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CONTENTS

Wprowadzenie

Obecnie główne tendencje w rozwoju międzynarodowych stosunków ekonomicznych to procesy międzynarodowej integracji gospodarczej, globalizacji i internacjonalizacji gospodarki światowej.

Istota badań integracji ekonomicznej przedstawionych w PNAP wpisuje się w proces globalizacji tworząc jego rdzeń, a właśnie globalizacja jest wyższym stopniem internacjonalizacji, jej dalszym rozwojem w momencie, gdy długo kumulowane zmiany ilościowe doprowadziły do skoku jakościowego.

Autorzy dokonali analizy głównych problemów i aspektów funkcjonowania gospodarki krajów Unii Europejskiej i Ukrainy, które przez lata swojej ewolucji przeszedły poważną transformację zorientowaną na ciągły wzrost.

W tę problematykę wpisuje się PNAP - Periodyk Naukowy Akademii Polonijnej, skupiający ludzi nauki z różnych kontynentów, gdzie artykuły naukowe podejmują problematykę o charakterze historyczno-kulturowym, polityczno-prawnym, ekonomiczno-społecznym, edukacyjno-zdrowotną. W PNAP występuje także dział recenzji i omówieni oraz sprawozdań.

Zapraszam do współpracy przedstawicieli ośrodków naukowych, których brak w Radzie Naukowej, praktyków, nauczycieli naukowo-dydaktycznych, doktorantów, studentów, których publikacje w PNAP, dzięki punktacji Czasopism Naukowych MNiSW oraz posiadaniu prefiksu DOI, będą czytane i staną się przedmiotem dyskusji, debat i poznania innowacji naukowych poszukiwań.

Dziękuję autorom, którzy podjęli i podejmą współpracę, zamieszczania swoich publikacji oraz szczególny rodzaj podziękowania kieruję do członków Rady Naukowej, którzy życzliwie przyjęli zaproszenie do współpracy do współtworzenia PNAP.

Serhii Hushko

Introduction

Nowadays the main trends in the development of international economic relations are the processes of international economic integration, globalization and the transnationalization of the world economy.

The relevance of the economic integration research presented in PNAP fits into the process of globalization, forming its core, and globalization itself represents a higher stage of internationalization, its further development, when long accumulating quantitative changes lead to a qualitative leap.

The authors have analyzed the main problems and aspects of the economy functioning in the countries of the European Union and Ukraine, which during the years of their evolution have undergone serious transformation oriented to permanent growth.

PNAP - the Scientific Journal of Polonia University fits in these issues bringing together scientists from different continents, whose scientific articles address the issues from the following fields: history and culture, politics and law, economics and social science, education and health. PNAP also includes the review and discussion sections as well as a report section.

I invite You to cooperate with the representatives of research centers, whom the Scientific Council lacks in, practitioners, teachers, academics, Ph.D. candidates, students, whose publications in PNAP, thanks to the scoring system of the Ministry of Science and Higher Education and having the prefix DOI, will be read and will become the subject of discussions, debates and exploration of scientific innovations.

I thank the authors who have already established cooperation and those who will do so in terms of submission of their publications. I would also like to express particular gratitude to the members of the Scientific Council, who kindly accepted the invitation to work together and to contribute to the creation of PNAP.

Serhii Hushko

MODERN METHODOLOGICAL TOOLS FOR RATIONAL USE OF FUELS AND LUBRICANTS

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Abstract. The article presents a modern interpretation of Chemmotology science, its role in development of technology and society. It shows that development and promotion of alternative fuels and Chemmotology problems solving are impossible without systematic approach. In addition, having both theoretical part and practical application, Chemmotology ensures energy and environmental security of the country's economy, rational use of traditional and alternative fuels and lubricants in operation of advanced modern equipment. The article focuses on the fact that in recent years one of the most important issues has been the ecological constituent of Chemmotology, which is aimed at ultra-minimization of negative impact of fuel lubricants and technical liquids on ecosystems.

Keywords: chemmotology, fuels & lubricants, technics, quality, exploitation, system approach

Introduction

Today the humanity has reached the level, when it possesses huge scientific and technical potential. However, they still don't manage to use this potential economically and rationally. Rational use of fuel and lubricants, energy efficiency and environmental safety are among the most important problems of our time. Their solution largely determines the sustainable development of the world economy and the preservation of human comfortable living conditions.

The article is aimed at considering purposes and goals of Chemmotology science as an effective tool for managing and rational use of fuels and lubricant in conditions of environmental awareness and minimization of negative anthropogenic impact on environment.

Processes of fuel use still face problem of highly effective fuel burning with production of maximum useful energy. Argument for this is the modern state of energy efficiency, and fuel efficiency in particular, efficiency factor of internal combustion engines (Bratkov, 1985). Fuel consumption by car engine is determined by its energy efficiency, in other words, quantity of heat produced during combustion of 1 kg of fuel. It was calculated, that today only 12% of energy produced during fuel combustion is used for car movement (Gureev et al., 1987). Today about 10 ton of fossil fuels per capita is extracted for a year. And only 1% (100 kg) is efficient (Boichenko, 2009). All the rest pollutes our atmosphere, soils and water bodies. Efficiency of fuel use can be shown as energy balance of a car (table 1).

Table 1

Energy balance of a car (Boichenko, 2009)

Energy of combusted fuel (100%)	
12%	88%
2,4% – rolling resistance 3,2% – air resistance 6,4% – inertial forces	42% – cooling system 22% – exhaust gases 13% – friction in engine 9% – friction in transmission 2% – engine accessory drive

Today efficiency factor of modern gasoline engines is about 35 – 36%, diesel engines is 42–44%, gas engines is 38–45% (table 2).

