

$F(A) = kF_1(A) + (1-k)F_2(A), k \in [0,1]$

(3)

is used. Calculating the $G$-indices in this example is performed in the following way:

\[
S^i = \frac{2}{\sqrt{[(r^i - l^i)^2 + 1]}}
\]

\[
\sin[Rg(x)] = \frac{1}{\sqrt{[(r^i - l^i)^2 + 1]}}
\]

\[
\sin[Rf(x)] = \frac{1}{\sqrt{[(r^i - l^i)^2 + 1]}}
\]

\[
F_1 = \frac{1}{\sum_{i=0}^{k} S^i} \sin[Rg(x)]
\]

\[
F_2 = \frac{1}{\sum_{i=0}^{k} S^i} \sin[Rf(x)]
\]

\[
F = pF_1 + (1-p)F_2, p \in [0,1].
\]

Calculations are as follows:

$S^1 = \frac{(r^1 - l^1) + (r^2 - l^2)}{2} = 0.09898$

$S^2 = 0.08436$, $S^3 = 0.0696$, $S^4 = 0.055$

$\sin[Rg(x)] = \frac{1}{\sqrt{[(r^i - l^i)^2 + 1]}} = 0.9981$

$\sin[Rf(x)] = 0.9981$

$\sin[Rg(x)] = 0.9981$

$\sin[Rf(x)] = 0.9981$

$\sin[Rf(x)] = 0.9981$

$\sin[Rf(x)] = 0.9984$

$\sin[Rf(x)] = 0.9984$

$\sin[Rf(x)] = 0.9984$

$F_1 = 0.061 + \sum_{i=0}^{k} S^i \sin[Rg(x)] = 0.368$

\[
F_2 = 0.442 - \sum_{i=0}^{k} S^i \sin[Rf(x)] = 0.135
\]

Therefore, the $G$-index of aggregated assessment of alternative $A_5$ by the three criteria for $p = 0.5$ is $F = pF_1 + (1-p)F_2 = 0.2518$.

Calculations for the remaining alternatives are analogous. The ordering of alternatives from best to worst using the $\textbf{Gamma}$ operator corresponds to the ordering of the $G$-indices, i.e.:
In this example, the following known from literature ten bidding strategies in CDA are:

- A1 - snipping-стратегия (Snip),
- A2 - strategy with fixed markup (L),
- A3, A4, A5 - three strategies with different historical prices treatment (H1, H2 and H3),
- A6 - zero-intelligence unconstrained (ZIU),
- A7 - zero-intelligence with budget constraints (ZIC),
- A8 - zero-intelligence plus (ZIP),
- A9 - risk-based strategy (RB), and
- A10 - strategy with genetic algorithm (GA).

Those are among the most cited strategies in literary sources on simulations in CDA. They vary in type – they can be stable, as well as adaptive regarding changes in the course of an auction.

For assessment and comparison of the chosen strategies, those thee criteria have been applied:

- c1 - time complexity,
- c2 – forecasting and
- c3 – attitude toward risk.

The obtained solution shows that according to the ARAKRI2 method with aggregation operator Gamma, a bidding agent should choose strategies GA, RB or ZIU. They get the highest assessments (0.78, 0.71 and 0.28, respectively) by all three comparison criteria. Clearly, the first two strategies are superior. At the bottom of the ordering are the most inert strategies Snip, L, H1 and H2. The last two strategies in the ordering fall significantly behind the others. In the middle of the ordering, in third to eighth places with results that are very close are stable, as well as adaptive strategies, H3 and ZIP, respectively.

We solve the task by sequentially changing the type of each one of the criteria from maximizing to minimizing. The following orderings are obtained:

When c1 is a minimizing criterion and c2 and c3 are maximizing criteria:

\[
\begin{bmatrix}
A_{10} & A_9 & A_8 & A_7 & A_6 & A_5 & A_4 & A_3 & A_2 & A_1 \\
0.78 & 0.71 & 0.28 & 0.25 & 0.20 & 0.18 & 0.16 & 0.14 & 0.06 & 0.03
\end{bmatrix}
\]

In this example, the following known from literature ten bidding strategies in CDA are:

- A1 - snipping-стратегия (Snip),
- A2 - strategy with fixed markup (L),
- A3, A4, A5 - three strategies with different historical prices treatment (H1, H2 and H3),
- A6 - zero-intelligence unconstrained (ZIU),
- A7 - zero-intelligence with budget constraints (ZIC),
- A8 - zero-intelligence plus (ZIP),
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- A10 - strategy with genetic algorithm (GA).

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- c3 – attitude toward risk.

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We solve the task by sequentially changing the type of each one of the criteria from maximizing to minimizing. The following orderings are obtained:

When c1 is a minimizing criterion and c2 and c3 are maximizing criteria:

\[
\begin{bmatrix}
A_{10} & A_9 & A_8 & A_7 & A_6 & A_5 & A_4 & A_3 & A_2 & A_1 \\
0.64 & 0.56 & 0.24 & 0.21 & 0.20 & 0.17 & 0.14 & 0.09 & 0.08 & 0.07
\end{bmatrix}
\]

When c2 is a minimizing criterion, and c1, c3 are maximizing criteria:

\[
\begin{bmatrix}
A_{10} & A_9 & A_8 & A_7 & A_6 & A_5 & A_4 & A_3 & A_2 & A_1 \\
0.45 & 0.34 & 0.29 & 0.29 & 0.24 & 0.19 & 0.19 & 0.18 & 0.15 & 0.14
\end{bmatrix}
\]

When criterion “forecasting capabilities” is minimizing, strategies ZIU, ZIC and ZIP, which do not use historical prices move up in the ordering and the rest show very similar among themselves assessments.

When c3 is a minimizing criterion, c1, c2 - maximizing criteria:

\[
\begin{bmatrix}
A_{10} & A_9 & A_8 & A_7 & A_6 & A_5 & A_4 & A_3 & A_2 & A_1 \\
0.57 & 0.56 & 0.49 & 0.49 & 0.45 & 0.34 & 0.20 & 0.18 & 0.17 & 0.12
\end{bmatrix}
\]

Now the first places are occupied by strategies which are risk-neutral and those which take risk into consideration such as GA and RB move to the lower part of the ordering.

3. Solving the task of multi-criterion strategy selection via other methods of multi-criterion ordering

In solving the task from chapter 2 via the FTNA method, ten matrices for comparing criteria in couples are used (one matrix for each strategy), filled in on the basis of expert assessments. The filling in of matrices is performed according to statistical data about bidding strategies’ quality. After normalization of assessments, the criteria weights of each strategy are determined. The weight of each criterion is specified by the geometric average formula from the corresponding matrix row. The weights depend on the level of importance of a criterion to the strategy. If we designate by w the set of weights and \( w = \{w_1, w_2, \ldots, w_m\} \), then \( w_i \in [0,1] \) as \( i = 1,2,\ldots,m \) and \( \sum_{i=1}^{m} w_i = 1 \). In order to eliminate the influence of weight coefficients, we assume that they are equal and have values \( w_1 = w_2 = \ldots = w_m = 1/m \).

Individual strategy-criterion relationship matrices of bidding agent-participants in an electronic auction have been given. Here the term “relationship” expresses the preference of agent \( k \) to selecting strategy \( i \) by criterion \( j \). Assessments of relationships \( a_{ij}^{k} \) (\( i = 1,2,\ldots,n \), \( j = 1,2,\ldots,m \), \( k = 1,2,\ldots,l \) \( n = 10 \), \( m = 3 \), \( l = 5 \) ) are presented in linguistic terms. Fuzzy agent relations for strategies and criteria are filled in the relationship matrices based on expert knowledge. Linguistic variables are transformed
to fuzzy triangular numbers in the range from “very low” = VL = (0,0,0,1) to “very high” = VH = (0,9,1,1) assessment (Table 3).

### Table 3. Strategy-criterion relationship matrices

<table>
<thead>
<tr>
<th>$A_1^t$</th>
<th>$h$</th>
<th>$r$</th>
<th>$A_2^t$</th>
<th>$h$</th>
<th>$r$</th>
<th>$A_3^t$</th>
<th>$h$</th>
<th>$r$</th>
<th>$A_4^t$</th>
<th>$h$</th>
<th>$r$</th>
<th>$A_5^t$</th>
<th>$h$</th>
<th>$r$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snip</td>
<td>VH</td>
<td>VL</td>
<td>ML</td>
<td>VL</td>
<td>L</td>
<td>M</td>
<td>VL</td>
<td>VL</td>
<td>M</td>
<td>VL</td>
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<td>M</td>
<td>VL</td>
<td>L</td>
</tr>
<tr>
<td>L</td>
<td>ML</td>
<td>M</td>
<td>M</td>
<td>VL</td>
<td>L</td>
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<td>L</td>
<td>VL</td>
<td>M</td>
<td>VL</td>
<td>L</td>
<td>M</td>
<td>VL</td>
<td>L</td>
</tr>
<tr>
<td>H_1</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>VL</td>
<td>L</td>
<td>M</td>
<td>L</td>
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<td>VL</td>
<td>L</td>
<td>M</td>
<td>VL</td>
<td>L</td>
</tr>
<tr>
<td>H_2</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>VL</td>
<td>L</td>
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</tr>
<tr>
<td>H_3</td>
<td>MH</td>
<td>M</td>
<td>M</td>
<td>VL</td>
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<td>L</td>
</tr>
<tr>
<td>ZIU</td>
<td>H</td>
<td>M</td>
<td>M</td>
<td>VL</td>
<td>L</td>
<td>M</td>
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<td>ZIP</td>
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<td>MH</td>
<td>ML</td>
<td>ML</td>
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<td>M</td>
<td>VL</td>
<td>L</td>
</tr>
<tr>
<td>ZIC</td>
<td>H</td>
<td>H</td>
<td>MH</td>
<td>M</td>
<td>ML</td>
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<td>M</td>
<td>VL</td>
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<tr>
<td>RB</td>
<td>L</td>
<td>VH</td>
<td>MH</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>VH</td>
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<td>VH</td>
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<tr>
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<td>VL</td>
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<td>VH</td>
<td>VH</td>
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<td>VH</td>
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<td>VH</td>
<td>M</td>
<td>VH</td>
<td>VH</td>
<td>M</td>
</tr>
</tbody>
</table>

The sum of individual assessments alternative-criterion matrices gives the assessments from Table 1 in chapter 2 with conclusions on fuzzy assessments of strategies. We apply the sequence of actions described in [1], to get the following ordering:

\[
\begin{bmatrix}
A^*_1 & A^*_2 & A^*_3 & A^*_4 & A^*_5 & A^*_6 & A^*_7 & A^*_8 & A^*_9 & A^*_10 \\
0.38 & 0.38 & 0.26 & 0.21 & 0.20 & 0.19 & 0.16 & 0.14 & 0.09 & 0.04
\end{bmatrix}
\]

Here are the solutions to the task via the ARAKRI2-algorithm, MaxMin and MinAvg:

\[
\begin{bmatrix}
A^*_1 & A^*_2 & A^*_3 & A^*_4 & A^*_5 & A^*_6 & A^*_7 & A^*_8 & A^*_9 & A^*_10 \\
0.82 & 0.81 & 0.52 & 0.46 & 0.45 & 0.37 & 0.31 & 0.30 & 0.24 & 0.10
\end{bmatrix}
\]

\[
\begin{bmatrix}
A^*_1 & A^*_2 & A^*_3 & A^*_4 & A^*_5 & A^*_6 & A^*_7 & A^*_8 & A^*_9 & A^*_10 \\
0.75 & 0.71 & 0.32 & 0.30 & 0.26 & 0.25 & 0.25 & 0.20 & 0.14 & 0.07
\end{bmatrix}
\]

### 4. Comparative analysis of experimental results

As a result of the described experiments, similar orderings of the compared strategies have been obtained. First places go to the most adaptive strategies – GA and RB. Last in the ordering are the most-inert strategies – L and Snip. It is worth noting that when working with the MinAvg operator, one of the qualitative strategies – ZIP, is in the middle of the ordering in lieu of one of the strategies that take historical prices into consideration H_3. A similar occurrence is observed in the ordering generated by the FTNA algorithm. Here as well, contrary to expectations, H_1 dominates ZIP. In both cases, strategies from the same groups have switched places – those with increased intelligence (ZIU, ZIC, ZIP) and those considering transactions history (H_1 and H_3).

A series of experiments with different values for $\gamma$ and $k$ has been conducted with minimizing and mixed (minimizing and maximizing) criteria. The obtained results confirmed the applicability of the described method for solving the task at hand.

### Conclusions and recommendations

The obtained experimental results indicate that the described method for decision making can be applied in electronic auctions for preliminary selection of the most appropriate strategy from a given set of available strategies as well as for changing a strategy in the course of an auction. The suggested method can become a part of a software decision making module in which various heuristics increasing reliability, sustainability and robustness when choosing a strategy can be implemented. Using fuzzy numbers and their direct aggregation will allow software agents to increase efficiency and adaptivity by selecting an optimal bidding strategy.

The method will find application in the agent system for CDA modeling MASECA in the form of a dedicated module managing the behavior of an agent in the course of an auction.

Future research will be on the task of multi-criterion ordering in heterogeneous assessments of alternatives via real numbers, fuzzy relations and/or fuzzy numbers.

### Acknowledgment

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### References


ИЗБОР НА СТРАТЕГИЯ ЗА НАДДАВАНЕ ЧРЕЗ ДИРЕКТНО АГРЕГИРАНЕ НА РАЗМИТИ ЧИСЛА
Галина Илиева
Пловдивски университет „Паисий Хилендарски”, Пловдив

Резюме

В работата се описва нов начин за избор на стратегия за наддаване в многоагентна система за електронни аукциони. Предлага се приложение на алгоритъм за многокритериална наредба чрез директно агрегиране на размити числа ARAKRI2. В класическата теория за многокритериален избор се използват матрица алтернатива-критерий и тегловни коефициенти, изразени чрез реални числа. В софтуерна система с участници агенти обаче е трудно да се намерят количествени измерители на критериите за оценка на стратегии както на индивидуално, така и на колективно ниво. Ето защо за оценка на стратегиите за наддаване по множество критерии се използват размити матрици на отношенията на агентите към战略ите. Прилагането на размита логика позволява на агентите да се справят с неопределеността, неточността и непълнотата на наличната информация.
NECESSARY CONDITIONS FOR MULTIFUNCTIONAL MANAGEMENT OF FORESTS

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Abstract

The paper treats the necessary conditions for multifunctional management of forests. For the successful carrying out of multifunctional management of forests, it is necessary to develop methods for valuable assessment of different types of material and non-material forest resources. Their valuable expression makes them comparable towards total complex of forest resources. This approach is objective and universal fundament for determination of the system of aims in forests through assessment of their significance and priorities. For the organization of utilization and reproduction of forest non-wood resources, as part of multifunctional management of forests, it is necessary to develop Regulations for inventory, assessment and planning of activities for utilization, protection and reproduction of non-wood resources of plant origin. To provide relevant scientific-and-applied decisions, a Regulation for inventory, assessment, organization and planning of activities in the field of non-material forest resources should be developed as well. As a result of implementation of these and other conditions, mentioned in this paper, maximal harmonization will be achieved between demands of society to forests and capabilities of these forests to satisfy them.

Key words: management, multifunctional management of forests, multifunctional forest inventory.

Introduction

Further development and improvement of theoretical basis of multifunctional management of forests.

Solving of big number of questions connected with management of multifunctional of forests should be preceded by solving of numerous scientific tasks in the field of forestry. Thus it will be possible to achieve conformity between natural capabilities of growing environment, condition of forests and demands of society. Such important for the forest indices like species composition of dendrocoenoses, horizontal and vertical structure, productivity, timber assortment composition, etc., should correspond to the climatic and soil conditions, on one hand, and on the other – to demands of society towards forests [3, 5].

Quite important are investigations on trends in development of future needs and demands to forests. This approach is necessary for carrying out of scientific strategy according to the type of future forest, which undoubtedly will have wide range of utilization. Today, with purposeful efforts, conditions should be established for prevention of unfavourable surprises in the future. Coming from the above-mentioned it follows that forest science should be directed to the problem for establishment of optimal stands and forests. Conditions for optimum will be put depending on natural and socio-economic conditions of a certain region or of the country as a whole.

1. Basic problems of forest science in the field of sustainable management of forests

Basic problems of forest science should be concentrated in the following directions:

a) To keep the process of scientific knowledge of forest;

b) To ground suitable from natural and economic point of view methods for gradual setting of today forests into condition, which will provide their due reproduction and establishment of multifunctional systems for utilization of forests.

To provide most suitable economic and technical influence on the forest fund with a view to conserve and improve the conditions of growing environment, biodiversity conservation, as well as vitality and sustainability of forests by means of:

a) development of forestry systems and regimes, connected with the multifunctional management of forests;

b) development and introduction of ecological technologies in utilization of forest resources;

c) development of a system of activities on preservation, protection and decreasing of damages on forest ecosystems.

Economic assessment of forests and economic ground of the effect of their utilisation.

Forest science has been functioning in all these directions until today, as well. On the pre-
sent stage, however, when the tendency is to respond better to today’s and tomorrow’s demands of time, it is necessary to direct the research activity more profound towards directions mentioned above.

Forests in Bulgaria need proper adaptation, which is possible to be done on the basis of profound complex knowledge of forest and in the same time to take into account the role of forestry in the future life of the country. From this point of view, the task of further scientific knowledge of forest attains prime significance. Regularities of growth should be basically specified for the so-called natural forests or those forests, which are insignificantly impacted by anthropogenic activities. These natural standards still can be found in Bulgarian forests.

Second main task should be directed to establishment of conditions for gradual transformation of forests to optimal condition according to aims of multifunctional management. It will be solved on the basis of mutual relationship and characteristics of processes and phenomena in natural forests (natural basis of the model), from one side, and from the other – under strict observance of economic and socio-ecological demands to the future forest (social basis of the model).

Third main task of forest science is to develop and determine more perfect technologies for economical-and-technical influence on forests. Establishment and forming of forest stands will be provided by carrying out of various forestry systems and methods of management. Future forest will differ from natural forest. Forest areas will be subject of active economic influence. Future forest will be optimal economic forest, which will be a tool to maximum realize aims of forest sector.

On fourth place, success in the organization of multifunctional forestry is in close relationship with economic assessment of forests [1, 14]. This assessment is in direct relationship with all elements, building the fundaments of multipurpose organization of management in forests. For example, economic and ecological meaning of tree species is different and these differences should be taken into account for the decision of the question for selection of optimal composition of forests.

The economic meaning of known forestry-and-technical forms of organization of forestry is different, which also should be subject of profound assessment. Maturity of the forest and rotation, as elements of organization of forest production, have deep economic essence. In conditions of multipurpose forestry, maturity should be connected with this age of stands, at which maximum average annual income from all forest products is achieved. Analysis of dynamics in assortment structure of stands, besides in natural dimension (m²·ha⁻¹) should be carried out in economic aspect – related with the balance of income and expenses during management and utilization of forests.

The present method for determination of rotation in forests could be determined as one-sided and classified as naturalistic approach. Technical maturity, which now is used as initial moment for determination of rotation for bigger part of the forests, cannot give the answer of the question at which age should tree stands be cut out to provide maximum total effect of multifunctional utilization of forest ecosystems. In the same time, this should be one of initial principles of organization of all economic activity in forests because age, at which forest stands are cut out, influences on the volume of works in the complex of forestry activities.

The significance of different types of utilization of forests on certain territory should be determined on the basis of their value assessment. According to their economic and ecological significance, types of utilization are graduated according to priority and this grading becomes basic principle for establishment of the whole organization of multifunctional forestry in the relevant forest territory.

2. Solving of problems of scientific-and-methodical, legislative-and-administrative and normative character

The activity on forming of multifunctional management in forests is connected with solving of problems of scientific-and-methodical, legislative-and-administrative and normative character. Part of necessary changes and conditions for building of fundaments of multifunctional management of forests is shown below.

The organization of multifunctional management of forests is connected with the action of numerous laws: for management of territories; for game management and protection of game; for environmental protection; for waters; for tourism; for medicinal plants; for biodiversity. That’s why it is necessary clearly and particularly to express in these laws the role of forest ecosystems, as necessary natural environment for successful solving of one part of their aims and
NECESSARY CONDITIONS FOR MULTIFUNCTIONAL MANAGEMENT OF FORESTS

tasks.

For more profound and complex investigation of forest on level forest stand it is necessary to improve principles and technology of range forest management method [2, 3]. More information is necessary about regional infrastructure and this research activity to be regulated and specified on the basis of multifunctional forest management [9, 10]. Forest management plan should be integrated as compound part of the complex management of territories. Through public discussion of interests to forests according to groups of users, relationships in the system “society–forest and forest resources” on regional level should be specified.

Pluralism in property of forests influences unfavourably on their multifunctional management and utilization. To overcome or reduce this defect it is necessary to establish conditions for creation and development of forest cooperations, for consolidation of forests, for uniting of owners in different forms for mutual management and utilization of forests or commitment (in certain order and conditions) of private and municipal forests for management by authorities of state forest administration.

For successful carrying out of multifunctional management of forests it is necessary to develop methods for value assessment of different types of material and non-material forest resources. Their valuable expression makes them measurable and comparable toward the total complex of forest resources, also expressed in value as arithmetic sum of composing resources. For the introduction of the value approach in the forest management practice, huge amount of work should be carried out because there are unsolved problems in inventory, quantitative and value assessment of non-material forest resources. In the same time this approach is universal fundament for determination of the system of aims in forests through assessing of their significance towards the total forest complex (determination of priorities of forest functions).

Further development and work in details is necessary in the approach for differentiation of purposeful economic and organizational units, through which to replace the economic classes. This activity is the most significant part in the organization of multifunctional management of forests. Suggestions for purposeful units should be given in the Task for planning and should be treated as pre-management general plan for development of multifunctional management of forests.

Carrying out of forest management plans for multifunctional management of forests is connected with increased volume of work - various according to types of activities and complexity of implementation. Various types of work (field investigations, inventory, assessment, analytical, planning, etc.) should be calculated in a way, which would conform to the type and complexity of forest management activities. This demands to develop new tariff regulations for determination of values of works during management of forest territories, as new approach of investigation, organisation and planning.

For the organization of utilization and reproduction of non-wood forest resources, it is necessary to develop regulations for inventory, evaluation and planning of activities for utilization, protection and reproduction of non-wood forest resources of plant origin. By providing of relevant scientific-and-applied decisions, regulations for inventory, evaluation and planning of activities concerning non-material forest resources should be developed.

The useful effect of forest functions should be paid by relevant institutions (companies of water management and energetics, recreational and tourist activities, health care, etc.), which obtain benefits from special functions of forests. Legislative basis is necessary for financial returns to the forestry sector on the basis of beneficial effect from forests. Today specific activities in forests, connected with providing of their special functions (water-protective forests, recreation forests, meliorative forests), increase the expenses in forestry sector without being connected with financial income, as a result of utilization of special (non-material) forest functions. The untimely decision of these problems, connected with forests, will bring to their exhaustion and decreasing of their productive, ecological, recreation and environmental-protective functions.

State institutions, legislative authorities and commissions and politicians should understand that forests are factor for protection of soils, water capacity of rivers in forest territories; they are favourable environment for health protection, winter sports and development of ecotourism, for biodiversity conservation. Due to these reasons forest sector should be provided with investments directed to development and satisfaction of social needs of forests and forest resources (functions) [11].
The general trend to worsening of ecological environment and health status of forests definitely obliges to extend forest management activity on evaluation of sanitary-and-hygienic and health status of forests. On this basis, forest management will develop a plan for convalescence and increasing of sustainability of forest ecosystems [15].

The forestry scientific ideas and the management team of forestry sector on all levels should inform the society by different means and activities and especially through the media about the unique importance of environment-making, environment-protecting, recreation, sanitary-and-hygienic and nature-protection functions of forests. This understanding of forests should become conscious social need and ecological culture.

Conclusions and Findings

Necessary prerequisites to run multifunctional management of the forests (MMF)

Scientific research in the field of multifunctional management has to be deepened in the following directions:
- The forests in Bulgaria need a relevant adaptation, which can be done on the basis of profound, complex knowledge about the forest and in consideration of the role of forestry in the country’s life in the future
- Establishment of conditions for gradual transformation of the forests to optimal state according to the purposes of multifunctional management.
- The third principal task in front of the forest science is development and justification of better technologies for managerial-technical impact on the forests.
- Success in organization of the multifunctional forestry is tightly related to the economic evaluation of the forests. This evaluation is directly connected to all elements building the basis of the multipurpose organization of the management of forests.

The necessary changes and conditions to establish the basis of the MMF are the following:
- The necessity is imposed for regulated and sustainable utilization and reproduction of not only the timber resources, but also of all other forest resources, with which the society is concerned.
- The organization of multifunctional management of the forests is connected with the operation of a set of laws... The role of the forest ecosystems should be expressed clearly and distinctly in these laws, because they serve as the necessary natural environment to successfully solve part of the objectives and tasks set in these laws.
- Principles and technology of the range-level forest management method have to be improved for more profound and complex investigation of the forest at stand level.
- Relationships in the system “society-forest and forest resources” have to be specified at regional level through public discussion of the interests of the different groups of stakeholders.
- Methods for value estimate of the different types of material and non-material forest resources have to be elaborated to carry out successfully the multifunctional management.
- The forest management activity on evaluation of sanitary-and-hygienic and health status of forests has to be extended. On this basis, forest management will develop a plan for health recovering and sustainability increase of the forest ecosystems.
- Forest scientists and the governing bodies of the forest branch at all levels have to make public the indispensable value of the environment-making, environment-protecting, recreational, sanitary-and-hygienic and nature-protection functions of forests.

***

Forestry sector should be put in conformity with new realities and public demands (economic, ecological, social and environmental-protecting). The certain approach in searching the right answer and proper decisions in this direction could be provided through multifunctional management. There is a necessity of regulated and sustainable utilization and reproduction not only of forest resources but also of all other forest resources, to which the society shows interest.
NECESSARY CONDITIONS FOR MULTIFUNCTIONAL MANAGEMENT OF FORESTS

References

НЕОБХОДИМИ УСЛОВИЯ ЗА УПРАВЛЕНИЕ НА МНОГОФУНКЦИОНАЛНО СТОПАНСТВО В ГОРИТЕ (МФСГ)

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Резюме

В доклада се обсъждат необходимите условия, свързани с многофункционалното лесоустроство и управлението на многофункционално стопанство в горите (МФСГ). За успешното провеждане на многофункционалното лесоустроство е необходимо да се разработят методики за стойностна оценка на различните видове материали и нематериални горски ресурси. Техният стойностен израз ги прави измерими и съставят спрямо общия комплекс от горски ресурси. Този подход е обективен и универсален основа за определяне на системата от цели пред горите, чрез претегляне на тяхната значимост и приоритетност. За организацията на ползването и възпроизводството на горските недървесни ресурси, като част от МФСГ е необходимо да се разработи Наредба за инвентаризация, оценка и проектиране на мероприятия по изпълзване, опазване и възпроизводство на недървесните ресурси от растителен произход. За осигуряване на съответни научно-приложен решения, следва да се разработи и Наредба за инвентаризация, оценка, организация и проектиране на мероприятия по отношение на нематериалните горски ресурси. В резултат на изпълнението на тези и други указани в разработката условия ще се постигне максимално хармонизиране между изискванията на обществото към горите и възможностите на последните за удовлетворяването им.

Ключови думи: управление, многофункционално стопанство в горите, многофункционално лесоустроство.
WATER RESOURCES IN PAKISTAN AND SUSTAINABLE AGRICULTURE: A REVIEW AND PERSPECTIVES

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Abstract

Water is the most important life supporting element all over the world and its availability is declining at an alarming rate. The increasing use of agriculture water especially from the beginning of Green Revolution has created a stress over water availability. This increasing use of water resources in agricultural production has contributed to the rapid decline in quantity as well as degradation of water quality. For sustainable agriculture, we have to focus many natural resources to be utilized in the agriculture production, out of which water is the most important one. Pakistan has one of the best agriculture irrigated system all over the world. Water pooled from surface water contributes for 62% of the total water utilized in irrigation in the irrigated areas of Pakistan. But the surface water availability for irrigation is declining year by year and water requirement for irrigation is increasing every year as the area for irrigation is increasing. Thus, for sustainable agriculture, there is a need to consider the water resources for their sustainable use and also to ensure the maximum availability of fresh water by pooling the all natural water resources at their maximum. There is a strong need to consider the sustainable use of water by enhancing its efficiency. In order to ensure the sustainable use of water, we may require all the indicators affecting the efficient use of water. Therefore, water availability, its resources, leakages of the water and its use, all these factors are important for sustainable agriculture. This working paper focuses the water resources used in agriculture in Pakistan. It also describes the water requirements, water availability and water escapes and finally gives the suggestion for sustainable management of water.

Key words: Sustainable Agriculture, Surface Water, Water Resources, Water Escapages, Sustainable Water Management.

Introduction

Sustainable agriculture and rural development can be defined as a system that; ensures the basic nutritional requirements of the present generation (quantitatively and qualitatively), provides durable employment, sufficient income, and decent living and working conditions for all those engaged in production, maintains and enhances the productive capacity of natural resources base as a whole, reduces the vulnerability of the agriculture sector to adverse natural and socio-economical factors and other risks and strengthens self-reliance [1].

Over the last century, world human population has increased as 3 times, global water withdrawal has increased as 7 times and per capita water withdrawal has increased as 4 times. About one sixth of the world’s population does not have access to safe water [2]. The state of Pakistan has 77088 thousand acres of total land area and 27160 thousand acres agriculture area out of which, 17820 thousand acres is the irrigated area which makes 65.61% of the total agricultural area. The total population of Pakistan is estimated as 184753 thousands, out of which 43% is agricultural population. From 2001 to 2010, there is 13% increase in the world population whereas in Pakistan there is 25% increase in its population. In agriculture, average population of the word is 38% of total world population and from 2001 to 2010, there is an increase of 2% in the agriculture population, whereas in case of Pakistan, from 2001 to 2010, there is an increase of 12% [2].

From 2001 to 2009, in Pakistan, there is a decrease in agricultural area as 880 thousand acres which makes approximately 3.24% of the total agricultural area. In the same period there is an increase of 1590 thousand acres in the irrigated area that makes 8.92% of total irrigated area [2]. Being a major food source, cereal crops production has been increased continuously from year 2001 to 2009. The sources of this increase in production are; area for cereal crop production that has been increased by 12.91% and there is an increase in the yield of crop production as 25.66% [3].

Pakistan has three major river basins; Indus, Kharan and Makran. Indus has the largest basin comprising the fertile plain lands in the Punjab and Sindh provinces, while Kharan and Makran have basin in Balochistan province. Indus and Makran drains off in the Arabian Sea while Kharan has closed basin as all of the water har-
vested in the catchment area is used within its periphery for agriculture, domestic and industrial use. The irrigation network of Pakistan is the largest infrastructural approximately, $300 billion of investment, contributes 25% to the country’s GDP and provides 90% of food and fiber. The remaining 10% comes from the arid agriculture [4]. Pakistan irrigation system has 19 barrages and 43 canal systems with 48 off-takes on the Indus River System, creating world’s largest contiguous man made system of 61,000 km of canals and 105,000 water courses, irrigating 14,165 million hectares of land. Additionally, 3 storage reservoirs were built; Mangla on River Jhelum and Tarbella and Chashma on River Indus, with total storage capacity of 20 million acre-feet. (MAF) (1 acre-feet = 3,259x10^5 U.S. gallons) and 12 link canals were built to transfer water from western to eastern rivers or the tributaries of the River Indus [5].

1. Objective of the Study
The objective of work is to study the current condition of water availability and demand of water for sustainable agriculture in Pakistan, while ensuring all resources of water are used efficiently and effectively.

2. Sustainable Use of Water
2.1. A Scientific Review
Aggarwal et al. [6] stated that the state of Punjab in India, comprises 1.5% of area of country and it is contributing 40-50% rice and 60-65% wheat to the central pool since last three decades. During the last 35 years, area for food grains has been increased from 39200 km^2 to 63400 km^2 and production of rice and wheat has increased from 0.18 to 0.32 kg/m^2 and 0.22 to 0.43 kg/m^2 respectively. Due to this, need for irrigation water has increased from 71 to 95% in the state. The number of tube wells has been increased from 0.192 to 1,165 million in the last 35 years. As a result the water table is declining. Therefore, there is an urgent need to shift at least 5-10% of the area under paddy crop, adopt efficient water management practices and adopt ground water augmenting techniques on mass scale for sustainability of agriculture. The wetlands of India, particularly in the area of Karela, are currently subject to acute pressure owing to rapid developmental activities and indiscriminate utilization of land and water. The major issues faced are mainly related to population; infrastructural and township development have destroyed the biodiversity, eutrophication causing excessive weed growth, decrease in agricultural production and productivity due to conservation and reclamation of the low lands and other wetland areas, scarcity of potable water, flood and drought, aesthetic value depletion due to encroachments, reclamation and waste dumping activities [7]. Agriculture consumes about 70% to 90% of abstracted fresh water resources in the developing countries. By using the treated wastewater for agriculture, demand for fresh water resources can be minimized [8].