Table 2

Efficiency factor of some engines (Boichenko, 2009)

Wat heat engine	~ 2,8%
Internal combustion engine	~ 20–40%
Steam turbine	~ 35–46%
Diesel engine	~ 44%
Jet engine	~ 47%

Total efficiency factor of engine is divided into main constituents (Boichenko, 2014):
- *fuel efficiency* shows what quantity of fuel that was efficiently burned in engine and turned into the volume of power gas of high temperature and pressure, and what part of fuel was not burned and was emitted as unburned hydrocarbons, carbonized particles (soot, smoke, fly ash, etc). Nowadays only 75% of fuel is completely burned and transformed into heat in existing engines. Two-stroke engines provide even less amount of completely burned fuel;
- *thermal efficiency factor* shows what amount of heat, produced after fuel burning is transformed into useful work and what amount is uselessly wasted in environment. Let us consider that piston engine has 30% efficiency factor on average. Then 70% of produced heat is emitted uselessly into environment through cooling system together with exhaust gases;
- *mechanical efficiency factor* shows what quantity of mechanical work is transformed into torque force at the main axle and transmitted to the consumer and what amount is uselessly wasted for friction or used for other driving supplementary mechanisms of the engine (fig. 1).
The above arguments suggest that mankind has a significant amount of energy from the point of view of the opportunities and the necessity to improve the technical means, when the source of energy is products of oil refining.
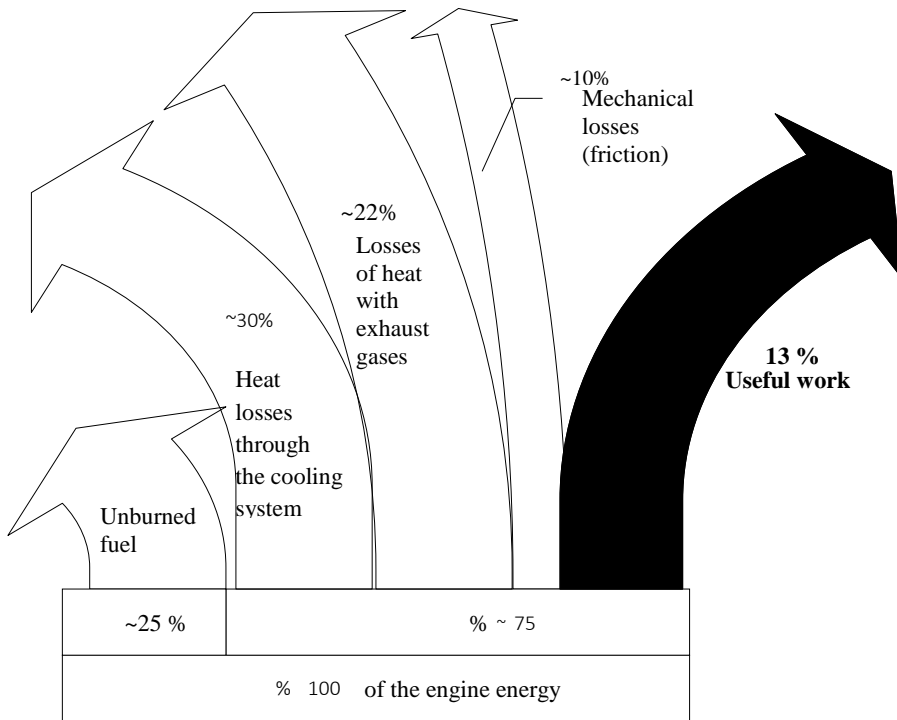
Fig. 1. Energy balance of internal combustion engine (Evdokimov et al., 2005)

The current state of natural resources and the environment causes change of future prospects of economic development and technological progress and evaluates them, considering environmental priorities, environmental risks and state of environmental safety. Rapid industrialization and urbanization together with quick development of transport infrastructure and strengthening of other impacts on environment have disturbed the life cycle of substances, natural metabolic energy processes and regeneration mechanisms in the biosphere *(Bolshakov, 1987)*. As a result progressive destruction has begun. Air, water and soil are polluted, landscape and biological diversity are depleted; these facts cause negative effect on living organisms and humans.

In order to eliminate this danger, existing environmental management practices should be revised, Production, economic activities and environmental systems should be radically restructured, taking into account social and economic needs of society and the biosphere opportunities *(Yanovskyi et al., 2005)*.

According to the forecasts of the World Energy Council, energy consumption will raise by 55% by 2020. According to the data of Organization of the Petroleum Exporting Countries, oil takes more than one third in world balance (table 3).

Despite the fact that in future share of crude oil in total primary energy consumption will be reduced in absolute terms, oil consumption (as well as other energy sources) will only increase. Being an exhaustible and non-renewable natural resource, crude oil requires its rational use. Even Mendeleev paid attention to the rational use of raw materials: "Oil is not a fuel, you can heat by assignats."

Table 3

World energy balance (OPEC forecast, data of World Oil Outlook, 2010)

Name of energy source	Volume, mln m BOE per day			Part, %		
	2010	2020	2030	2010	2020	2030
Oil	80,4	89,9	97,6	35,0	32,7	30,2
Coal	66,2	80,1	92,1	28,8	29,2	28,5
Gas	52,1	64,5	79,1	22,7	23,5	24,5
Nuclear energy	14,7	16,9	20,7	6,4	6,2	6,4
Hydroenergy	5,8	7,3	9,0	2,5	2,7	2,8
Biofuel	9,2	12,9	17,5	4,0	4,7	5,4
Other renewable energy sources	1,5	3,2	6,8	0,7	1,2	2,1
Total:	229,9	274,8	322,9	100,0	100,0	100,0

* Per unit of fuel (coal equivalent) accepted the calorific value of 1 kg of coal = 29.3 MJ or 7000 kcal. The International Energy Agency (IEA) has adopted a unit of oil equivalent, usually abbreviated as TOE (born ton of oil equivalent). One ton of oil equivalent is equal to 41.868 GJ or 11.63MW•h It is also used barrel of oil equivalent (BOE). Ratio: 1 toe = 7,11, 7,33 or 7,4 boe

Growth in use of natural resources, their depletion and degradation necessitated development and implementation of strategies and tactics for sustainable environmental management and continuous monitoring of changes in natural and anthropogenic processes for the integrated management of natural resources and environment (Evdokimov, 2011).

There is no alternative to environmental management, which is based on considering laws of nature and forming of safe conditions of human life and living organisms. Therefore, humanity has already generated and implemented strategy and tactics of natural resources use, ensuring systematic (integrated) management of natural resources and their rational use, protection from pollution and depletion. Besides, constant monitoring of natural and anthropogenic processes changes in environmental systems is applied.

Science that became responsible for ensuring integrity in dealing with a variety of tasks connected to these problems, is Chemmotology (Aksenov, 2008). Encyclopedic concept of science defines it as a sphere of human activity, the function of which is the development and theoretical systematization of objective knowledge of reality (Piskunov, 1983). The direct goals of the science are description, explanation and prediction of the processes and phenomena of reality, which are the subject of its study on the basis of public law, i.e. the theoretical reflection of reality. Chemmotology possesses all these features (Danilov, 2003).