Maity and Chatterjee [9] conducted a study to estimate the farmers’ perceptions toward individual modern inputs (fertilizers, pesticides, and irrigation and HYV area) and their impact on perceived sustainability. They found that the farmers’ perception toward modern inputs and their education have significant positive effect on perceived sustainability; however, these impacts are not equal for all inputs. In this case, farmers’ awareness indices for irrigation are highest and for HYVs are lowest.

Forouzani & Karami [10] proposed an agricultural water poverty index (AWPI) as an important instrument to provide a holistic picture of vital issues for sustainable water management. Water directly impacts all the dimensions of agricultural sustainability. Although water is an important component in measuring sustainability of agricultural system but it was not acknowledged well to be specific and integral available indicators.

Rojas et al. [11] proposed a safe method for disinfection of wastewater and demonstrated that in addition to disinfecting the wastewater, ozone contributes oxygen and nutrients to the soil, thereby reducing the need for chemical fertilizers. Ozone reduces the risk of infection by eliminating highly pathogenic micro-organisms and it also increases the rate of plant growth. When ozone is applied for one hour with a concentration of 7.36mg O_3/L, it removes Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) as 87% and 93% respectively, while the nutrients are not removed and pathogen micro-organisms are destroyed. Ozone treated water also increases the length of seedling and germination rate.

Al-Saud [12] conducted a detailed analysis of future potential impacts on groundwater resources of the Kingdom of Saudi Arabia and the impacts of the recent government policy reforms in water and agriculture sectors for conservation and sustainable development. As impacts of the
policy, the Kingdom will be able to save huge amount of water (51 BCM) from non renewable groundwater resources during the period 2009 to 2020 which will contribute to a great relief on highly stressed national strategic groundwater resource of the Kingdom. Saud recommended modern irrigation techniques of drip irrigation, using virtual water for growing food crops outside the Kingdom as policy option, optimal use of renewable water resources with modern rainwater harvesting technologies, recycling of urban waste water & storm water and a system of continuous monitoring the policy implementations.

2.2. Use of Water Resources in Pakistan

In Pakistan, 93% of the total water from all resources is used in agriculture. Remaining 5% and 2% are utilized in industries and by the public, respectively [13]. Only 7% of the total rural population of Pakistan depends on dug wells, river, canals or streams. But, province wise, the situation is different. The thickly populated province of Pakistan, Punjab has 80% fresh water whereas Sindh province has only 30% fresh water. 24% & 46% of total population does not have access to safe water in the province of Sindh and Balochistan respectively. 24% & 46% of total population does not have access to safe water in the province of Sindh and Balochistan respectively. 72% of rural people in Blochistan still depend on dug wells and other unsafe water resources [13-17].

2.3. Per Capita Water Availability

According to a list of 130 countries listed in the 1995 world development report, Pakistan ranks eighth in per capita fresh water withdrawal, with 2,053 m$^3$ per person. Pakistan is among the countries that are facing a continuous stress of surface water. One of the major reasons for this decrease in surface water is continuous reduction in annual rainfall index. During the year 1971 – 80 rainfall index was 509 mm/year, while in 2001 rainfall was minimum approximately 400 mm/year [2]. Per capita water availability graph is declining very sharply; in 1951, per capita water (PCW) was 5000 (m$^3$). But in 2000, PCW available was only 1200 (m$^3$) and it is expected that PCW will be 850 (m$^3$) and 659 (m$^3$) in 2013 and 2025 respectively. Similarly the thirst of water in Pakistan was estimated as 29% in 2010 and in 2025, it will be 33% [13-17].

2.4. Water and Pollution in Pakistan

Three common sources of water pollution which are causing increase in pollution are; municipal sewage, industrial water pollution, and agricultural water pollution. It was estimated that approximately 2,000 million gallons of sewage is being discharged to surface water bodies every day in Pakistan [14]. This water is contaminated with lead, PCBs, cyanides, mercury, hospital wastes and pharmaceutical wastes. In addition to these common sources of pollution, 80% of the total industrial effluents are produced by the petrochemicals, paper and pulp, food processing, sugar mills, textile mills, cement and fertilizers factories. On the other hand only 1% of the waste water is treated by industries before being discharged directly into rivers and drains [13-17].

3. Data Collection and Analysis

3.1. Secondary Data Analysis

The data was accessed from Food and Agriculture Organization [2] and Federal Bureau of Statistics, Pakistan [18]. Data was tabulated and analyzed through MS Excel by simple arithmetic calculations and graphical presentations to have some beneficial results.

3.1.1. Water Availability in Pakistan

Depending on cropping seasons the water availability in Pakistan can be categorized in two; Kharif cropping seasons and Rabi cropping season. Agriculture has two major water sources i.e. surface water and ground water. Surface water depends widely on the nature. Rate of annual rainfall and time of rainfall both are very important to manage and to get the maximum benefit from surface water. Pakistan faces the problems of less surface water availability especially during the Rabi Cropping Season. In order to meet the demand of water for irrigation, ground water resources are used. On the average, 135,21 MAF water is needed annually in the irrigated areas of Pakistan. Out of 135,21 MAF, 85,03 MAF water is available at farm gate from the surface water through canal irrigation systems. Remaining 50,18 MAF water is drawn from the ground water through tube wells and wells etc. Approximately, 37,11% of total demand of water is drawn from the ground water by utilizing the energy sources; electricity and fuel. During the Kharif Cropping Season, water requirement is more as compared to the Rabi Cropping Season; total water utilized for irrigation during the Kharif Season is 81,59 MAF and
total water utilized for Rabi Cropping Season in irrigated agriculture area is 53,62 MAF. Surface water available at farm gate in Kharif & Rabi seasons are 56,64 MAF and 28,39 MAF respectively. During each of the cropping season (Kharif and Rabi), 25 MAF water is drawn from the ground water. On the average, 95 MAF water is available annually at the canal heads, whereas 85 MAF water is available at farms gate. Remaining 10 MAF water is lasted annually due to seepage etc. [18].

Table 1. Surface and Ground Water

<table>
<thead>
<tr>
<th>Year</th>
<th>Season</th>
<th>Surface Water</th>
<th>Ground Water</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>At Canal Head</td>
<td>At Farm Gate</td>
<td>Public T. Wells</td>
</tr>
<tr>
<td>2000-01</td>
<td>Kharif</td>
<td>62.85</td>
<td>52.57</td>
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<td></td>
<td>Rabi</td>
<td>23.22</td>
<td>31.65</td>
<td>0.97</td>
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<td></td>
<td>Total</td>
<td>86.07</td>
<td>84.22</td>
<td>1.93</td>
</tr>
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<td>52.62</td>
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<td>Rabi</td>
<td>21.50</td>
<td>31.72</td>
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<td>79.61</td>
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<td>52.68</td>
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<td>Rabi</td>
<td>28.22</td>
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<td>84.46</td>
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<td>Kharif</td>
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<td>Rabi</td>
<td>33.56</td>
<td>31.90</td>
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<td>Rabi</td>
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<td>25.70</td>
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<td></td>
<td>Rabi</td>
<td>31.51</td>
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<td></td>
<td>Total</td>
<td>102.46</td>
<td>87.68</td>
<td>1.93</td>
</tr>
<tr>
<td>2007-09</td>
<td>Kharif</td>
<td>69.03</td>
<td>56.99</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>Rabi</td>
<td>26.38</td>
<td>24.20</td>
<td>0.97</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>95.41</td>
<td>81.19</td>
<td>1.93</td>
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<td>2009-10</td>
<td>Kharif</td>
<td>69.91</td>
<td>58.43</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>Rabi</td>
<td>26.83</td>
<td>25.06</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>96.74</td>
<td>83.49</td>
<td>1.91</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>952.26</td>
<td>850.34</td>
<td>19.28</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>95.23</td>
<td>85.03</td>
<td>1.93</td>
</tr>
</tbody>
</table>


3.1.2. Increasing Demand for Water

The increasing demand for water can be concluded from the increasing population, intensive agriculture crops cultivation and increase in irrigated area. In Pakistan, from 2001 to 2010, population has increased as 25% and agriculture population has increased as 12%. Total area equipped for irrigation in Pakistan has increased from 17820 thousand acres in 2001 to 20200 thousand acres in 2010 [2].

From 2001 to 2010, there is a continuous increase in the production of the five major crops (sugarcane, wheat, rice, cotton and maize). Increase in production may be due to increase in cultivated area, cultivating high yielding crop varieties and/or cultivating more number of crops per unit area. In each case, water utilization increases. As shown along the secondary vertical axis in Fig. 1, from 2001 to 2009, the production has increased as 26.33%, 77.31%,
14.77%, 19.65% and 95.96% for wheat, rice, sugarcane, cotton lint and maize respectively [2].

3.1.3. Total Equipped Irrigated Area of Pakistan

There is continuous increase in actual cultivated irrigated area as well as in the equipped irrigated area, indicating the increase in the demand of water. From year 2001 to 2010 agriculture irrigated area has been increased from 17820 to 19410 thousand hectares (a total increase of 1590 thousand hectares) i.e. actual irrigated area increased by 8.92% in year 2010.

In the same period, total area equipped for irrigation has increased from 17820 to 20200 thousand hectares (a total increase of 2380 thousand hectares). Increase in total area equipped for irrigation in year 2010 is 13.36% greater than that of in year 2001, which indicates the stress of water [2]. This information is shown in the Fig. 2.

Table 2. Total and irrigated Area of Pakistan '000' Hectares

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country area (Pakistan)</td>
<td>79610</td>
<td>79610</td>
<td>79610</td>
<td>79610</td>
<td>79610</td>
<td>79610</td>
<td>79610</td>
<td>79610</td>
<td>79610</td>
</tr>
<tr>
<td>Land area</td>
<td>77088</td>
<td>77088</td>
<td>77088</td>
<td>77088</td>
<td>77088</td>
<td>77088</td>
<td>77088</td>
<td>77088</td>
<td>77088</td>
</tr>
<tr>
<td>Agricultural Area</td>
<td>27160</td>
<td>27270</td>
<td>27230</td>
<td>27030</td>
<td>27060</td>
<td>27290</td>
<td>26880</td>
<td>26280</td>
<td>26280</td>
</tr>
<tr>
<td>Agricultural Irrigated Area</td>
<td>17820</td>
<td>17990</td>
<td>18230</td>
<td>18760</td>
<td>18980</td>
<td>19130</td>
<td>19100</td>
<td>19130</td>
<td>19410</td>
</tr>
<tr>
<td>Total Area Equipped for Irrigation</td>
<td>17820</td>
<td>17990</td>
<td>18230</td>
<td>18760</td>
<td>18980</td>
<td>19300</td>
<td>19100</td>
<td>19300</td>
<td>19990</td>
</tr>
</tbody>
</table>


3.1.4. Water Demand on the Basis of Increase in Cropping Intensity

Fig. 3 shows the area cultivated by each five major crops (sugarcane, wheat, rice, cotton, and maize) from year 1990 to 2005. Total cropped area cultivated by the five major crops was 14255 thousand hectares in year 1990 and it increased to 16180 thousand hectares in year 2005. So there is a net increase of 1925200 hectares in the same period which makes 13.51% increase in total cultivated area. Approximately, on the average, there is 1% increase in the cropping area each year. Therefore, from year 2001 to year 2009 the estimated increase in the cropping intensity of the five major crops cultivated in Pakistan may be as 9%.
in wheat cultivated area that is irrigated during the Rabi cropping season.

3.1.5. Increase in Water Demand on the Basis of Increase in Wheat Cultivated Irrigation Area

Pakistan has one of the best canal irrigation systems. Approximately, 87% of the total wheat cultivated area is irrigated area. In the Fig. 4, total wheat cultivated area and total wheat irrigated area is shown from year 2001 to 2010. There is a continuous increase in the irrigated area for wheat. Starting from 2000-01, there was total 7039.30 thousand hectares of irrigated wheat area and in 2009-10; this area has been increased to 8075.50 thousand hectares. We have discussed in the previous section that the availability of water in the Rabi cropping season is lesser as compared to water availability in Kharif cropping season. In the Rabi cropping season, wheat is the major crop cultivated in the irrigated area of Pakistan.

Now let see the change in the wheat cultivated area from year 2001 to 2010. Total wheat cultivated area in Pakistan has increased from 8180.80 thousand hectares (year 2001) to 9131.60 thousand hectares (year 2010). So there is an increase of 950.80 thousand hectares (11.62%) in the total wheat cultivated area. In the same period wheat cultivated area by irrigation has been increased from 7039.30 thousand hectares to 8075.50 thousand hectares. So there is a net increase of 1036.20 thousand hectares in wheat cultivated area through irrigation i.e. increase in wheat cultivated area through irrigation is greater than total wheat cultivated area. Due to this increase in wheat cultivated area by irrigation water demand has increased by 14.72% in the year 2010 as compared to that of in year 2001.

The Fig. 5 shows irrigated wheat area in thousand hectares and availability of surface water during the Rabi Cropping Season from year 2001 to 2010.

There is continuous increase in the irrigated wheat cultivated area whereas the availability of surface water availability (shown along secondary-axis) is decreasing year by year. Most probably this increase in demand of water depending on increase in wheat irrigated area is offset by the water resources other than surface water. Other sources of water may include water drawn from the ground by tube wells run by fuel or electric energy; causing a stress on the other energy sources. Surface water availability for Rabi cropping season in year 2001 was 31.65 MAF and it decreased to 25.06 in year 2010 i.e. there is a decrease of 20.82% in year 2010 as that of in year 2001 [18].

<table>
<thead>
<tr>
<th>Table 3. Area and Production of Wheat Crop by Source of Irrigation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>2000-01</td>
</tr>
<tr>
<td>2001-02</td>
</tr>
<tr>
<td>2002-03</td>
</tr>
<tr>
<td>2003-04</td>
</tr>
<tr>
<td>2004-05</td>
</tr>
<tr>
<td>2005-06</td>
</tr>
</tbody>
</table>
### 3.1.6. Crop Wise Increase in Water Demand

Water requirement for different crops cultivated in the irrigated area of Pakistan is different. Following tables show the area cultivated with 5 major crops and the water demand of 5 major crops.

#### Table 4. Area cultivated with 5 major crops

<table>
<thead>
<tr>
<th>Year</th>
<th>Sugarcane T.Area (Ha)</th>
<th>Wheat T. Area (Ha)</th>
<th>Rice T. Area (Ha)</th>
<th>Cotton Total Area (Ha)</th>
<th>Maize T. Area (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>854300,00</td>
<td>7844500,00</td>
<td>2112700,00</td>
<td>2598500,00</td>
<td>845200,00</td>
</tr>
<tr>
<td>1991</td>
<td>883800,00</td>
<td>7911400,00</td>
<td>2096900,00</td>
<td>2662200,00</td>
<td>847500,00</td>
</tr>
<tr>
<td>1992</td>
<td>896100,00</td>
<td>7877600,00</td>
<td>1973400,00</td>
<td>2835500,00</td>
<td>867500,00</td>
</tr>
<tr>
<td>1993</td>
<td>884600,00</td>
<td>8299700,00</td>
<td>2187100,00</td>
<td>2835900,00</td>
<td>878500,00</td>
</tr>
<tr>
<td>1994</td>
<td>962800,00</td>
<td>8034200,00</td>
<td>2124600,00</td>
<td>2804600,00</td>
<td>889500,00</td>
</tr>
<tr>
<td>1995</td>
<td>1009000,00</td>
<td>8169800,00</td>
<td>2161800,00</td>
<td>2652800,00</td>
<td>939000,00</td>
</tr>
<tr>
<td>1996</td>
<td>963100,00</td>
<td>8376500,00</td>
<td>2251100,00</td>
<td>2997300,00</td>
<td>928000,00</td>
</tr>
<tr>
<td>1997</td>
<td>964500,00</td>
<td>81091000</td>
<td>2317300,00</td>
<td>3148600,00</td>
<td>933000,00</td>
</tr>
<tr>
<td>1998</td>
<td>1056200,00</td>
<td>8354600,00</td>
<td>2423600,00</td>
<td>2959700,00</td>
<td>962200,00</td>
</tr>
<tr>
<td>1999</td>
<td>1155100,00</td>
<td>8229900,00</td>
<td>2515400,00</td>
<td>2922800,00</td>
<td>961700,00</td>
</tr>
<tr>
<td>2000</td>
<td>1009800,00</td>
<td>8463000,00</td>
<td>2376600,00</td>
<td>2983100,00</td>
<td>944000,00</td>
</tr>
<tr>
<td>2001</td>
<td>960800,00</td>
<td>8180800,00</td>
<td>2114200,00</td>
<td>2927500,00</td>
<td>941600,00</td>
</tr>
<tr>
<td>2002</td>
<td>999700,00</td>
<td>8057500,00</td>
<td>2225000,00</td>
<td>3115800,00</td>
<td>935500,00</td>
</tr>
<tr>
<td>2003</td>
<td>1099600,00</td>
<td>8033900,00</td>
<td>2460600,00</td>
<td>2793600,00</td>
<td>947100,00</td>
</tr>
<tr>
<td>2004</td>
<td>1074500,00</td>
<td>8216200,00</td>
<td>2519600,00</td>
<td>2989300,00</td>
<td>981800,00</td>
</tr>
<tr>
<td>2005</td>
<td>966400,00</td>
<td>8358000,00</td>
<td>2621400,00</td>
<td>3192600,00</td>
<td>1042000,00</td>
</tr>
</tbody>
</table>

Source: [2, 18].

#### Table 5. Average Seasonal Water Requirement by crop

<table>
<thead>
<tr>
<th>Crop Name</th>
<th>Average Seasonal Water Requirements (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugarcane</td>
<td>1640</td>
</tr>
<tr>
<td>Rice</td>
<td>960</td>
</tr>
<tr>
<td>Cotton</td>
<td>630</td>
</tr>
<tr>
<td>Wheat</td>
<td>400</td>
</tr>
<tr>
<td>Maize</td>
<td>354</td>
</tr>
</tbody>
</table>

Source: Bhati et al. (2009).
Fig. 6 shows the increase in the cultivated area with five major crops (Sugarcane, Wheat, Cotton, Rice and Maize) in Pakistan from 1990 to 2005 along the primary vertical axis and % increase in area cultivated and increase in water demand is given along the secondary vertical axis. The increase in water demand for five major crops was calculated according the water requirement of each crop given in table 5.

Since year 1990 to year 2005 sugarcane, wheat, rice, cotton and maize cultivated area increased by 13,12%, 6,55%, 24,08%, 22,86% and 23,28% respectively. So % age wise, rice cultivated area increased more than the other four major crops. Secondly from year 1990 to year 2005, cultivated area for sugarcane, wheat, rice, cotton and maize was increased by 112100, 513500, 508700, 594100 and 196800 hectares respectively. So, total area cultivated with these five major crops was increased by 1925200 hectares. Hence % increase in total area cultivated by all major crops (sugarcane, wheat, rice, cotton and maize) is 5,82%, 26,67%, 26,42%, 30,86% and 10,22% respectively. Now, according to the water seasonal demands (given in the table above) water seasonal demand increased by 13,91, 15,54, 36,95, 28,32 and 5,27% for sugarcane, wheat, rice, cotton and maize respectively. Note able point here is that rice cultivated area increased by 26,42% but its water demand increased by 36,95%. In the same way increase in sugarcane cultivated area is 5,82% of total increase in cultivated area but increase in water demand is 13,91%. For the other three crops; wheat, cotton and maize % increase in water demand is lesser as compared to % increase in their cultivated area.

<table>
<thead>
<tr>
<th>Year</th>
<th>Wheat</th>
<th>Rice</th>
<th>Sugarcane</th>
<th>Cotton Lint</th>
<th>Maize</th>
</tr>
</thead>
<tbody>
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<td>5823000</td>
<td>43606300</td>
<td>1805200</td>
<td>1664400</td>
</tr>
<tr>
<td>2002</td>
<td>18226500</td>
<td>6717750</td>
<td>48041600</td>
<td>1736800</td>
<td>1737100</td>
</tr>
<tr>
<td>2003</td>
<td>19183300</td>
<td>7271400</td>
<td>52055800</td>
<td>1709100</td>
<td>1897400</td>
</tr>
<tr>
<td>2004</td>
<td>19499800</td>
<td>7537200</td>
<td>53820000</td>
<td>1736800</td>
<td>2579000</td>
</tr>
<tr>
<td>2005</td>
<td>21612300</td>
<td>8320800</td>
<td>47244100</td>
<td>2214300</td>
<td>3109600</td>
</tr>
<tr>
<td>2006</td>
<td>21276800</td>
<td>8157600</td>
<td>44665500</td>
<td>2187000</td>
<td>3088000</td>
</tr>
<tr>
<td>2007</td>
<td>23294700</td>
<td>8345100</td>
<td>54741600</td>
<td>1982000</td>
<td>3605000</td>
</tr>
<tr>
<td>2008</td>
<td>20958800</td>
<td>10428000</td>
<td>63920000</td>
<td>2010000</td>
<td>3593000</td>
</tr>
<tr>
<td>2009</td>
<td>24033000</td>
<td>10324500</td>
<td>50045400</td>
<td>2160000</td>
<td>3261500</td>
</tr>
</tbody>
</table>


3.1.7. Wastages of Water by Outflow from Rivers to the Sea and through Seepage

The annual total surface water available on the canal heads in Pakistan’s irrigated area is approximately 95 MAF while water available at the farm gate is calculated as 85 MAF. In this way 10 MAF water is annually goes wasted while approaching to the farm gate. This loss is due to poor canal systems and poor water channels i.e. most of the canals and water channels are constructed by mud and cause seepage of water. Sometimes, water is also wasted due to breakages in the canals and water channels. Second main source of loss of surface water is escapages of water from the rivers to sea or somewhere else and it is not used for some beneficial use. Pakistan has two combinations of rivers which contribute to Pakistan irrigation system. One is the Indus River which captures the water inflow from River Jehlum and Chanab too. Its irrigation canals originate from different dams and barrages. On the tail of River Indus is Kotri Barrage.

From 2001 to 2010, the average escapage of water is approximately 9,75 MAF annually. Similarly, the second combination of rivers (Ravi, Beas & Satlug), their last barrage is Panjnad.
Table 6. Water Escapages Below Panjnad and Kotri Barrages (MAF) in Pakistan

<table>
<thead>
<tr>
<th></th>
<th>Panjnad Below</th>
<th>Kotri Below</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kharif</td>
<td>Rabi</td>
</tr>
<tr>
<td>2000-01</td>
<td>1.71</td>
<td>0.37</td>
</tr>
<tr>
<td>2001-02</td>
<td>1.68</td>
<td>0.09</td>
</tr>
<tr>
<td>2002-03</td>
<td>2.37</td>
<td>2.06</td>
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<td>2003-04</td>
<td>8.42</td>
<td>1.63</td>
</tr>
<tr>
<td>2004-05</td>
<td>0.29</td>
<td>2.68</td>
</tr>
<tr>
<td>2005-06</td>
<td>7.39</td>
<td>3.88</td>
</tr>
<tr>
<td>2006-07</td>
<td>6.15</td>
<td>5.62</td>
</tr>
<tr>
<td>2007-08</td>
<td>3.74</td>
<td>0.82</td>
</tr>
<tr>
<td>2007-09</td>
<td>2.13</td>
<td>0.74</td>
</tr>
<tr>
<td>2009-10</td>
<td>0.38</td>
<td>0.10</td>
</tr>
<tr>
<td>Total</td>
<td>34.26</td>
<td>17.99</td>
</tr>
<tr>
<td>Average</td>
<td>3.43</td>
<td>1.80</td>
</tr>
</tbody>
</table>


From the Panjnad barrage, water escapage calculated is 5.23 MAF which runoff in the delta and it is not available for crops for irrigation. Both of the escapages, on the average is 14.97 MAF of water per year. Collectively, loss from the escapages and seepage counts for about 25 MAF per year [18]. Fig. 7 explains the water losses discussed above.

Due to increase in population the agriculture area has been decreased from 27160 thousand acres in 2001 to 26280 thousand acres in 2009; a total decrease of 880 thousand acres. Total equipped are for irrigation has been increased from 17820 thousand acres in 2001 to 20200 thousand acres in 2009; an increase of 2380 thousand acres. Similarly, actual agriculture irrigated area in Pakistan has increased from 17820 thousand acres in 2001 to 19410 thousand acres in 2009; total increase is 1590 thousand acres. This increase in the equipped and actual irrigated area has increased the demand of water by 13.36%.

Considering the five major crops (wheat, rice, sugarcane, cotton and maize) crop production has been increased. From 2001 to 2009, there is an increase of 26.33%, 77.31%, 14.77%, 19.65% and 95.96% in crop production of wheat, rice, sugarcane, cotton and maize respectively. Total cropped area cultivated by the five major crops was 14255200 hectares in 1990 and it increased to 16180400 hectares in 2005. So there is a net increase of 1925200 hectares in the same period which makes 13.51% increase in total cultivated area. This increase may be termed as increase in cropping intensity which has increased the demand of water by 13.51% in year 2009 as that of in the year 2001. Water availability for Rabi cropping season is more under stress as compared to Kharif cropping season. Wheat cultivated area by irrigation has increased by 14.72% in 2010 as compared to that of in 2001. During the same period surface water availability for Rabi cropping season has been decreased by 20.82%. Therefore, water stress during the Rabi cropping season is

Conclusion

Pakistan has one of the best irrigation systems in the world. Irrigated area comprises 65.61% of total agriculture land area approximately. More than 87% of the total agriculture products are produced in the irrigated area of Pakistan. Remaining 13% agriculture products are contributed from the arid zone. The agriculture area of Pakistan is decreasing day by day due to; increase in population (urban encroachment), industrial area, and roads etc. From 2001 to 2010, population of Pakistan has increased from 148110 thousands to 184753 thousands; 25% increase. Similarly 43% of the total population is directly related with agriculture. During the period from 2001 to 2010, there was 12% increase in the agriculture population.

Fig. 7. Total Water Escapages

Source: Author Work. Data Source: [18].
in two folds; first increase in demand by 14.72% due to increase in the wheat cultivated area and secondly decrease in the supply of surface water by 20.82%.

Since year 1990 to year 2005 sugarcane, wheat, rice, cotton and maize cultivated area increased by 13.12%, 6.55%, 24.08%, 22.86% and 23.28% respectively but water seasonal demand increased by 13.91, 15.54, 36.95, and 23.28% respectively but water seasonal demand increased by 13.12%, 6.55%, 24.08%, 22.86% and 5.27% respectively. Rice cultivated area increased by 26.42% of total cultivated area by five major crops but its water demand increased by 36.95%. In the same way increase in sugarcane cultivated area is 5.82% of increase in total cultivated area but increase in water demand is 13.91%. For the other three crops; wheat, cotton and maize % increase in water demand is lesser as compared to % increase in their cultivated area.

More than 62% of the water used in irrigated cropped area is pooled up from the surface water sources. Remaining 38%, water required is drawn from the ground by pumps or other machines run by electricity and/or fuel. Water required for irrigation in the irrigated agriculture area is more than 135 MAF annually. On the average, 85 MAF water is available annually from the surface water sources, therefore, the remaining water is drawn from the ground water by the tube wells etc. Starting from year 2001, water used in the irrigated area of Pakistan is increasing year by year. On the other hand water availability from the surface water is decreasing year by year. In order to meet the required water demand, water is drawn from the ground resources, therefore, water drawn from the ground is also increasing year by year.

According to cultivation of crops in irrigated area of Pakistan, cropping seasons are divided into two periods; Kharif and Rabi. During both of the cropping seasons, surface water is not sufficient for the crops cultivated. During Kharif cropping season, almost 82 MAF water is utilized, out of which 57 MAF water is available from the surface water and remaining 25 MAF water is drawn from the groundwater. Similarly during Rabi cropping season, 54 MAF water is utilized, out of which 28 MAF water is available from the surface water and remaining 26 MAF water is drawn from the groundwater. Water drawn from the groundwater for both of the cropping seasons is approximately equal.

On the average 15 MAF water is wasted annually through escapages from the terminal barrages of the rivers which is not used for some beneficial agriculture purpose. Similarly, approximately 10 MAF water is wasted while approaching from the canal head to the farm gate through canals and water channels. This waste of water is mainly due to seepage of water and due to breakages in the canals and water channels. Conclusively, 25 MF water annually is wasted. The Government and other regulating authorities need to focus on these areas of water management. These escapages can be minimized and more surface water can be available to the cultivated crops in the irrigated area. As 51 MAF water is drawn from the ground water, so if we save these leakages of surface water we can save half of the electric and other fuel energy which is used to pump up the ground water.

References


RESEARCHES OF THERMAL TREATMENT PROCESS OF WOOD IN LIQUIDS

Evgeny Razumov, Ruslan Safin, Ruslan Khasanshin
Kazan National Research Technological University, Kazan, Russian Federation

Abstract

A technology for thermal processing of hard wood in hydrophobic liquids is worked out in order to increase its biological stability and even colour scheme for the entire cross section of timber. As a result of experimental studies and mathematical modelling there were defined rational mode parameters of the process. There was developed hardware design of the technologies, which due to its constructive solution can be applied both by large and small woodworking enterprises.

Key words: thermal treatment, wood, liquid, fumed oak.

Introduction

There is an increased interest in thermal treated wood in recent years, due to the introduction of the European Commission in 2004 a ban on the use of chemically treated wood, as well as unique properties of the obtained products, such as environmental friendliness, high bio stability, durability, low equilibrium moisture content, a wide range of colours. Researches in this area are being done in the last 10-15 years in countries such as Finland (Technology-Thermowood®), France (Retification), America (WEST-WOOD), Latvia (Vacuum Plus), Germany (Thermoholz). Problems of research and technology development of thermal treated wood materials in liquids are the subject of many works by foreign scholars. Heat transfer issues in technology, heat treatment of wood, the thermo physical properties of wood, mathematical modeling of heat and moisture of wood were studied by scientist Nencho Deliiski (Bulgaria); the impact of heat treatment on the physics-mechanical, chemical and performance properties of wood was in works Danica Kačičková František Kačič (Slovakia), Ladislav Dzurenda (Slovakia) and Vincent Repellin (France), who also studies the patterns of the color score changes in the process of timber thermal treatment; issues on wood thermal treatment could be found in works by Andreas O. Rapp (Hamburg); the handling of wood in organic oils was in works by of Anna Koski (Finland), Michael Sailer (Germany). A common characteristic of the known methods of thermal treatment can be called the treatment temperature range from 180 to 240 °C, which is explained by the physical and chemical processes occurring in the wood at a given temperature, contributing to the colour change of the material and its physical and mechanical properties. The fundamental differences are the following: the time from 16 to 180 hours and the processing environment, for example, in a protective atmosphere of water vapor (Thermowood, PLATO-Wood, WEST-WOOD), in a vacuum (Vacuum Plus), in a protective atmosphere of inert gas - nitrogen (Retification), in organic oils (Thermoholz), and the fact that many of the technologies used for heat treatment are used only for low-grade timber, which limits the possibility of their application to hard wood.

Thus one of the most neglected technologies still remains thermal treatment of wood in hydrophobic liquids, which is defined by eco friendliness and is a modern alternative to chemical methods of wood processing, and thanks to a constructive solution can be applied at small enterprises. Existing technology Thermoholz, where heat treatment occurs in organic oils, has two significant drawbacks: it has a considerable duration of the process by cooling the material in a natural way and is not intended for the treatment of hard wood. It can be assumed that technology for thermal treatment of wood in liquids is rational for the hardwood thanks to its lowest penetrating power.

Therefore, the development of technology designed for the treatment of hard wood species and ensuring the quality of the product, as well as an even colour scheme for the cross section of material is an important task for today. In this regard, the work tasks were set to study high-temperature treatment of wood materials in hydrophobic liquids, the analysis of the effect of high temperatures on the timber, the physical properties of the agent processing (hydrophobic liquid), physics-mechanical and chemical properties of wood as a heat treatment object.
Results

We have proposed a power-saving technology for thermal treatment of hardwood in liquids, including pre-oscillating drying of lumber in liquids, temperatures up to 200-240 °C and endurance of wood at these temperatures in a sealed chamber filled with oil with a boiling point above 260 °C, cooling by the oil drain plug, vacuum timber, steaming it and re-steam vacuum for 2-3 hours.

The process of heat treatment of wood in a liquid medium can be represented as a set of stages of heating and thermal treatment of wood as well as cooling, which in turn is divided into draining, evacuation, steaming with water vapour, re-evacuation and exposure to vacuum conditions.