Chemmotology, being an independent science today, can systematically solve complex environmental and energy problems, for example, in the transport sector. Currently there is a new stage in the development of this science and its role in the overall system of knowledge.

Chemmotology gave comprehensive solutions of such important practical tasks as design and production of machinery, equipment maintenance, development and use of fuels, oils, lubricants and fluids. Chemmotology unites and embodies the efforts of developers and manufacturers of machinery, oil products, oil refineries and operators of technique.

The origin of Chemmotology dates back to 1964. The separation of Chemmotology into the independent applied science united scientists and practitioners of engineering, oil and chemical industries along with the companies which operate the technologies for Chemmotological problems solving.

For the modern science it is the transition from subjective to problematic orientation that becomes more typical. The new areas of knowledge arise because of advancement of some major theoretical and practical problems. This is the reason for the edge sciences to appear and Chemmotology, in particular, being a problem science, is at the edge of Chemistry, Physics, Engineering, Economics and others. It is even possible to use such word combination as "technical Philosophy," since it describes the essence of this science.

The modern definition of Chemmotology is interpreted as following: It is the science about the technological processes, properties, quality and methodology for the rational use of fuels, oils, lubricants and technical liquids in the operation of machinery (Bratkov, 1985). It is necessary to consider both conventional and alternative fuels and lubricants.

Knowledge of technology not involves only knowledge of design, kinematic, dynamic, temperature characteristics; physical and chemical properties of construction materials are also necessary for the analysis and prediction of physico-chemical processes during the application of specific fuels and lubricants (Boichenko, 2009; Gureev et al.,1987).

For example, the aircraft is a huge amount of metallic and composite parts, which are flying at a speed of 900 km/h (0.85 from the speed of sound, it is a typical speed of the Boeing 787 Dreamliner) at an altitude of 10 km. A couple of million parts are manufactured and assembled into one product and aircraft flies, providing comfort for passengers and profit for owners (Fig. 2).

Providing reliable and economical joint flight of these details, linking the most different requirements (load capacity, fuel consumption, flight range, noise during takeoff and landing, the requirements for the length of the takeoff and landing, the need for easy maintenance on the ground, the lack of icing, the safety of people on board and so on) is possible only with the help of system engineering approach, taking into account the requirements of a variety of specialists, representing a variety of professional and community groups (Bratkov, 2004).
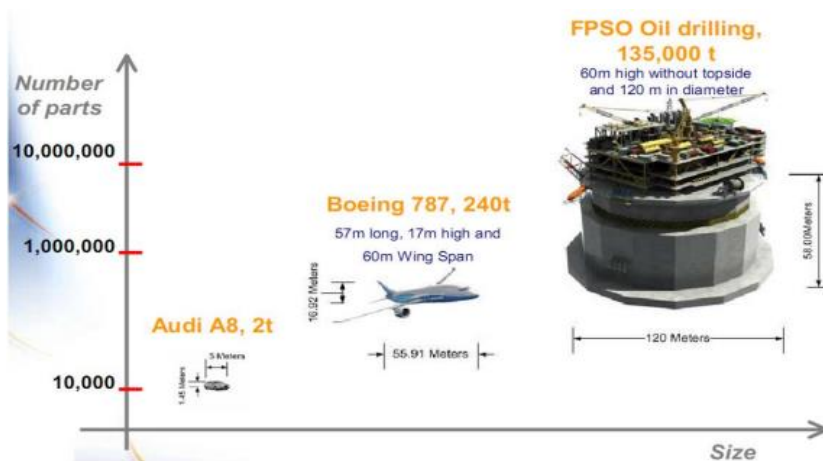
Fig. 2. Number of details and weight of some engineering constructions

Generalized utility function of fuels and lubricants as socially useful products (as opposed to a generalized function of vehicles) cannot be described by appropriate design of documentation and drawings (Sereda, 2004; Lahshi, 2004). This fundamental difference between the fuels and lubricants, on the one side, and mechanical engineering products, on the other side, objectively led to the emergence of Chemmotology (Boichenko, 2009; Fuks et al. 2004; Volgin et al., 2009).

The analysis of publications for the recent years gives a possibility to distinguish three main directions of development of theoretical fundamentals of Chemmotology:

– study of local mechanisms performance of components and various functionality additives in fuels and lubricants;

– search for more general patterns in Chemmotology based on the use of fundamental laws of Physics, Chemistry and other sciences;

– study of Chemmotological processes for prognostication of fuels and lubricants performance in technological equipment at various conditions.

The main goals of Chemmotology are the following ones:

– optimization of requirements for quality and composition of fuels, lubricants and technical fluids, their service performance taking into account the primary energy sources reserves, achievements of scientific and technological advance in the development of technology, peculiarities of technological equipment and the conditions of its performance, ecological and economic requirements;

– development of recommendations as for unification, interchangeability and determination of conditions of rational and economic use of fuels, lubricants and special fluids;

– improving of oil product supply systems and quality management during production, storage, transportation and application of fuels, lubricants and special fluids;

– modernization of compliance assessment system (certification, testing, permission to production and application), modernization of methods of qualifying tests for fuels, lubricants and special fluids;

– unification of local standards for testing methods of fuels, lubricants and special fluids with international ones;

– development of new highly efficient kinds of fuels, lubricants and special fluids that ensure the improvement in technical and ecological performance of technological equipment;

– disposal and recycling of the off-grade and worked-off fuels, lubricants and special fluids;

– building grounds for conducting logistic measures for preserving the quality and decreasing the losses of fuels, lubricants and special fluids during their storage, pumping and transportation;

– developing methods for service performance and quality control assessment of fuels and lubricants, along with disposal of worked-off, unmarketable and off-grade fuels and lubricating materials;

– improvement of the existing and development of the new technologies for fuels, lubricants and special fluids production.

As we know from the classical scientific works on Chemmotology (Piskunov, 1983; Aksenov et al., 2009), there is a universal four-tier Chemmotology system in any kind of machinery and equipment, which uses fuel, lubricants and technical liquids (Fig. 3). This system takes into account the relationship between the quality of the fuels and lubricants, the

reliability of equipment and the conditions of its operation (Grishin et al., 2004; Aksenov et al., 2013). It can also be seen in Fig. 4 that shows an improved Chemmotology system.
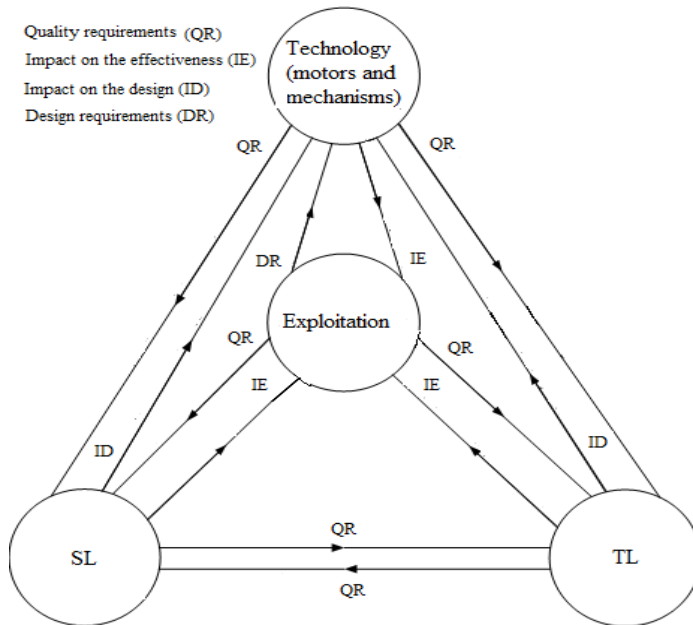
Fig. 3. Improved four-tier Chemmotology system (Aksenov et al., 2013).

Initially Chemmotology science is characterized by systematicity. Chemmotology, as well as system technology and system engineering, has such methodological tools in science and technology, which cover design, development, testing and operation of complex systems. To a certain extent, it is an applied embodiment of system theory in which the term "system" is used in a special way, referring to the way of thinking to explain coherent links between elements of the system, synergy and emergence.

Here, the "system" not only means the essence, but is also related to the nature of the object, emphasizing the class properties, which distinguish it from diversity of definitions and a huge number of possible ways of the system decomposition and release of subsystems (Boichenko, 2009; Shkolnikov, 2007).

These ideas can be illustrated by Fig.3. It shows the integrated interdisciplinarity of Chemmotology, science system itself, it hierarchy, Chemmotology coherent connections, structure, nature, synergy and emergence Boichenko, 2009; Aksenov et al., 2013). It is clearly shown how the interaction of elements and coherent processes on the example of an aircraft engine results in synergistic and emergent effects: ecological compatibility, efficiency, reliability and durability of the equipment.

Economical meaning of Chemmotology is achievement of maximal economy of raw materials, fuels, lubricants and special fluids through optimization of balance and quality of products, their rational and efficient usage.
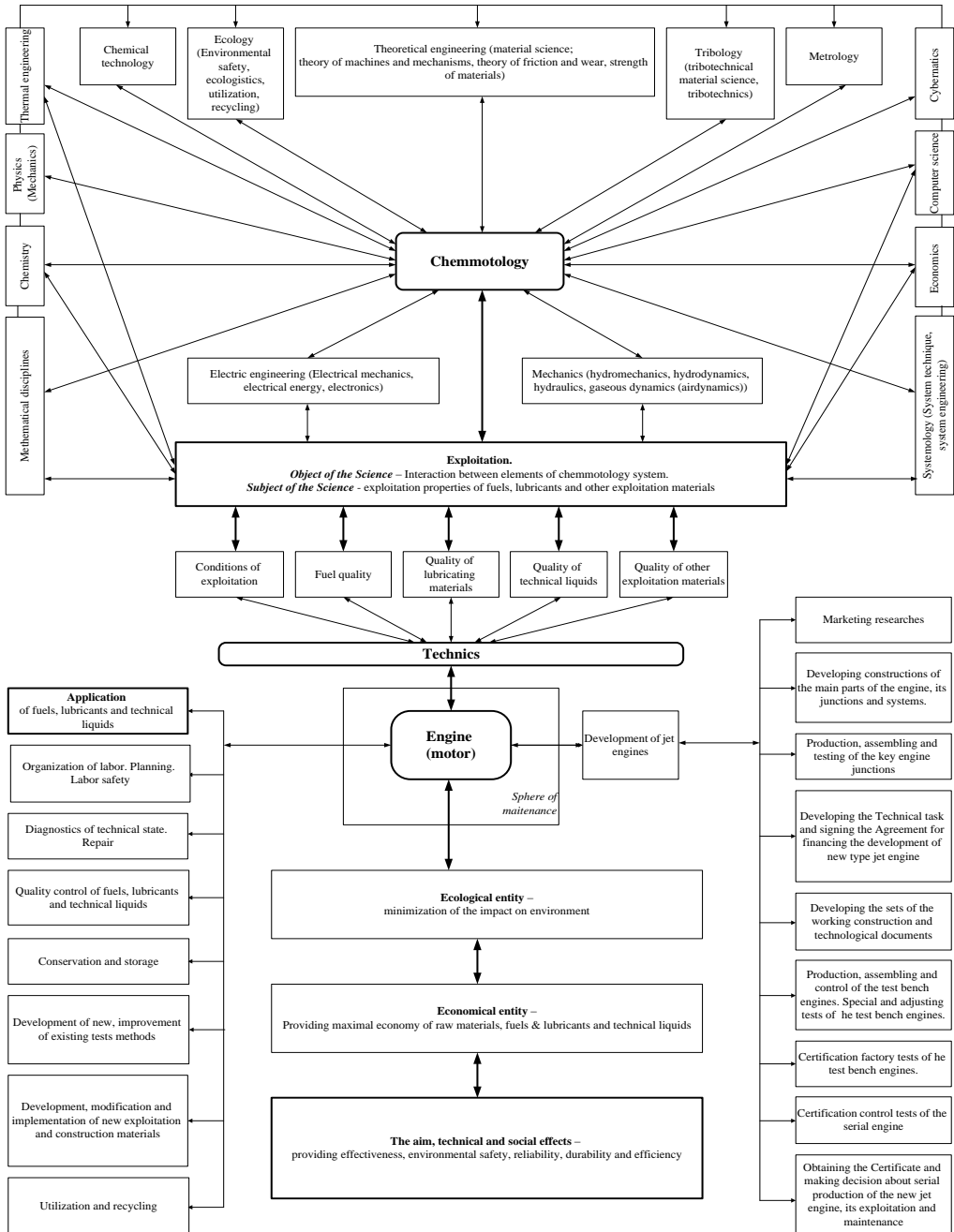
Fig. 4. The phenomenological scheme (model) of Chemmotology (Boichenko, 2003)

Theoretical fundamentals of Chemmotology consist of development of general theory and establishing laws that connect the quality of fuels, lubricants and special fluids together with reliability, durability, ecological compatibility, economy and efficiency of technical equipment; substantiation of optimal requirements for the quality; selection (development) of the new grades; unification of types and grades; ensuring the quality preservation; study of physical, chemical, and ecological properties during the storage, transportation and distribution; decreasing specific consumption and normed losses; decreasing the overall volume of quality control; development of quality regeneration methods; solving the problems of interchangeability of fuels, lubricants and special fluid grades produced in different countries; developing methods, equipment and service performance testing systems and quality parameters tests; protection of the environment from the influence of Chemmotological system.