Process of thermal treatment of timber in a liquid medium starts with filling the cavity of the working chamber with the hydrophobic liquid through a vacuum chamber with subsequent heating at its pressure not exceeding atmospheric value, and post-heating timber until 200-240 °C. Then, there carried out its exposure in a liquid medium at a given temperature, depending on the desired degree of thermal treatment. Upon reaching the required degree of thermal treatment there happen discharge of all liquid, then with a vacuum pump and condenser vacuum is created and carries out an excerpt of the material to remove the agent from the processing of internal cavities of wood cells. Then the water vapour supplied into the chamber where it contacts the hot wood and heats up, while to maintain the desired temperature in the chamber an internal capacitor is included in the work environment. After processing the timber in an environment of water vapour vacuum is created again in the chamber and timber is exposed to it. The use of vacuum and steaming stages after thermal treatment of timber aimed at reducing the temperature of the material to 120-130 °C and to prevent spontaneous ignition of wood at the specified high temperature conditions, as well as the removal of internal stresses in the material and the smell of burnt thermowood in its further use.

In process of heat treatment of timber in liquids inside the material two inverse flows are observed: the flow of liquid impregnation from the environment, inward the timber, and the flow of gas mixture of decomposition products, which is directed from the timber. The process of impregnation is the movement of wetting liquid in a capillary with trapped gas, and a major influence on its progress is by processes of dissolution and diffusion of the gas-vapour mixture in the soaking liquid. The process of impregnation fluid occurs when the velocity of the fluid in the dead-end capillary, determined by the rate of dissolution and diffusion of trapped gas in it, will be greater than or equal to the rate of gaseous flow of decomposition products. Otherwise, the steam-gas flow degradation products will result in the expulsion of liquid impregnation of wood.

After completing the stage of thermal modification the material must be cooled without additional oxygen in order to avoid its spontaneous combustion. Lowering the temperature of products is carried out directly in the chamber by feeding steam from steam-generator.

To determine the optimal operational parameters of the process there was set up experimental setup and conducted research. As an agent for processing while conducting the experimental researches there have used the hydrophobic liquid with a boiling temperature of 260 °C - glycerine distilled mark D-98, GOST 6824-96.

Analysis of the results for samples of different wood species (birch, pine, oak) with 50 mm showed that the rate of flow of liquid impregnation is in direct proportional to the temperature of thermal treatment, and the depth of penetration of the agent in the treatment of timber does not depend on penetrating power of natural wood, and from its base density. In particular, natural birch penetrating power is higher than penetrating power of natural pine, but the depth of penetration of the agent in the treated pine (pine, heat-treated) was higher than in the case of thermal birch. This can be explained by the fact that during the thermal treatment of wood there happens a release of cavities of macrostructural elements of the material from the contained substances (e.g. tar), which in turn, determine the ability of timber to the permeability of liquids. Therefore thermal treatment of wood in hydrophobic liquids is more rational to be used for hard wood, with greater density and, thus, less depth of penetration of the agent processing, thereby reducing the consumption of a hydrophobic liquid to carry out the process and avoid large losses of material in the process of further mechanical processing. Therefore, further basic research has been focused on the process of thermo modification of oak lumber.

The experimental data of heating fluid and wood immersed into it point out the uneven
heating of the material thickness by immersing the sample in a preliminary heated fluid, and vice versa, while heating the liquid and placing the material into it there is an even material heat treatment over the cross section. As a result of experimental studies and mathematical modelling the expression for determining the rational rate of temperature increase in the environment was determined, depending on the thickness of the timber, ensuring the quality of the material (oak), obtained during the process of heat treatment.

\[
\ln \left( \frac{\Delta T}{\Delta t} \right) = 1.508 - 2.004 \ln \left( \frac{s_m}{2} \right)
\]  

(1)

The results of experimental studies, the changes of integral densities of thermal treated wood in hydrophobic liquids have shown that thermal treatment has a direct impact on changes in the density of wood, in addition the higher the processing temperature is, the stronger the reduction in the density of the material. At the same time, wood species has no significant effect on change in this parameter.

Analysis of the results of the kinetics of the relative mass oak sample at different temperature regimes of treatment showed that the mass of the timber in the light soaking substantive and fluid changes depending on the processing temperature as follows: at relatively low temperatures (180 °C and 200 °C) mass of the sample starts to grow intensively from the very beginning of the process, indicating that the penetration of the agent in the treatment of lumber, while at higher temperatures (220 °C, 240 °C) there observed intense mass loss of the sample in the first 1-3 hours, which indicates that the active phase of the emission of the products of timber decomposition, preventing the impregnation of timber.

It is established that the thickness of the timber directly affects the duration of the process and the depth of penetration of the handling agent into the material. The depth of impregnation of the material increases in lower proportion to the expected duration of the process, so thermal treatment of wood in liquids should be performed for lumber with greater thickness.

Processing of experimental and theoretical data for emission of vapour-gas mixture out from the wood during thermal treatment made it possible to determine the change in the flux of volatile in time required to calculate the system catches and condensation of products of decomposition of wood. It is established that the performance of the catch and condensation should be regulated during heat treatment, depending on the temperature of heat treatment process, the thickness of lumber and wood.

The simulation results characterizing the dependence of the steam flow during the cooling stage of heat-treated wood showed that the steam consumption increases in rise of material specific surface. The obtained dependences allow to control the flow of steam and gradually low the temperature of the material to 120-130 °C, ensuring the quality of the obtained thermo wood.

As a result of experimental studies there have established that thermal treated oak wood may be the best substitute for natural fumed wood, since it opens opportunities for the use of wood as a highly artistic material, superior in quality due to obtained new physical-mechanical, operational and aesthetic characteristics. Analysis of studies on the properties of thermal treated oak showed a decrease in strength properties of lumber. However thermal treated oak exceeds on the performance the characteristics of the natural fumed oak. In particular, the flexural strength for treated oak is 4-30% higher than for natural oak, and the compressive strength is 1-5% more, depending on the degree of thermal treatment, the coefficients of shrinkage and swelling on average is five times less, and the shock hardness of artificial oak is slightly lower than of the natural. For convenience there were obtained empirical correlations of core physical and thermo-mechanical properties of oak on the temperature, time, and duration of any process.

During the process of thermal treatment of wood there observed the chemical processes, running inside the timber, accompanied by a change in its colour throughout the thickness. For unifying the values of colours of the thermal treated samples the colour mode was used in which images are described using 256 shades of gray.

Based on these data there was developed an engineering method of calculation of the rational regime parameters of the process depending on the desired level of thermal treatment and physical-mechanical properties of the received thermo wood.

As a result of researches there was designed a pilot plant equipment, which consists of a sealed chamber with a heater, vacuum lines and the system of cooling, including storage capacity.
of the hydrophobic liquid with built-in tank filled with water, connected with the chamber by means of steam pipe. After completion of heat treatment stage the hydrophobic liquid is drained out from the chamber is drained into a container, where it gives the heat through the walls of the inner tank to the water, resulting in steaming which is served back to the camera. This action eliminates the need of additional spending on water vapor and intensifies the process of cooling the hydrophobic liquid before the next cycle of thermal treatment.

Conclusions
The presented technology of thermal treatment of wood in liquids, thanks to a constructive solution can be applied both in large and small woodworking enterprises, while decreasing energy costs, improving quality of thermo treated wood, colouring of the material is even throughout the thickness and colour scheme can be predicted.

References
МОДЕРНИЗАЦИЯ ЭКОНОМИКИ КАК ОСНОВА БЕЗОПАСНОСТИ ГОСУДАРСТВА

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Аннотация
Показывается, что успех модернизации зависит от согласованности технологической, образовательной и коммуникационной стратегий.

Ключевые слова: инновационный потенциал, модернизация, технологическое строительство, образовательные и коммуникационные программы, ТВ.

Модернизация экономики - кардинальное изменение характера функционирования экономической системы, обеспечивающее наращивание ее инновационного потенциала. Стратегия технологического развития создает необходимые материальные ресурсы, система образования формирует интеллектуальный капитал, способный создавать и реализовать новые технологии, а коммуникационные программы - новые установки и модели поведения. Единство технологической, образовательной и коммуникационной стратегий, поддерживающих друг друга, создает маховик ускорения экономического роста и повышения его качества.

Проблема моего исследования: доминирующие в российском образовательном и медиапространстве программы не поддерживают стратегию технологического развития, что делает невозможным достижение целей модернизации экономики.

Модернизация экономики - это кардинальное и достаточно быстрое (по историческим меркам) изменение характера функционирования экономической системы. Наращивается ее экономический (технологический), человеческий и социальный потенциал за счет повышения инновационной активности, которая позволяет более эффективно использовать существующие ресурсы и создавать новые ресурсы, неся ограничения для развития общества.

Инновационный потенциал характеризует способность общества создавать новые технологии (производственные, управленческие, социальные, информационные). Инновационное общество - это и другие технологии, и другая образовательная система, и другое отношение к жизни, работе.

Технологическая стратегия как основа модернизации
Возможны разные стратегии использования ресурсов, у которых будут разные результаты с точки зрения темпов и устойчивости экономического роста, производительности и стандартов жизни населения. Позиция страны на мировом рынке определяется характером используемых технологий. Экономические стратегии стран различаются уровнем технологического развития, которого они способны достичь и, соответственно, местом на глобальной конкурентной лестнице. Чем выше уровень технологий, тем, тем больше возможности устойчивого развития они создают. Экономическая мощь страны возрастает по мере продвижения от производства простых товаров к производству самых сложных новых, уникальных товаров и созданию новых технологий [1].

При наших богатейших ресурсах мы можем:
1. Постепенно оказаться на нижней мировой технологической ступеньке, производя преимущественно сырьевые и однородные простые товары, превратившись в economику с убывающей отдачей, т.е. окончательно неразвитую экономику, обреченную на последнее место в мировой экономике и, скорее всего, не способную прокормить 140 млн. своих граждан. Этот процесс называют „десиндустриализацией“ (технологической деградацией), его мы наблюдали в целом ряде стран, а совсем недавно – и в России.
Стратегия технологического развития не разрабатывается, ибо технологический фактор не привлекает внимания элиты. Иностранные инвестиции в страну не идут, отечественный капитал уходит из страны или изнашивается.
2. Использовать ресурсы для производства все более сложных товаров и оборудования преимущественно на основе разработанных за рубежом технологий. Такая стратегия обеспечивает возрастающую отдачу и усиление контроля над рынками, однако, при высокой зависимости от стран - разработчиков новых технологий. Здесь важно постоянно поднимать дно товаров с более высоким уровнем сложности и уникальности: они приносят более высокую добавленную стоимость и производительность, а полезность традиционных ресурсов и технологий падает по мере распространения новых.

Эту стратегию нередко называют „реиндустриализацией”; она реализуется в России в последние годы, обретая облик догоняющего технологического развития. Важно привлечь современные технологии из-за рубежа, выигрывая в конкуренции за них с другими развивающимися странами. Целенаправленное заимствование сочетается с воспроизводством лучших технологий собственными силами.

3. Восстановить свою способность разрабатывать новые технологические принципы, технологические платформы и технологии. Мы были в состоянии делать это в прошлом, когда наша страна обеспечила мощный технологический рынок. Сейчас такая стратегия кажется наглой, практически невозможной. В краткосрочном периоде — да, это невозможно; в долгосрочном — это реально. Ибо у нас есть необходимые для этого ресурсы и политическая воля. Нам потребуется немало времени, чтобы подготовить необходимые ресурсы, технологии, системы управления, адаптировать систему образования и изменить доминирующие модели поведения. Это стратегия технологического лидерства, позволяющая осваивать новые отрасли и новые рынки. Первые ростки этой стратегии мы наблюдаем сегодня и в России.

Любая из стратегий технологического развития (а не деградации) предполагает активное участие государства в модернизации экономики. Общезвестна закономерность: рынки сами по себе не способны провести кардинальные структурные преобразования, обеспечить переход экономики на новый технологический уклад с помощью прорывных инноваций. В этой ситуации механизмы рыночной самоорганизации дают сбой [2].

С помощью государства предстоит определить технологические приоритеты (поддерживае-мые технологические платформы), повысить в 1,5-2 раза норму накопления и сконцентрировать ресурсы на прорывных технологиях с помощью более гибких и эффективных институ-тов развития, выращивать национальных чемпионов, опираясь прежде всего на национальный капитал, создав условия для его нара-щивания. Ни в одной большой стране мира успешная технологическая модернизация не про-водилась за счет иностранного капитала.

Одновременно государство стимулирует создание инновационной среды, которая настраивает рыночные механизмы на непрерывное внедрение улучшающих технологий, которые со временем приводят к кардинальному повы-шению эффективности производства.

О важности технологического обновления для устойчивого экономического развития сви-детельствует тот факт, что из 10 томов программ выхода из кризиса, разработанной пра- вительством США, 8 томов были посвящены управлению технологиями.

Технологическое развитие и образование

Стратегический выбор делают элиты страны. Особую роль в подготовке этого выбора играет национальная система образования. Система образования, с одной стороны, создает новые интеллектуальные ресурсы для новых технологий; с другой — формирует национальную элиту, т.е. компетентные, энергичные и нравственные силы, способные перевести страну в качественно новое состояние.

Для разработки новых технологических принципов и технологий необходимы определенные модели мышления и поведения, которые формируются системой образования. На-циональная система образования должна быть максимально вовлечена в мировую технологи-ческую конкуренцию, как это было в России три десятилетия назад. Исследователи сходятся во мнении, что мир стоит на пороге новой волны технологической гонки, обусловленной переходом к новому технологическому укладу, началом новой технологической волны [3].

Неформальная коалиция бизнес-сообществ США поставила цель удвоить к 2015 году выпуск бакалавров по естественнонаучным и инженерным дисциплинам, обращая внимание на тот факт, что в Китае, Индии и Южной Корее число выпускников вузов по естественно-научным и инженерным дисциплинам растет
намного более быстрыми темпами, чем в США. Эксперты Национальной инженерной академии США озабочены тем, что в Китае и Японии на долю естественнонаучных и инже-
нерно-технических дисциплин приходится бо-
лее двух третей от общего числа бакалавров,
тот же средний показатель по 25 странам ЕС —
36%, в США — только 24%. И этот разрыв еще
больше для обладателей докторских степеней.
Королевская инженерная академия Великобри-
тании создала специальную рабочую группу
„Инженерное образование для XXI века”, кото-
рая пришла к выводу, что на протяжении мно-
гих лет имеет место серьезное недофинанси-
рование инженерных программ обучения в на-
циональных университетах [4].

Профессиональная подготовка определяется тем, к работе с какими технологиями готовят выпускников образовательных учреждений. Ха-
рактер труда, уровень доходов и социальный статус выпускников напрямую зависит от уров-
ня технологий, с которыми они могут работать. Чем выше технологический уровень, тем выше качество образования и требования к студен-
tам, тем престижнее образовательное учреж-
дение. Все остальные показатели оценки образо-
вательного учреждения являются вторичными по отношению к этому критерию.

Между тем в развернувшейся дискуссии по реформе российского образования меньше всего внимания уделяется отраслевым и ме-
жотраслевым прогнозам развития технологий (производственных, управленческих, соци-
альных), для работы с которыми и готовятся специалисты с высшим, средним и начальным профессиональным образованием. Разнообра-
зие и уровень этих технологий определяет сег-
ментацию и уровень образовательных учрежде-
ний. Общая тенденция – усиление сегментации технологий, продуктов, рынков (гиперсегмен-
tация), что создает новые возможности для об-
разовательных учреждений.

Для каждого технологического сегмента нам предстоит сформировать свои образовательные цепочки: школа, лицеи, колледж, университет, создать образовательные кластеры, способные работать с необходимым опережением. Мы умеем это делать. В СССР подготовка специа-
листов для авиакосмической отрасли началась сразу после войны, в 1946 г., задолго до мас-
сового производства ракет и самолетов нового типа. Впоследствии обучение, благодаря тесным связям вузов с разработчиками техно-
логий, было настолько гибким, что уже через 2-
3 года после появления новых технологий из
стен вузов выходили специалисты, способные работать с этими технологиями.

Необходимо воссоздать систему подготовки и переподготовки квалифицированных рабочих
и техников, способных работать в потоке непрерывно обновляющихся технологий. Российс-
кая система начального и среднего профессионально-технического образования, которую
зарубежные эксперты называли уникальной, понесла наибольший урон. В 90-е годы прои-
зошло резкое сокращение подготовки рабочих
кадров в ПГУ и профессиональных лицеях, чья
материальная база к настоящему времени ус-
тарела физически и морально. В 2009 году в
ПГУ и технических лицеях учились в 7 раз
меньше студентов, чем в вузах. При вводе
новых промышленных комплексов приходится
завозить из-за рубежа не только технологии и
оборудование, но и квалифицированных рабо-
чих.