Chemmotology creates the necessary "basement" for ensuring optimal conditions of oil products rational use and modern requirements to their quality.

Social and economical impact of Chemmotology comes in the shaping of highly-educated specialist which, first of all, could meet modern level of highly-technological production and service. The role of this kind of specialists is constantly increasing in many countries since deep knowledge and superior technologies are becoming new strategic resources nowadays.

Currently, considering problems of Chemmotology to be beyond a systematic approach to knowledge is not possible. It is higher qualitatively than just a substantive way of knowing. (Synergies is summarizing effect of the interaction of two or more factors, characterized by the fact that their effect is much greater than the effect of each individual component in the form of a simple sum). In its turn, emergence is a quality, property of the system, which is not inherent in its elements separately, but instead rises by combining these elements into a single, integral system.

From a philosophical point of view, we can easily state that Chemmotology science makes the consolidating function of integration of communication scholars and practitioners of engineering, chemical, oil-refining and petrochemical sectors of the economy, together with technique operators to solve evolution problems of scientific and technological progress. For example, refiners produce gasoline, diesel and other fuels for further use in engines (Boichenko, 2003). Knowing fuels, lubricants and technical liquids means to have a clear understanding of the relationship of indicators characterizing quality of a physico-chemical and energy processes that occur during their use in specific conditions, and the relationship with their chemical and group composition.

The lack of such an analysis and forecasts makes it impossible to achieve the objective technical and social effects. There is another clear evidence of synergy effects in the operation of Chemmotology system (Seregin, 2009). Quality control of fuels, lubricants and technical liquids plays a special role in Chimmotology on the way from their producer to consumer (Sereda, 2008). As we can see from Fig. 3 quality of materials exploitation is included into the parameter of the system itself. Practice has proved that the use of fuels, lubricants and technical liquids with the overestimated indicators of quality (quality level) leads to excess of costs in their production and cost escalation in mechanical engineering and operation of equipment.

Considering any scientific problem is known to be impossible without a coherent ideological system. Worldview, which selects a particular civilization, defines the whole character of the activities of society and its impact on the environment. On this basis, the

environmental essence of Chemmotology lies in ultra- minimizing the negative impact of fuels, lubricants and technical liquids on ecosystems (Boichenko et al., 2013; Seregin, 2009).

The importance of tasks solved by the Chemmotology is shown by its role as an applied science, namely, ensuring energy and environmental safety of the country's economy, rational use of traditional and alternative fuels, lubricants and technical liquids in the operation of advanced modern equipment.

Deterioration of fuels, lubricants and technical liquids quality is also typical for operation of technique as result of evaporation, oxidation products accumulation, precipitation and leaching of some additives, mixing fuels, lubricants and technical liquids of different brands, to name just a few. (Fig. 4). The processes of regeneration, restoring quality, utilization and recycling are of utmost importance.

Classic of systematic approach indicates that the solution of any problem is characterized by the following elements:

1) someone (or some group) should be put into the front of the problem, i.e. requires the existence of decision-makers;

2) the purpose, desire of decision-maker is aimed at solving a problem situation that is its purpose and the basis for formulation of the problem and achieving goal;

3) decision-makers should have a choice among alternative actions that lead to achieving goal.

These arguments allow us to assert that Chemmotology system "engine-fuel-lubricants-technical liquid" is a management task, in which prescriptive and descriptive methods are applied. Here we can trace Chemmotology coherence with cybernetics (which depicts connections in the upper part of Fig 4). At each stage of engine creation (the right side of Fig. 4), operation and application of SCL also demonstrates the need for decision-making (the left side of Fig.), which is eventually embodied in the synergetic result: to ensure efficient, ecological, reliable and economical operation of equipment.

Conclusions and suggestions

Consequently, the fundamentality of Chemmotology science is the manifestation of the system of methodological characteristics for solving modern engineering problems, improving technology and development of energy sources for motor vehicles simultaneously. Applying Chemmotology it is possible to achieve significant results of scientific and technical progress in technique. The concept of Chemmotology is the systematic integration of engineering knowledge into chemical, oil-refining and petrochemical spheres of scientific and practical activities to achieve synergistic results in ensuring reliability, safety, durability and efficiency of equipment.

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VALUE CREATION OF PORTFOLIO COMPANIES BY VENTURE CAPITAL FUNDS ON THE POLISH MARKET

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Abstract. Data on VC and PE efficiency shows that the overall efficiency of VC-backed firms is higher than that of non-VC-backed firms at every point in time. This efficiency advantage of VC-backed firms arises from both screening and monitoring. The efficiency of VC-backed firms prior to receiving financing is higher than that of non-VC-backed firms, and further, the growth in efficiency subsequent to VC financing is greater for such firms. The above increases in efficiency of VC-backed firms are spread over the first two rounds of VC financing after which the TFP of such firms remains constant until exit. Overall efficiency gains generated by VC backing arise primarily from improvements in sales, the efficiency gains of high-reputation VC-backed firms arise also from lower increases in production costs. Finally, we show that VC backing and the associated efficiency gains positively affect the probability of a successful exit.

Keywords: venture capital, private equity, performance, multiplies.