Между тем развитые страны активно ис-
 пользуют формы обучения, от которых мы по-
чему-то отказались. Например, профессиональная подготовка в школе. В США две трети
старшеклассников охвачены профессиональной подготовкой. Есть программа общей трудовой
подготовки, которая создает базу для выбора будущей профессии и развивает первые про-
фессиональные навыки. И есть программа под-
готовки к работе по конкретным специальнос-
тям (по выбору). Из 19,3 тыс. учебных заведе-
ний, обеспечивавших профессиональное обу-
чение в США, 10,9 тыс. – это школы. Профес-
сиональное образование субсидируется из
государственного бюджета в размере 25-55%
от общих затрат. В Германии выпускник школы
способен приступить к работе на высокотехно-
логическом оборудовании после двухмесячной
подготовки.

В нашей стране в течение многих десятиле-
tий развитие системы подготовки квалифици-
рованных рабочих имело циклический харак-
тер. Когда ставилась задача технологического перевооружения экономики, и необходимо
было в кратчайшие сроки и в больших масшта-
бах провести подготовку и переподготовку ква-
лифицированных рабочих, система профессио-
нального обучения сливается с предприятиями
(переходит под их контроль и финансируется
преимущественно ими). В периоды развития на
существующей технологической основе систе-
мы профессиональной подготовки отделяется
от предприятий, контролируется и финансру-
ется преимущественно государственными органами образования.

В России началась новая волна технологического перевооружения, и неизбежно будет усиливаться сотрудничество бизнеса и профессиональных учебных заведений, финансирования и подготовка кадров приобретет все более выраженный целевой характер. При этом, как и во всем мире, размываются границы между учебными заведениями разных уровней профессиональной подготовки: школами (где учащиеся получают возможность попасть в производственную практику и осваивать профессию), ПТУ и техническими лицеями, техникумами (прикладной бакалавриат), колледжами и университетами. Региональные системы подготовки квалифицированных кадров, финансируемые федеральным и региональным бюджетами, а также бизнесом, должны обеспечивать доступность профессионального образования, что очень важно для сельских с невысоким материальным достатком. Крупные бизнес-структуры все чаще приобретают ПТУ и техникумы, создают корпоративные университеты и отраслевые центры подготовки кадров.

Будущие инженеры и исследователи должны иметь возможность стажироваться в лучших технологических компаниях мира. Напомним, что в 20-е годы прошлого века российское правительство направляло на стажировки талантливых выпускников российских вузов в лучшие международные исследовательские центры (в Англии - к Э. Резерфорду, во Францию – к супругам Кюри, в Данию – к Н. Бору). Вернувшись, эти талантливые ребята создавали новые научные направления и обеспечили подготовку технологического прорыва.

Система образования воспроизводит и трансформирует культуру как совокупность ценностей, убеждений и норм поведения – ключевой элемент как устойчивости общества, так и его развития. Это особенно важно, когда главные ресурсы развития в информационном обществе – финансы и интеллект – становятся настолько мобильными, что теряют территориальную привязку, постоянно перемещаясь между странами и регионами. В этом движении элиты успешных стран (владельцы важнейших ресурсов) усиливают свою культурную и национальную идентичность, действуя в интересах своей страны. Элиты других стран, напротив, отрываются от национальной почвы, теряют внутреннюю связь со своей родиной и обретают способность действовать вопреки ее интересам. Российская система образования призвана усиливать конкурентоспособность национальной культуры.

В России уже есть и будут развиваться конкурентоспособные (мирового уровня) центры подготовки элиты. Основная задача элитных образовательных центров, к которым относится лучшие вузы страны, – сформировать национально ориентированную элиту мирового уровня, которая работала бы на благо всего нашего общества, нации и государства, обладала бы необходимыми для этого нравственными и духовными ценностями, а также профессиональными умениями и навыками. За последние 10 лет российская элита стала более сплоченной, постепенно формируется национальный консенсус относительно будущего страны.

Вместе с тем в российской элите мы видим группы политиков и бизнесменов, которые привыкли управлять в тепличных условиях, когда все рынки растут, нет сильной конкуренции и не нужны крупные инвестиции в новые технологии, а население не интересуется политикой. Они не обладали такой целесустрениемностью и решительностью, которая заставляла бы делать все, что было в их силах, для процветания своих организаций и нашей страны. Они не связывали удовлетворение своих интересов с самостоятельной экономической стратегией российского государства на мировых рынках, следовательно, не являются национальной элитой. Национальная элита действует не в интересах Запада или Востока, а в своих интересах, т.е. в интересах управляющей ими страны.

Они полагали, что российское государство не способно создать условия для модернизации, и не хотели участвовать в долгой и трудной работе по обновлению России и усилению ее позиций на мировых рынках. Они не верили и в себя, в свои способности создать компанию мирового уровня в нашей стране.

По мере реализации стратегии модернизации в российской элите будут выпадать те, кто ставит корысть или гордость выше национальных интересов. А руководители, способные выращивать „национальных и мировых чемпионов“, будут пополнять российскую элиту.

Эти люди будут иметь разные профессии, и работать в разных сферах деятельности, у них будут разные интересы, но они считают себя единомышленниками, членами одной команды. Российская элита эпохи модернизации видит смысл своей жизни в построении эффективной
российской экономики и сильного государства, в достижении высокого жизненного уровня соотечественников.
Эти люди понимают, что придется работать много и тяжело, но они готовы к этому и хотят этого. Успешные российские лидеры станут частью мировой элиты, но будут преданы России, потому что в нашей стране для них будут созданы наилучшие условия.
Стратегия развития системы образования критично важна для России. Принимаемые сегодня решения в сфере образования определят нашу жизнь на многие годы вперед.
Необходимы новые коммуникационные программы
Сложнее всего изменить поведение людей. Поведение людей определяется их ценностями, установками, убеждениями и мотивацией, на которые можно воздействовать посредством коммуникаций.
Коммуникации обеспечивают внутреннюю солидарность общества, объединяя его в монолит с общими целями, убеждениями и мотивацией на основе идеологический (внекономической) сверхзадачи. Проанализируйте опыт трансформаций великих стран (России в том числе) и великих компаний, и вы увидите, что только так проводятся успешные преобразования [5].
Очевиден общий мировой тренд: роль и место идей и представлений людей в развитии экономики постоянно растет, соответственно, качественно возрастает роль коммуникаций. Новые информационные технологии сделали прибыльным преобразование человеческого сознания. Эффективность коммуникационных программ оценивается тем, насколько изменения в поведении людей соответствуют желаемым.
Следовательно, проведение кардинальных перемен должно начинаться с разработки соответствующих коммуникационных программ. Т.е. в первую очередь инновации проводятся в системах, формирующих общественное сознание. Задача СМИ — создать общественный климат, господствующие ценности, установки и мотивацию, соответствующие новой инновационной стратегической парадигме.
Опыт показывает, что в процессе трансформации снижается устойчивость любой экономической системы, которая становится очень чувствительной к внешним и внутренним воздействиям. Чем стремительнее и глубже преобразования, тем они менее управляемы и предсказуемы.
Коммуникационные программы направлены на минимизацию рисков, связанных с снижением управляемости экономической системы в процессе ее трансформации. Недооценка значения коммуникационных программ может привести к новому кризису или катастрофе.
Наши исследования еще раз доказали: чем выше темпы и глубина трансформации предприятий, тем больше должны быть коммуникационные бюджеты и эффективнее коммуникационные программы (точнее и сильнее воздействовать) [6]. Между тем и государственные чиновники, и менеджеры компаний недооценивают коммуникационные аспекты модернизации, в результате повышаются издержки преобразований, поставленные цели не достигаются.
Необходимо ликвидировать коммуникационные программы, разрушающие инновационный потенциал общества, его человеческий и социальный капитал и все еще занимающие большую часть эфирного времени на российском телевидении. В 2006 г. количество россиян, с недоверием относящихся к окружающим, почти в 4 раза превышает количество тех, кто доверяет другим людям (56,4% против 15,2%). На протяжении предыдущих 15 лет, как отмечает Полина Козырева, усилились подозрительность, настороженность и недоверие в обществе [7].
Созданием негативных коммуникационных программ занималась та часть российской информационной элиты, для которой, как показали исследования, характерны: предельно критичное отношение к собственной стране (ее истории и перспективам), отрицание позитивных перемен; стремление обслуживать большие потоки капитала, прежде всего международного; неверие в отечественный бизнес и отсутствие интереса к реальным проблемам простых людей; они полагают, что большинство способных уехали или хотят уехать из страны.
Разрушение человеческого и социального капитала резко снижает вероятность новых технологических прорывов, напротив, делает неизбежным появление новых глубоких кризисов. В такой общественной атмосфере любые призывы к модернизации и инновациям не будут услышаны и поддерживаются.
Если вы думаете, что проблема разрушающих коммуникаций существует только в России, то вы ошибаетесь. Похожая ситуация была
несколько десятилетий назад в развитых странах.

Проведенные в США исследования (Калифорнийский университет) показали, что влияние фильмов, внедряющих в сознание людей негативные модели поведения, усиливалось в этой стране с середины 60-х до конца 80-х. Были выявлены компании, финансирующие такой рода коммуникационные программы, проведены расследования, показывающие, кому и как направлялись деньги. Известный американский режиссер всему миру признавался в том, что он делал свои фильмы таким образом, чтобы убедить зрителей в том, что курить модно, "гламурно", ибо ему за это платили табачные корпорации. Он покаялся и просил прощения.

В США два десятилетия назад эти негативные программы были ликвидированы. А основным источником доходов табачных корпораций в этой стране стала продажа продуктов питания. Сегодня в развитых странах реализуются мощные коммуникационные программы, финансируемые государством и бизнесом, направленные на наращивание инновационного потенциала общества. Создаются образы героев – активных, умеющих, сильных и мужественных людей, способных решить самые трудные проблемы и сделать все, что в их силах, для блага своей Родины.

России сегодня как воздух необходимы новые коммуникационные программы, ориентированные на наращивание инновационного потенциала страны, формирующие национальные модели образа жизни в инновационном обществе. На наш взгляд, опорными точками новых коммуникационных программ являются три ценностные позиции [8]:

1. в обществе возник запрос на умное и увлекательное телевидение, которое позволит россиянам реализовать интерес к знаниям, желание творить и совместно создавать будущее, а эти ценности являются фундаментальной особенностью нашего национального характера. Следует чаще показывать, как рождаются открытия и изобретения, давать успешные примеры технического творчества в России и за рубежом, способствовать тому, чтобы научно-техническое творчество высоко оценивалось обществом, было доступным талантливым людям, приносило им успех и процветание;

2. коммуникационные программы должны быть направлены на формирование здоро-
овього образа жизни, уверенности в себе, в своих способностях и возможностях. Прежде всего, необходимо разрушить нелепые мифы о пьянстве и лени россиян, противоречащие историческим фактам;

3. нам нужно общее согласие в том, как мы и какими мы хотим стать, нам нужна четкая и сильная идеология, формирующая наши убеждения, и история, которой мы можем гордиться.

Последние слова об отношении к истории – это цитата из выступления Николя Саркози, который сказал о том, что французам нужна история, которой они могут гордиться. Посмотрите последний французский фильм о Наполеоне, где император, принесший огромные бедствия своей стране, показан как герой, который делал все для укрепления могущества французского государства. Представления о национальной истории должны поддерживать стратегию развития государства и фундаментальные ценности, на которых она основывается.

Проведенные за рубежом исследования [4] показали, что великим становится только те компании, у которых есть сильная идеология. Весь мировой опыт свидетельствует о том, что великим становятся только нации с сильной идеологией, способствующей их непрерывному и устойчивому развитию.

Основной инструмент управления поведением больших масс людей - это телевидение, к которому стремительно приближается интернет. Телевидение в эпоху модернизации экономики призвано:

- способствовать пониманию того, что общество в целом развивается в правильном направлении, поскольку есть четкая, понятная всем и поддерживаемая всеми идеологическая основа для проведения преобразований гибкая правильная реакция на быстроменяющиеся условия;

- показывать, от чего нужно отказаться, что должно уйти в прошлое, и как теперь нужно действовать по-новому; давать конкретные образцы новых решений, распространяя лучший опыт на всех уровнях общества;

- создавать ощущение причастности людей к происходящему, сломать отчуж-
деньность, доказывая, что от действий каждого из нас зависит будущее страны; как можно чаще выводить на экраны энергичных и талантливых людей, делом доказавших, что они способны решать возникающие проблемы.
Российскому телевидению крайне необходимы новые телевизионные „продукты“, новые форматы телепередач. Для модернизации телевидения следует использовать известные инструменты инновационного управления: привлекать талантливых людей, создавать новые организационные структуры и источники финансирования, новые системы мотивации и новые технологии работы.
Чем выше уровень доминирующих технологий, тем выше уровень экономического и социального развития общества, тем сильнее демократия, опирающаяся на мощную культуру, и тем увереннее содержание коммуникационных программ направляется на достижение поставленных общественных целей, преодоление неизбежных противоречий между социальными группами. Чему способствуют эффективные технологии формирования общественного сознания и информационной элиты.

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**MODERNIZATION OF THE ECONOMY AS A UNITY OF THE TECHNOLOGICAL, EDUCATIONAL AND COMMUNICATION STRATEGIES**

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**Abstract**
It is shown that success of modernization depends on the coherence of technological, educational and communication strategies.

**Key words**: innovation potential, modernization, technology strategy, education and communication programs, TV.
ВЛИЯНИЕ НАЛОГОВОЙ ПОЛИТИКИ НА ПРЕДПРИНИМАТЕЛЬСКУЮ АКТИВНОСТЬ
В ЛАТВИИ В УСЛОВИЯХ ЭКОНОМИЧЕСКОГО КРИЗИСА

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Резюме

Влиянию налоговой политики на бизнес и экономическое развитие посвящены ряд научных исследований. Особую актуальность вопросы структуры налогов и налоговой нагрузки приобретают в условиях экономического кризиса. Рост дефицита государственного бюджета приводит к тому, что правительство нередко проводит изменения в налоговом законодательстве в направлении увеличения налоговых ставок и расширения налоговой базы без должного обоснования. Налоги на капитал, рабочую силу и потребление оказывают различное влияние на развитие бизнеса. Например, в ответ на изменения налогов на капитал, предприниматели стремятся сохранить стабильную норму доходности на капитал. Таким образом, эффект влияния корпоративного подоходного налога формируется за счет издержек производства и цен, которые затем влияют на конкурентоспособность товаров. В условиях международной налоговой конкуренции следует также учитывать воздействие налога на прибыль на потоки иностранных инвестиций. Налоговая нагрузка на рабочую силу влияет на затраты предпринимателей на рабочую силу и / или на чистую (нетто) заработную плату работников. Это может вызывать дисбаланс на рынке труда, в результате сокращения предложения рабочей силы. Бизнесмены, в случае увеличения налоговой нагрузки на рабочую силу, уменьшают спрос на работников, а также выбирают для ведения бизнеса страны с более привлекательными налоговыми условиями. Повышение налоговых ставок может также стимулировать рост неформального сектора экономики, что противоречит основному принципу рыночной экономики – обеспечения честной конкуренции. Некоторые оценки показывают, что налоговые поступления не отражают динамики роста налоговой базы и налоговой ставки, что косвенно указывает на увеличение теневого сектора экономики. Изменения в латвийской налоговой системе в условиях экономического кризиса, были проведены механически, без экономического анализа воздействия на бизнес сектор и его конкурентоспособность в контексте устойчивого развития.

Ключевые слова: налоговая система, налоги на рабочую силу и капитал, предпринимательская среда.
Key words: tax system, capital and labour tax, entrepreneurship development.

Введение

В условиях экономической рецессии инструменты налоговой политики следует использовать очень продуманно, с учетом их влияния на предпринимательскую среду, социальную защиту населения и экономический рост. При этом необходимо иметь в виду, что изменения в государственных расходах оказывают более значительный мультипликативный эффект, чем изменения в налогах. Однако изменения в налоговой политике могут быть проведены значительно быстрее, чем изменения в государственных расходах.

Глобальный кризис оказал негативное влияние на экономику многих стран. Латвию мировой финансовый и экономический кризис дотянул во второй половине 2008 года, когда после быстрого, но несбалансированного роста начался глубокий спад. Одним из факторов, окаязавших негативное влияние на экономическое развитие, была непродуманная проциклическая экспансивная фискальная политика. В период с 2005 по 2008 год темп роста государственных расходов (в среднем 20% в год) значительно превышал темп роста валового внутреннего продукта.

Государственные расходы базировались на краткосрочном росте доходов государственного бюджета и при этом не был обеспечен рост эффективности этих расходов [1].

В кризисный период актуальным стал вопрос консолидации бюджета, которую можно осуществить либо уменьшая расходы, либо увеличивая налоги, либо реализуя одновременно оба этих мероприятия. Продуманное снижение бюджетных расходов, которое сопровождается благоприятными для народного хозяйства структурными реформами, может обеспечить устойчивый в долгосрочном плане и соответствующий возможностям государства бюджет. В свою очередь, повышенная налоговая нагрузка необходимо справлять с её негативным влиянием на предпринимательство, уровень занятости и конкурентоспособность экономики. В краткосрочном периоде повышение налогов оказывает более значительное негативное влияние на экономическое развитие экономики государства, чем сокращение неэффективных государств...
твенных расходов. В данной статье рассматриваются проблемы влияния налогов на рабочую силу и капитал на предпринимательство в Латвии.

1. Каналы влияния налогов

Налоги на рабочую силу и капитал оказывают прямое воздействие на предпринимательскую активность и экономический рост. В меньшей мере негативное влияние оказывает изменение в налогах на потребление и собственность [2].

Изменения в налогах на рабочую силу могут оказать влияние как на трудовые издержки, так и на чистую заработную плату. Это зависит от многих факторов – от ситуации на рынке труда (нехватка или избыток рабочей силы), законодательной базы, деятельности профсоюзов и др. факторов.

Многие исследования свидетельствуют о наличии такого влияния, причем некоторые из них дают количественные оценки такого влияния [3]. В случае повышения трудовых затрат конкурентоспособность произведенной продукции снижается, что теоретически может привести к падению объемов производства. Последствия такого падения общеизвестны – это сокращение занятости в частном секторе, снижение налоговых поступлений, а также уменьшение работающих в государственном секторе, если сокращение налоговых поступлений значительно увеличивает бюджетный дефицит. Предприниматели также выбирают для ведения бизнеса страны с наиболее привлекательной налоговой средой. Таким образом, увеличение налогов на рабочую силу приводит к снижению занятости в краткосрочном периоде, а также к снижению экономической активности.

Некоторые исследования показывают, что повышение подоходного налога с населения и социального налога, особенно неблагоприятно сказывается на экономическом росте, деформируя рынок труда и уменьшая предложение рабочей силы [4]. Повышение налогов на трудовые доходы оказывает негативное влияние и на предложение рабочей силы, поскольку работоспособное население для обеспечения соответствующего уровня жизни вынуждено искать работу в странах с наиболее привлекательной налоговой средой. Это увеличивает потоки внешней миграции и страна зачастую теряет высококвалифицированную рабочую силу, на подготовку которой были затрачены государственные средства.

Как известно, в современном мире наблюдается высокая межстрановая конкуренция в области привлечения капитала и прямых иностранных инвестиций. Повышение затрат на рабочую силу и капитал негативно влияет на потоки иностранных инвестиций, причем снижение инвестиций оказывается довольно значительным [5-7]. Следует иметь виду также порядок уплаты налога на прибыль в различных странах – либо по ставке страны, в которую инвестируют, либо по ставке инвестирующей страны. Межстрановая конкуренция является важнейшим фактором приводящим к снижению налогов на прибыль и капитал. В последние десятилетия наблюдается тенденция снижения налога на прибыль практически во всех развитых странах. Существенным фактором, оказывающим влияние на условия ведения бизнеса, является также норма, которая регулирует налогообложение регистрируемой прибыли. Если в условиях кризиса правительство повышает налоги на прибыль и капитал, это ухудшает условия ведения бизнеса и потоки капитала направляются в те страны, которые обеспечивают наиболее благоприятные условия. В случае повышения налога на прибыль предприниматели стремятся к сохранению ставки доходности на прежнем уровне, что в свою очередь влияет на производственные затраты и цены. Увеличение цены производимой продукции негативно сказывается на ее конкурентоспособности на международном рынке.

2. Подоходная система налогов Латвии в условиях кризиса

В настоящее время в различных странах наблюдаются существенные различия в уровне налоговой нагрузки. Налоговая нагрузка в странах Европейского союза оценивается как довольно высокая – в 2008 году в среднем по ЕС она составляла 39,3% от валового внутреннего продукта (ВВП). В Латвии общий уровень налоговой нагрузки является одним из наиболее низких, например в 2010 году он составлял 28,6% от ВВП [8].

В рамках коррекции государственного бюджета в условиях экономического кризиса в Латвии были проведены значительные изменения в налоговом законодательстве в направлении повышения налоговых ставок и расширения налоговой базы. Существенные изменения были реализованы в системе подоходных налогов. В части подоходного налога с населения в кризисные годы был снижен необлагаемый на-
Влияние налоговой политики на предпринимательскую активность в Латвии в условиях ... 

логом минимум – в 2009 году до 35 латов в месяц (примерно 50 евро). В настоящее время необлагаемый минимум в Латвии составляет 45 латов (примерно 64 евро), что более чем в 2 раза ниже, чем в Литве и Эстонии. Снижение необлагаемого налогом минимума негативно повлияло на благосостояние малообеспеченного населения и фактически необлагаемый минимум, как экономическая категория, утратил свое значение в регулировании уровня доходов населения и обеспечении социальной справедливости. Ставка подоходного налога с населения возросла с 23% до 25%, а также была расширена налоговая база за счет включения в нее доходов на капитал. С января 2010 года дивиденды и процентные доходы облагаются по ставке налога 10%, а прирост капитала - по ставке 15%. Латвия является одной из немногих стран, где используется пропорциональная ставка подоходного налога с населения. Такие ставки применяются в Болгарии, Чехии, Эстонии, Литве, Румынии и Словакии, а в остальных странах ЕС действует прогрессивный подоходный налог. Изменение, которые были проведены в системе подоходного налога с населения, значительно повысили налоговую нагрузку и привели к тому, что этот налог стал более регрессивным. В это же время был повышен и социальный налог уплачивающий работники с 9% до 11%, таким образом ставка социального налога возросла до 35,09%.

Общая налоговая нагрузка на рабочую силу выросла и разница между брутто и нетто заработной платы составляет 29%, в свою очередь в Литве и Эстонии эта разница составляет соответственно 22% и 20%. Наиболее существенно в Балтийских странах эта разнице ощутимо даже те, кто получают невысокую заработную плату (9). Число жителей, получающих минимальную заработную плату или меньше, составляет примерно 30% от общего числа занятых. Следует также отметить, что установленный государством уровень минимальной заработной платы после уплаты подоходного и социального налога является ниже, чем прожиточный минимум. Это приводит к значительному увеличению числа населения живущего за чертой бедности.

По данным Латвийского Центрального статистического управления, полученных в результате анализа данных обследования о доходах и условиях жизни в Европейских странах (EU-SILC), в 2010 году 425 тысяч или 19% жителей Латвии были подвержены относительно-
му риску бедности. Увеличилась зависимость населения от социальных трансферов - в 2010 году 31% от общих доходов составляли социальные трансферы, а индекс бедности, который рассчитывается без учета социальных выплат, составил 46%, что является наивысшим показателем с 2004 года (10).

Одним из показателей, характеризующих влияние налоговых ставок и льгот на частную заработную плату, является так называемый налоговый разрыв. Этот показатель рассчитывается на основе ставок налога на рабочую силу с учетом льгот, применяя их к индивиду с определенным уровнем дохода. Уже в 2007 году этот показатель в Латвии для работников с низкими доходами был выше, чем в среднем по ЕС. В свою очередь с учетом вышеуказанных изменений в налоговой системе, в 2010 году налоговый разрыв для индивида, который получал среднюю заработную плату и у которого на содержании не было иждивенцев, составил 44,1%. Этот показатель является одним из наиболее высоких среди стран Европейского союза.

Исследования показывают, что в развитых странах повышение налогового разрыва на 10 процентных пунктов приводит к снижению занятости трудоспособного населения на 1–3% [11]. Снижение занятости в свою очередь вызывает сокращение валового внутреннего продукта.

Все вышеуказанные свидетельствует о необходимости повышения необлагаемого налогом минимума, а также введения прогрессивного налогообложения доходов населения. К сожалению идеи прогрессивного налогообложения не находит поддержки со стороны правительства.

Система подоходного налога с предприятий была сформирована на базе закона Латвийской Республики „О подоходном налоге с предприятий”, который был принят в 1995 году. Согласно этому закону ставка налога составляла 25% и в последующие годы происходило постепенное снижение ставки этого налога. В 2002 году ставка была снижена до 22%, а в 2003 году – до 19%, а в 2004 году – до 15%. Латвийский налог на доходы предприятий является одним из наиболее благоприятных среди стран ЕС. Поступления от налога на прибыль не являются определяющими с точки зрения формирования бюджета. Во время кризиса они сократились с 9,8% в 2008 году до 3,2% от общих налоговых поступлений, поскольку сократилась
экономическая активность, а также предприниматели максимально уменьшили налогом облагаемую базу.

С сентября 2010 года вступил в силу закон «О налоге с микропредприятий», который существенно облегчает и стимулирует деятельность малых предприятий. Согласно закону, микропредприятием может быть индивидуальный коммерсант, индивидуальное предприятие, предприятие с ограниченной ответственностью или физическое лицо, которое зарегистрировано в Государственной службе доходов. Микропредприятию должно соответствовать определенным критериям, например, численность работников не более 5 работников, годовой оборот не более 70 000 латов (100 000 евро) в год и др. Ставка налога составляет 9% с оборота и включает в себя социальные платежи, подоходный налог с населения и предприятия.

Вторым существенным стимулом предпринимательства в Латвии с января 2011 года является введение скидки по налогу на прибыль в случае, если предприятие осуществляет долгосрочные инвестиции в проекты в приоритетных отраслях экономики. Скидка по налогу на прибыль составляет 25% от инвестиций до 35 миллионов латов (примерно 50 миллионов евро) и 15% - если объем инвестиций превышает 35 миллионов латов. Учитывая большой объем необходимых инвестиций, эта льгота в большей степени относится к зарубежным инвесторам, поскольку для местных инвесторов вложения такого уровня являются непосильными. Поэтому для стимулирования внутренних инвестиций необходима отмена налога на реинвестированную прибыль.

Оба вышеуказанных стимула являются эффективными, однако были введены с опозданием. Одной из форм привлечения зарубежных инвестиций в Латвию могло бы быть создание так называемого режима холдинговых предприятий, для которых действует определенный налоговый режим на прибыль. Холдинговые предприятия не ведут хозяйственную деятельность, а являются держателем долей капитала или собственности. В случае отчуждения последней или в случае выплаты дивидендов, с этих доходов не удерживается подоходный налог. Зарубежная практика показывает, что если затраты на содержание такого рода предприятий не являются высокими и если ставка налога на прибыль ниже, чем в других странах, то это стимулирует аккумуляцию прибыли именно в этих странах (подобная система действует, например, на Кипре). Это увеличивает налоговые поступления в бюджет государства.

Выводы и предложения

Изменения, проведенные в системе налогов на доходы предприятий и населения, были введены достаточно механически, без должного анализа влияния последних на предпринимательскую среду в Латвии. Особенно негативны были последние увеличения налоговой нагрузки на рабочую силу. Основываясь на проведенном анализе, можно сформулировать следующие рекомендации: необходимо повысить необлагаемый подоходным налогом минималь, компенсируя снижение доходов бюджета введением прогрессивной системы налогообложения доходов работников; отменить налог на реинвестированную прибыль и создать специфический налоговый режим для холдинговых компаний.

Литература


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**EFFECT OF TAX POLICY ON ENTREPRENEURIAL ACTIVITY IN LATVIA DURING ECONOMIC CRISIS**

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**Abstract**

A number of scientific studies explore the impact of tax policy on business and economic development. The issues of tax structure and tax burden become particularly relevant in the times of economic and financial crisis. Increasing budget deficit leads to governments changing tax legislation in the direction of increasing tax rates and broadening the tax base without proper justification. Taxes on capital, labour and consumption have different effects on business development. For example, in response to changes in capital tax, entrepreneurs strive to maintain a stable rate of return on capital. Thus, the effect of corporate income tax is formed at the expense of production costs and prices, which then affect the competitiveness of goods. In the context of international tax competition, the impact of income tax on foreign investment flow has to be considered as well. The tax burden on labour affects employers’ costs on labour and/or the net wages of employees. This can cause an imbalance in the labour market by reducing the supply of labour. In times of increased tax burden on labour, entrepreneurs often reduce the demand for workers, as well as choose to do business in countries with more attractive fiscal terms. Raising tax rates may also stimulate the growth of the informal economy, which contradicts the basic principle of market economy – to ensure fair competition. Some estimates show that tax revenues do not reflect the dynamics of growth of tax base and tax rates, which indirectly indicates an increase in the informal sector. Changes in Latvian tax system during economic crisis were carried out mechanically, without any economic analysis of the impact on the business sector and its competitiveness in the context of sustainable development.
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Аннотация

Рассмотрены теоретические основы управления организацией с позиций единства общих и специальных
функций управления. Реализация каждой из функций управления промышленным предприятием должна вклю-
чать в себя следующие типовые элементы управленческого цикла, общие для всех функций (общие функции):
прогнозирование и планирование; организация работы; координация и регулирование; активизация (мотивация)
и материальное стимулирование; контроль, учет и анализ. При определении перечня конкретных функций уп-
равления каждого промышленного предприятия и формирования системы управления целесообразно руковод-
ствоваться следующим составом функций управления, сгруппированным по определенным признакам объекта
управления: по признаку воздействия на все сферы деятельности (перспективное и текущее экономическое,
социальное и экологическое планирование; организация работ по стандартизации; учет, анализ и аудит), по
признаку воздействия на отдельные стадии производственного процесса (управление технической подготовкой
производства; организация производства (основного, обеспечивающего и обслуживающего); управление техно-
логическими процессами; оперативное управление производством; организация метрологического обеспече-
ния; технический контроль и испытания; маркетинг и сбыт продукции), по признаку воздействия на отдельные
факторы производства (организация работы с кадрами; управление организацией труда и заработной платы;
организация творческой деятельности коллектива работников; материально-техническое снабжение; капиталь-
ное строительство, инвестиционная деятельность; организация финансовой деятельности; управление внеш-
некономической деятельностью. Подчеркивается важность использования практики успешного хозяйствова-
ния в процессе совершенствования теории и методологии управления. Акцентируется внимание на необходи-
мости расширения методов оценки эффективности как производственной, так и управленческой системы уп-
равления промышленным предприятием.

Ключевые слова: принципы, организация, теория, управление, функции.

Вступление

Мы пытаемся часто забегать вперед в тео-
рии и практике управления, игнорируя наработ-
ки предшественников. К примеру, 2011 год
должен был бы отмечаться как юбилейный.
Ведь 100 лет тому назад вышла уникальная
книга „отца научного менеджмента” Фредерика
У. Тейлора „Прinciples научного управления”
(1911) [1]. Возможно, удастся исправить ситу-
ацию в 2016 году, когда исполнится 100 лет
выхода в свет еще одного уникального труда –
„Общее и индустриальное управление” [2]
выдающегося практика и теоретика в сфере
управления Анри Файоля. Ведь в отмеченных и
многих других трудах заложен фундамент нау-
ки и практики управления.

Не обделена талантами и Украина, и Болга-
рия. Назовем лишь несколько фамилий наших
современников, которые заслуживают того,
чтобы их имена вошли в историю науки управ-
ления: В. С. Бойко, А. С. Дяк, В. А. Згурский,
В. Ф. Злобин, В. А. Масол, Г. М. Скударь [3], П.
А. Шило. Фамилии названы нами не случайно.
Не трудно прийти к заключению, что начиная с
Ф. Тейлора, А. Файоля, продолжая В. А. Згурс-
ким, П. А. Шилом, наука управления, обычно,
идет следом за практикой ведения хозяйства. Отметим, за успешной практикой ведения хо-
зяйства. Благодаря обобщению передового опы-
та удается выстроить определенную систему
знаний, которая и носит название „наука уп-
равления”, или является ее составляющей. На-
учно-технический прогресс, повышение благо-
состояния населения, проявление закона спро-
са-предложения свидетельствуют о процессе
расширения масштабов производства, совер-
шенствования организации как собственно про-
изводства, так и процесса распределения, об-
мена, потребления продукции. Существенно
удобства в других предпринимается решение, какое нужно решать в
процессе хозяйствования. То есть, идет речь о
расширении функций производства, функций
управления. Именно этим объясняется выбор
темы исследования, т.е., идет речь о реализа-
ции функционального подхода в управлении.