Introduction

Venture capital can be defined as finance that is provided on a medium to long term basis in exchange for an equity stake. The investor will share in the upside, obtaining their return in the form of a capital gain on the value of the shares at a divestment transaction which normally involves either a stock market listing, the acquisition of the company by another investor or the sale of the shares to another venture capitalist, but will generate the lostwhen their investment or business fails. Venture capital investors therefore restrict their investments to businesses which have the potential to achieve very rapid growth and in a short time period to obtain a significant size and market position. This it is the only solution in these circumstances that they will be able to achieve both a liquidity event and a capital gain from their investment. However, a little number of new businesses is capable of meeting these very demanding investment criteria. Although the number of companies that are successful in raising venture capital is small they have a disproportionate impact on economic development in terms of innovation, job creation, R&D expenditures, export sales and the payment of taxes. The injection of money and support enables venture capital-backed companies to grow much more faster than the proceeds from sales revenue alone would allow. Moreover, this superior growth rate is sustained over the long-run. Venture capital-backed companies are faster in developing their products portfolio and bringing them to broad market, pursue more radical and ambitious product or process innovation and produce more valuable patents. It is because funds play such an important role economic development that venture capital attracts the attention of both scholars and policy-makers.At its core venture capital and private equity industry have emerged as a tool to reduce agency costs. However, for this industry to

function, certain conditions must be present. First of all there must be companies that present room for improvement: this could be incompetent management or lack of focus on value creation. So there must be agency costs to reduce. Second there must be well developed capital market with active stock exchange so improved companies can be sold on again and the increase in value can be captured by the venture capital firm. Agency costs present the opportunity for private equity and venture capital firms to realize gains – for as long as managers are underperforming in maximizing the value of the companies they are managing.

1. Private equity and venture capital characteristics

Venture capital firms are professional investment organisations who raise finance from financial institutions (e.g. banks, insurance companies, pension funds) and other investors (e.g. wealthy families, endowment funds, universities, companies), attracted by the potential for superior returns. These funds are established with a fixed life (10-15 years) and will normally have a specific investment focusin terms of stage of business, industry and location. The investors in the fund lack the resources and expertise to invest directly in companies, and are only allocating a small proportion of their investments to this asset class (typically a maximum of 1-2%) and so find it more convenient to invest in funds managed by venture capital firms who have specialist abilities which enables them to deal more efficiently with asymmetric information than other types of investor:

- The potential for adverse selection is reduced by their information gathering skills, specialist knowledge of particular industries and expertise in selection enables them to identify and select projects with the potential for high returns;

- Moral hazard problems are minimised by their skills in structuring the transaction and monitoring the investment;

- Their skills in providing value-adding services to their investee businesses and securing an exit for the investment maximises returns.

PE is a form of equity investment into companies that are not quoted on a stock exchange. Under this limited partnership model the venture capitalists have discretion over the management of the fund which is normally established with a 10 year life. PE market consists of several specialized segments, such as: buy-out capital, venture capital, mezzanine capital, specialized real estate funds, secondary market and distressed funds. Private equity is characterized by its passive investment model, in which it seeks to deliver operational improvements in companies that it is engaged in. Private equity funds invest in companies that arein late stagesof development and represent relatively large businesses. Investment period is medium term and generally oscillates around three to five years. Investing in large and established businesses is associated with lower risk in comparison with investing into small companies. Many of the PE investments are buy-out deals including leveraged buy-outs and management buy-outs. Management buyoutsare often associatedwith maturecompanieswith high potentialto generate positivecash flow.In many cases these areprivatecompanieswhose ownersdo not want tocontinue the business, large companies that spin-off part of their business or public companies that are delisted after the transaction.

Venture capital investmentscan be defined asequityinvestmentsinunlistedcompanies that are inthe earlieststages of development that operate in innovative industries that offer a high growth potential which translates into high expected rate of return. The stage of the investment is usually called seed or start-up phase. On the other side high expected rate of

return means high investment risk. This explains why venture capital funds are also named risk capital funds. What is more, in many cases venture capital funds back entrepreneurs who have just the germ of a business idea (the European Private Equity and Venture Capital Association definition). Investment horizon of the venture capital investments is between 3 and 7 years. What is important both types of funds not only support companies in the form of capital but also offer advisory services to the companies that they co-own. Moreover, funds help companies to promote their products on a market.

2. Value creation and performance of venture capital portfolio companies

A huge number of studies shows that venture capital investors can contribute significantly to the successful value creation and development of the companies in which they invest. There are three main phases of the investments: early, expansion, divestment stage. European Venture Capital Associationshows that the needs of entrepreneurs, their aims and their management style changes with the current stage in the life cycle of the company. It seems obvious that companies in the early stage have different needs than companies in their divestment stage. It is also seems obvious that a company which operates in different branches requires – due to product life cycle, R&D intensity and special market conditions – different value added than an internet company. There is a focus on operative management support and development of market entry strategies especially in the early stages. In expansion stages the focus is on general strategy, especially concerning internationalization of the business activities and follow up financial rounds. Hellman and Puri come to the conclusion that value added from venture capital companies is highest for ventures in early stages (Hellman et. al., 2000). They point the importance of early professionalization of internal process due to pressure from venture capital managers to implement certain reporting standards. Some studies found that value added depends on the kind of networks and industry sector expertise of the investor. They come to the conclusion that the source of venture capital is as important as the extent of financing. The right match can yield a synergistic relationship that will propel the firm to higher level of excellence.

The relationship between entrepreneur and investor is a fruitful area for value added research. Most important might be acceptance of the investment manager through the management of the venture. Cable and Shane conclude that a cooperative relationship between entrepreneur and investor is even more important for the positive development of a company than a provision of money itself. This relation is characterized by as a socially complex inter-organizational relationship. They argue that the relationship between two parties increases in its social complexity and therefore becomes more and more difficult to imitate (Cable at. al., 1997). This in turn lead to an improvement in the company's performance. VC investors support their portfolio companies with a variety of value added measures. There is a long list of activities that venture capital need to take to add value to the venture. First of al it could be the participation in the definition of business strategy as well as the assistance in establishing an organizational structure. Assistance in establishing internal processes in the company might be helpful in the whole process of monitoring business activities. Very important factor for development could be advice with the respect to internationalization and expansion of the venture. New venture might also need the participation in the development of product and services as well as participation and advice with marketing and sales strategy. For fast developing company assistance in budgeting and business planning and monitoring financial development is also crucial. Venture capital funds

managers have their networks and it helps in assistance in acquiring additional equity, in acquiring additional debt and in obtaining subsidies. Managing growing company also means very high quality human resources. VC funds could support portfolio companies in hiring general stuff, management, technical stuff and provide an assistance in negotiating employment contracts. It could develop good quality motivation system. Other factors that influence right management of the company are: acquisition of customers and assistance in sales, acquisition of main accounts and sales partners, advice in choosing suppliers and equipment, assistance in solving of crisis and problem of daily basis as well as contact to portfolio companies of the investor and to technology leader and R&D partners.

Some of the researchers have tried to categorize these value adding activities and roles of venture capital investor. All of these categorizations have disadvantage that they do not clearly differentiate one category from another one. Thus Gompers and Lerner differentiate between strategic value added, social or supportive value added, and networking value added. Introduced two additional categories: strategy, finance, organization and operations, network and cooperation, and personnel (Gompers at. al., 2001).

Value added provided by corporate venture capital companies is regarded as primarily product related, whereas the value added by independent venture capital companies is seen as oriented towards the venture and its development. In early stage ventures the weight attached to operational value added is higher than in the stage of expansion. The importance of hands on management with accordance to is a synonymous for operational value added and it vanishes with the ongoing development of the venture. It is rational behaviour for entrepreneurs to ask for and accept help at an early stage of the company development since it is in this crucial stage that the foundation of success or failure of a venture is set. It therefore seems to be certain that the requirements with the respect to value added change during the life cycle of the venture. In expansion stage the role of operational value added diminishes. European Venture Capital Association studies found that investors care less (in terms of time per venture) for portfolio companies in their expansion stage than for those in their early stage.

Value of a company depends also on the dynamics of a sector that venture is operating. These variable dynamics can cover both technological aspects of the product and its market development. Highly dynamic industrial sectors usually generate more need for value added than those with lower dynamics. Value added in this respect would be an access to the investor's networks. This is regarded by the entrepreneurs as especially important since the market decides faster and faster whether a technical innovation becomes a success or failure. In this case of a technological less dynamics sector the speed of investment commitment from the investor seems to be of a greater interest than any value added. The reason for this is that low-tech business models are easy to imitate, making it crucial for the success of the venture to enter the market as soon as possible and to be step ahead competition. One of the most important determinants of value added is expertise of entrepreneurs in the sector concerned. Experienced entrepreneurs tend to refuse value added since this is often regarded as interference and exceed the ordinary monitoring and controlling of stakes by the investor. In such cases only selective value adding activities are welcomed, depending on the dynamics of the sector.

3. Evidence of value creation by venture capital and private equity funds on the Polish market

Private equity and venture capital on emerging markets is still in the phase of growing and expanding. Those markets experience strong economic growth, good business outlook which is providing a strong foundation for an active and developing PE and VC industry. The economies of many emerging market countries have already gone through their initial 'teething' problems and are being helped in the transformation process by PE funds. Important role of PE funds and its managers was to provide capital and know-how to entrepreneurial firms. PE's penetration of emerging markets (expressed as a ratio of the value of private equity investment to gross domestic product, or GDP) has been steadily improving over the years when compared to developed nations (emerging markets: India – 0.32%, China – 0.13%, Brazil – 0.07%, Russia – 0.02%, Poland – 0.01%; developed markets: the United States – 0.30%, United Kingdom – 0.32%). Secondly, fundraising in emerging markets now accounts for about 9% of global private equity fundraising, increasing from $6.5 billion in 2001 to $22.6 billion in 2009 (with a peak of $66.5 billion in 2008). So this part of the market become increasingly important. In this chapter it will be Central and Eastern European Countries concentration especially Poland which account for over 50% of all deal volume in the CEE region (Zasepa, 2013).

In the early years, private equity firms were relatively slow to list their investee firms. In the period between 1994 and 2004, private equity firms listed between one and three firms per annum (the exception being 1997, when four firms were listed). During this period, many successful listings were achieved in spite of declining liquidity and valuations in public markets, foreign investor unease about the effects of the Russian crisis, and the weak economic performance of Poland's neighbouring countries. The total capitalization of private equity-backed firms equalled $4.2 billion (3.1% of total market capitalization), with an average 'normalized' capitalization per firm of about $90 million. The average value of shares offered to the public during the initial public offering (IPO) process was equal to $27.4 million (largest – $139.6 million; smallest – $2.1 million). About one half of the offer value was generated by the shareholders selling their shares as a part of the IPO; this indicates that private equity firms generally prefer to sell a significant equity stake in their investee firms as soon as possible after the initial listing. The local private equity industry has achieved good financial returns from selling its equity stakes to foreign strategic investors or local trade buyers. However, as noted previously, the average cash-on-cash return from a sale to a strategic investor is lower than in the case of public listing. The most well-known trade sales include Polcard (3.16 cash-on-cash multiple), Lukas (c-o-c - 5.66), @Entertainment (c-o-c - 2.66), and Town & City (c-o-c - 2.66). The experience of local private equity firms selling to strategic investors can be summarized in the following manner. Firstly, the best exit results are often generated when strategic investors are involved in competitive bidding for an investee business. Strategic investors are more motivated when they are seeking entry into a new market (as outlined by strategic expansion plans) or when the existing local business is especially difficult to compete against. Good examples of leading market players attractive to strategic investors are Lukas (Enterprise Investors) and Town & City (Innova Capital). Secondly, strategic investors seem to pay less for the business if they already have a local presence. In this circumstance, strategic investors may only be willing to assign value to a specific part of the business (i.e., manufacturing capability, management, consumer list, proprietary supplier access, and so on) or limited value to other areas of operation (i.e.,

distribution). Lastly, timing is everything in the sale of any business. Strategic investors prefer to acquire businesses that are profitable, that have an appetite for growth, and that are able to access cheaper external financing (i.e., debt or equity at limited dilution to existing shareholders). Such businesses typically exist in periods of strong economic growth and prosperity; during an economic downturn, strategic investors tend to look inward and focus on either optimizing their costs or restructuring.

Table 1

List of the Polish Venture backed IPO and their multiplies and underpricing

No	Year	Company	Initial return in %	Offer value in PLN million	Cash-on-cash multiple
1	2001	LPP	0,00%	40,3	2,6
2		Eldorado	0,00%	19,9	2,8
3	2002	W Kruk	-9,14%	27,3	0,3
4	2004	Comp Rzeszów	14,67%	120.00	7,9
5		Praterm	10,00%	80.24	2,4
6		Techmex	6,00%	187.53	n/a
7		Intercars	4,76%	46.80	2,8
8		ATM	8,64%	110.00	3,1
9	2005	PEP	-7,69%	169.04	2,4
10		Teta	30,39%	11.90	2,9
11		Zelmer	32,58%	35.81	2,6
12		Opoczno	0,00%	455.97	3,4
13		Jago	17,50%	6.67	n/a
14		Travelplanet	11,11%	19.92	6,8
15		Zetkama	-8,93%	31.42	6,9
16	2006	AB	1,74%	91.83	2,8
17		Sfinks	0,36%	32.21	6,8
18		One2One	55,00%	25.13	10,2
19		Wumak Seqom	1,83%	42.80	1,2
20		Mispol	11,25%	14.00	3,2
21		Ergis	0,00%	63.77	n/a
22		Bankier.pl	5,33%	13.00	4,7
23		Fota	0,59%	74.09	n/a
24		Ecard	85,00%	99.14	1,6
25	2007	Magellan	4,76%	36.00	7
26		Mercor	36,59%	104.13	2,9
27		ACE	0,00%	256.01	n/a
28		CP energia	9,44%	243.14	2,7
29		Bipromet	-4,08%	54.60	2,4