К сожалению, на протяжении последних
dвух десятилетий в Украине происходит сворачи-
вание, упадок реального сектора экономики. Исчезают целые отрасли промышленности. Отечественный товаропроизводитель из внут-
ренного рынка агрессивно вытесняется зарубежными фирмами. Абсолютно по непонятным причинам среди 16 министерств после последней реструктуризации правительства не нашлось места ... Министерству промышленной политики (??). При этих обстоятельствах вести речь о теории и практике управления современным производством в Украине чрезвычайно сложно. Но кому-то нужно это делать. С позиций научных, с позиций здравого смысла, с позиций производственного опыта, с позиций, в конце концов, патриотизма.

При изучении дисциплины „Менеджмент” студенты НТУУ „КПИ” и КНЭУ пользуются, в первую очередь книгой „Основы менеджмента” Мескона М. Х., Альберта М., Хэдоури Ф. Понятно, что учебная программа по менеджменту базируется на общих функциях управления (кстати, 4-х: планирование, организация, мотивация, контроль). Насколько оправдан такой подход с позиций классической теории управления, с позиций практики предпринимательской деятельности?

Учебники по менеджменту в Украине за последние два-три десятков лет вышло много. Вместе с тем, по нашему мнению, заслуживают внимания, в первую очередь, книги по управлению таких украинских авторов: под редакцией Г. Л. Таукача и В. П. Дубоноса [4], Б. М. Андрощенкова и О. Е. Кузьмина [5], Ф. И. Хмия [6]. Почему? Учебники отмеченных авторов максимально приближены к реалиям управленческой деятельности. Если же вести речь о дискуссиях вокруг проблем теории и практики управления, есть смысл воспользоваться оригинальными по содержанию и логике изложения материалом публикации Ф. И. Хмия „Мифы зарубежной науки менеджмента и украинские реалии” [7], Б. П. Будзань „Менеджмент в Украине: современность и перспективы” [8].

При рассмотрении современных тенденций развития науки управления мы коснемся лишь некоторых составляющих теории и методологии управления организацией. Внимание акцентируем, в первую очередь, на процессе раскрытия специфических (конкретных) функций управления.

Цель подготовленного материала заключается в углублении теоретико-методологических основ управления организацией с позиций функционального подхода. Среди основных задач научного поиска: а) анализ структуры и содержания основ теории управления, что относится отображение в трудах зарубежных и отечественных ученых, б) исследовать, насколько объективно практика ведения хозяйства отображается в современной теории и методологии управления; в) какие изменения стоит внедрить в процессе подготовки и переподготовки управленческих кадров. При этом второе намеревается игнорировать наработки по вопросам ситуационного подхода в управлении, по вопросам теории управления по результатам и т.п.

1. О сущности управления организацией

Ни у кого не должно вызывать сомнение отдельного того, что в основе создания любого изделия заложена инженерная мысль. Часто она отодвигается на задворки, поскольку в готовом виде в эффективной упаковке с клеймом „Made in ...” преподносится потребителю, обычно, через многочисленные каналы распределения. Отечественный товаропроизводитель становится невостребованным. Для изменения такой ситуации необходимо изменения. Вновь актуальной становится проблема подготовки инженера-экономиста, инженера-производителя, который, с одной стороны, хорошо владеет инструментарием создания нового товара (инноваций), с другой, - способен выступать в роли организатора производства и коммерциализации продукта.

Управление по отношению к социально-экономической системе, в роли которой выступает предприятие, мы рассматриваем как целенаправленное (для перевода системы из одного в другое, более успешное состояние) влияние на коллектив специально подготовленных людей, то есть специалистов. Целенаправленность допускает, что управленческое решение должно, при определенных условиях, привести к желаемому результату, к успеху. Влияние, действие может носить разносторонний характер, но в рамках обще принятых принципов, норм, правил.

Касательно „специально подготовленных людей”, то мы делаем акцент на этом лишь по той причине, что в большинстве случаев теоретики менеджмента пишут об отношениях между людьми. Так, Э. М. Коротков тему 23 своей книги „Концепция менеджмента” назвал: „Человек в системе менеджмента” [9]. На производстве мы пришли к заключению, пришли к закономерности, что „хороший человек - не профессия”. Ведь предприятие объединяет в себе не просто набор случайных людей, а конструкторов, технологов, нормировщиков, фи-
нансистов, бухгалтеров, маркетологов, представителей многих других профессий, т. е. специалистов, профессионалов. Теперь о „переводе системы из одного состояния в другой“. Желательно, чтобы система переходила в новое, более прогрессивное состояние, тогда будем иметь дело с „эффективным“ управлением.

2. От практики и практиков управления к теории управления

Теория управления берет начало с первых летописей, от Геродота, от Макиавелли, от Аристотеля, от Платона, от Конфуция, из трактата „Артхашастра“, от „Наставлений Птаххотепа“. В вопросах теории управления можно воспользоваться „Управленческим континуумом“ Клядо Ст. Джорджа-младшего. О практике успешного управления можно вести речь из времена Киевской Руси. Вспомним имя Ярослава Мудрого, который сначала успешно оправдывал доверие ростовчан (Ростов Великий), после чего — жителей Великого Новгорода на княжеском троне, а потом с 1019 по 1054 год так же успешно правил Киевской Русью. Благодаря Ярославу Мудрому Киевскую Русь знали, увлекали в тогдашней Европе. Считали за честь поддерживать с ней не только торговые связи, но и устанавливать семейные отношения на уровне правителей государств.

В фундаменте теории управления, безусловно, находится практика управления, опыт успешного ведения хозяйства. В начале, мы назвали несколько фамилий „генералов“ производства, которые на протяжении своей управленческой деятельности довели свои системы близкими к совершенству: В. А. Зэгурский, П. А. Шило, В. Ф. Злобин и другие. Это — генеральные директора крупнейших в свое время киевских предприятий. Имена на уровне Ф. Тейлора, А. Файоля. Отличие в том, что А. Файоль всегда сумел обобщить свой 46-летний производственный и управленческий опыт и написать „Общее и промышленное управление“ (1916). Все операции, которые только встречаются на предприятиях, А. Файоль разбил на шесть групп: технические (заготовка, обработка, производство); коммерческие (покупка, продажа, обмен); финансовые (привлечение средств и распоряжение ими); страхование (страхование, охрана имущества и лиц); учет (бухгалтерия, калькуляция, учет, статистика); администрирование (планирование, организация, руководство, координация, контроль). Свой взгляд к составляющим процесса администрирования изложил Г. Кунц, С. О’Доннел, Л. Гюлик, многие другие теоретики управления.

3. О единстве общих и конкретных функций управления

Управление организацией мы рассматриваем как систему лиц и деятельности. В центре ядра мы бы разместили административную функцию (по А. Файолю), вокруг нее расположили бы другие операции (функции). Макро- и микроэлементы, их динамика, несомненно, влияют на изменение содержания и уделенного веса каждой из компонент. Так, в 17-модульной программе для менеджеров, подготовленной учеными Государственного университета управления (Россия) выделены следующие виды специального менеджмента: стратегическое и антикризисное управление, управление производством и операциями, производительною и качеством, инновациями, программами и проектами, внешнеторговой деятельностью, маркетингом, финансами, управление человеческими и информационными ресурсами.

Наведем несколько выдержек из экспериментального ГОСТ 24525.0-80. Управление производственным объединением и промышленным предприятием [10]. Во-первых, в состав групп стандартов системы управления ПО (ПП) включены: общие вопросы управления; подсистема линейного руководства; целевые комплексные подсистемы; функциональные подсистемы; подсистемы обеспечения управления. Во-вторых, к методологическим основам управления отнесены: принципы управления; цели управления; функции управления; методы управления; управленческие решения; требования к формированию стиля руководства; организацию труда руководителя. В-третьих, реализация каждой из функций включает следующие типичные элементы управленческого цикла, общие для всех функций: прогнозирование и планирование; организация работы; координация и регулирование; активизация и стимулирование; контроль, учет и анализ.

В-четвертых, при формировании системы управления необходимо руководствоваться следующим типичным составом функций управления, сгруппированным по определенным признакам объекта управления: а) по признаку воздействия на все сферы деятельности предприятия: перспективное и текущее экономическое и социальное планирование, организация работ по стандартизации, учет и отчетность,
экономический анализ; б) по признаку воздействия на отдельные стадии производственного процесса: управление технической подготовкой производства, организация производства (основного, обеспечивающего, обслуживающего), управление технологическими процессами, оперативное управление производством, организация метрологического обеспечения, технический контроль и испытание, сбыт продукции; в) по признаку воздействия на отдельные факторы производства: организация работы с кадрами, организация труда и заработной платы, организация творческой деятельности трудового коллектива, материально-техническое снабжение, капитальное строительство, финансовая деятельность.

На протяжении 32 лет после публикации ГОСТ 24525-80 жизнь внесла определенные коррективы в систему деятельности предприятия. Это — приватизация, глобализация, интеграция, маркетинг, логистика и др. Но стержень, методологические подходы к управлению не претерпели сверхъестественных изменений. На- помним еще о такой экономической категории, как «воспроизводство» - общественное производство, которое рассматривается, как процесс, который непрерывно повторяется в неразрывной взаимосвязи производства, распределения, обмена и потребления. Производство, безусловно, является определяющим по отношению к другим фазам воспроизводства.

4. В. В. Глухов о структуре дисциплины „Менеджмент”

В. В. Глухов [11] теорию менеджмента видит со следующих позиций: «Основы менеджмента» (принципы управления; политика предприятия; структура управления; стратегия деятельности; тактическое планирование; оперативное планирование); „Математика для менеджера” (простые типичные математические модели; методы решения управленческих задач); „Управленческие функциональные решения” (выбор формы ведения хозяйства; управление качеством; управление нововведениями; управление оборудованием); „Методы разработки управленческих решений” (риски в управленческих решениях; групповые методы выработки управленческих решений; графический образ проблемы; экспертные методы выбора вариантов решений; информационная поддержка руководителя); „Управление персоналом” (принципы управления персоналом; организация управления персоналом; типичные процессы и решения по управлению кадрами; оплата труда); „Организация консультирования” (принципы и сферы консультационной деятельности); кризисный менеджмент; „Управленческие ситуации” (организационное поведение; информационный обмен); „Самоменеджмент” (самоменеджмент; время — капитал управленческого работника; имидж; тестирование менеджера; кодекс чести).

Какие можно сделать выводы о структуре и содержании книги В. В. Глухова? Во-первых, оригинальность подхода к теории менеджмента. Во-вторых, почему-то общие функции управления отодвинуты на второй план. В-третьих, конкретные функции управления „рассены веером”, не упорядочены. К примеру, в четвертой части рассматриваются несколько конкретных функций управления. „Управление персоналом” почему-то необоснованно вынесено в отдельную часть (пятую).

5. О теоретиках управления

Авторов и их учебники по теории управления можно разделить на несколько категорий. К первой мы бы отнесли тех, кто объединяет общие и конкретные функции управления. Это — „реалисты”. Удостоверенно назовем фамилии: Э. М. Коротков, В. В. Глухов, А. Й. Шваб. Так, Э. М. Коротков [9] концепцию менеджмента рассматривает по ниже отмеченной схеме: 1) деятельность человека: потребность в управлении; менеджмент: тип управления, концепция, профессионализм; особенности русского менеджмента; 2) менеджмент: интеграция деятельности: динамика менеджмента: процессы управления; механизм менеджмента: средства и методы управления; методология и организация менеджмента; стратегия и тактика менеджмента: формальное и неформальное управление; 3) диверсификация менеджмента: типология и выбор альтернатив; управление проектами; антикризисный менеджмент; мотивационный менеджмент, корпоративное управление; распределение полномочий: централизация и децентрализация управления; маркетинг; стратегический менеджмент; административный менеджмент; 4) экономика и социология управления: персонал управления: человеческий капитал; ресурсы и эффективность управления; 5) человек в системе менеджмента: личность менеджера; лидерство и стиль управления; власть и партнерство; групповая динамика и конфликты в менеджменте; 6) тенденции менеджмента: готовность к будущему; управле-
ние качеством и качество управления; инновационный потенциал менеджмента; профессионализация управления. Не трудно заметить, что в 3-ом разделе Э. М. Коротков почему-то делает попытку “вкинуть” несколько специальных функций управления в систему общих функций управления.

Стоит вспомнить одну из первых переводных книг американского менеджмента „Курс для высшего управленческого персонала” [12]. Наведем лишь названия разделов: подготовка руководителей и улучшение административных служб; руководитель и производство; организация сбыта; управление финансами; юридические вопросы бизнеса; советы руководителю. Т.е., проявляется чисто прагматичный подход к управлению.

При выполнении одного из консультативных проектов в Германии нам удалось познакомиться с работой А. Й. Шваба „Менеджмент для инженера” [13]. Поскольку „Основы менеджмента” мы читаем в техническом университете, то структура работы немецкого коллеги должна, на наш взгляд, вызвать интерес у читателя. В нашем переводе содержание книги А. Й. Шваба можно представить следующим образом: инженер как менеджер; смысл и цель предпринимательства; как функционирует предприятие (окружение, структура организации, логистика, внешне организации, организационно-правовые формы); налоги; финансовые знания для инженера (себестоимость, бухучет, баланс, прибыль, финансовый анализ, цена, фискальные, инвестиции, расчеты, банки); элементарные управленческие функции (планирование, управление, контроль и контропланирование); специальные управленческие функции (целевой менеджмент, инвестиционный менеджмент, менеджмент персонала, менеджмент изменениями, этический менеджмент); оптимизация процесса предпринимательства (анализ, бенчмаркинг); техника менеджмента (методы анализа, прогнозы и сценарии, обсуждение, собеседования с руководителями, презентации); основы существования; документирование. Для заинтересованного читателя есть информация относительно того, что следует рассматривать при изучении „Основ менеджмента”.

Структура работы Б. М. Андрюшкива, О. Е. Кузьмина „Основы менеджмента” [11] выглядит следующим образом: содержание, история и роль менеджмента; организации; функции менеджмента; планирование как функция менеджмента; организация взаимодействия как функция менеджмента; мотивация как функция менеджмента; контроль как функция менеджмента; методы менеджмента; коммуникации в менеджменте; принятие решений в менеджменте; методы принятия рациональных решений в менеджменте; управление коллективами (группами) работников; управление конфликтами, изменениями и стрессами; социальная ответственность и социальная этика в менеджменте; руководство в организации; организация управленческого труда. Какая идеология этой работы? В качестве основы авторского подхода выступают общие функции управления. Конкретные функции управления почему-то не стали предметом рассмотрения.

Есть также категория авторов, которая придерживается принципа повторя, „пропуская” четыре или пять известных общих функций управления, опять через те же функции, то есть „планирование планирования”, „планирование организации” и т. п. От комментариев воздержимся.

6. Об эффективности управления

Эффективность управления определяется с помощью сравнения результатов управления и ресурсов, потраченных на их достижение. Если объем потраченных на управление ресурсов посчитать можно, то оценить результаты самого управления несколько сложнее. Да, можно посчитать объем реализованной продукции, прибыльность, рентабельность. А каков удельный вес в конечном результате управлений? Определить можно только с известной степенью точности. Опосредованно можно оценить уровень управления с помощью таких показателей: производительность труда, ритмичность производства, уровень качества продукции, своевременность снабжения, степень достижения поставленных целей. А морально- психологический климат, текучесть кадров? В оценке эффективности управления организацией следует учитывать не только экономическую сторону управленческих процессов, но и организационную, научно-техническую, социальную, экологическую составляющую. Эффективность также следует рассматривать с позиций стратегических, то есть, каким образом принимаемые управленческие решения отражаются на результатах деятельности предприятия через десять, двадцать или, возможно, и пятьдесят лет (вспомним К. Масуциту).
Выводы
1. Для обеспечения рационального распределения и кооперации труда в сфере управления, повышения на этой основе его эффективности, должен реализоваться функциональный подход в управлении предприятием. Сущность такого подхода заключается в выделении совокупности конкретных (специальных) функций управления как в определенной степени обособленных видов управленческого труда и формировании для их осуществления специализированных функциональных подсистем управления (структурных подразделений).
2. Единство системы управления предприятием обеспечивается на основе взаимодействия всех структурных подразделений при выполнении ими специальных функций, обеспечивая при этом сочетания целевого, линейного и функционального управления на всех уровнях структуры управления (по вертикали, горизонтали, диагонали).
3. Эффективность управления, эффективность деятельности каждого работника предприятия должна оцениваться вкладом каждого в 1 гривню (доллар, евро, лев) реализованной продукции или на внутреннем, или/и на внешнем рынке.

Литература