30		Hawe	34,72%	29.70	3,9
31	2008	GG	16,19%	22.27	2,2
32		K2	-6,00%	18.75	1,8
33	2010	ABC Data	0,43%	79.41	1,8
34		Harper Hygienics	14,63%	53.30	1,6
35	2011	Kruk	5,06%	369.21	1,3
36		Enel-Med	1,80%	35.50	2,6
37	2012	Solar company	6,46%	40	2,1
38	2014	Skarbiec Holding	5,00%	20,2	3,1

Source: own calculation.

Analysing the data of multiple (cash on cash) we can observe that average value is 3.2, which shows that PE funds on average triple their investments. Standard deviation is at the level of 2.09 which is quite high. Other evidence suggests that the leading private equity firms achieve strong returns in Poland. In the last 10 years (the period between 2000 and 2010), the average return for a private equity deal completed in Poland has been equal to 15.6% (note that 20-year returns were equal to 8.6% − a respectable average given the initial problems faced by the private equity industry in Poland). The top quartile of private equity firms in Poland have been able to achieve returns equal to 32.4% per annum − more than two times higher than public returns and average private equity performance. Private equity returns in Poland outperform those achieved in the CEE region (13.9%) and other emerging markets, Latin America (2.0% – EMPEA 2010) and most notably Asia (7.8%). This numbers show that Polish PE sector in terms of returns and IPO activity is achieving very good results. Very high positive returns bring more opportunity for the investors for looking more portfolio companies and strong capital market as Warsaw Stock Exchange is supporting this trend.

4. Conclusion

Data on VC and PE efficiency shows that the overall efficiency of VC-backed firms is higher than that of non-VC-backed firms at every point in time. This efficiency advantage of VC-backed firms arises from both screening and monitoring. The efficiency of VC-backed firms prior to receiving financing is higher than that of non-VC-backed firms, and further, the growth in efficiency subsequent to VC financing is greater for such firms. The above increases in efficiency of VC-backed firms are spread over the first two rounds of VC financing after which the TFP of such firms remains constant until exit. Overall efficiency gains generated by VC backing arise primarily from improvements in sales, the efficiency gains of high-reputation VC-backed firms arise also from lower increases in production costs. Finally, we show that VC backing and the associated efficiency gains positively affect the probability of a successful exit.

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FORMATION OF PUBLIC ACCOUNTING AND ANALYTICAL SUPPORT OF STRATEGIC MANAGEMENT OF INTEGRATED BUSINESS STRUCTURES

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Abstract. The articledealswith the problem of formation of accountingand analytical support of making strategic decisions concerning domestic integrated business structures. In particular, the author substantiated the necessity of preparingstrategic report by Ukrainian integrated businessstructures and proposed the way of structuring the information in this reporting form.

Keywords: reporting form, integrated business structure, strategic management, strategic report, accounting and analytical support.

Introduction

Under conditions of limited financial resources in the world market, caused by increasing globalization in the world economy, top-management of integrated business structures meets the problem of intensification of the struggle for investors. Considering this, among prerequisites for the survival and sustainable development of integrated business structuresare the ability of management to bring owners (including potential ones) relevant information on the activity of amalgamated business, and also the ability to form a positive opinion on functioning of entities that are headed by themin the society.Thus, the problem of the development of approaches to formation of public accounting and analytical support of strategic management of integrated business structures is of particular relevance.

It presupposes an understanding of informational needs of different types of stakeholders (in particular, investors; creditors; customers; mediators, which take part in production distribution; employees, which do not belong to top-management; society) and the ways to satisfy them.

Investigation of domestic legislation has revealed the absence of any approaches to the regulation of this issue as opposed to a foreign one, which solves this problem by means of "The Companies Act 2006 (Strategic Report and Directors' Report) Regulations 2013". The UK government enacted this Act into force on October 1, 2013.

In turn, the study of specialized literature revealed almost complete lack of approachesof both domestic and foreign economists concerning formation of public accounting and analytical support for strategic management of companies, which have a significant number of business areas and economically organized as an integrated business structure. In particular, in papers of the vast majority of economists, among which one should mention King M. (2013), Serafeim G. (2014), Druckman P. (2014), Balashova N.N., Silerova E., Melikhov V.A. (2015), the problem of the disclosure of information about the

strategy of the company is presented in indirect way by means of investigation of methodology of formation of its integrated reporting.

In turn, the development of formalized system of preparation of reporting information on the business strategies of companies (in particular, on the example of agricultural) was disclosed only in the paper of such scholars as Melyhov V. and Akhmanova S. (2015). In particular, these economists suggested approaches to formation of the strategic report and its structure.They also developed and recommended a "road map" to implement the process of formation of the strategic report of the group of companies on the basis of a formalized system of disclosure of business strategy (defined logical structure, procedures, risks, priorities, key performance indicators) (Melikhov, Akhmanova, 2015).

The results of investigation of legislation, specialized literature and strategic reports of a number of British integrated business structures, such as Shell (2015), Marks & Spencer (2015) and Tesco (2015), allowedarguing about the feasibility of introducing the strategic report into the practice of domestic integrated business structures.It must be mentioned that the author agrees with the results of the research of these economists, but at the same time the author believes, that current approach to the structure of presentation of information in the strategic report is somewhat controversial.

In particular, taking into account recommendations of the Financial Reporting Council in the part of the reporting of information to investors in the form which is the most understandable for them, in the capacity of the basis for separation of sections of the strategic report of the integrated business structure, the author recommends to put the criteria of value goal-setting of stakeholders.

That is, the author proposes to provide information in this report in a more structured way by means of its grouping as:

– common information on the operation of the integrated business structure that will be equally interesting to all types of stakeholders;

– individual information concerning functioning of the integrated business structure, which willsatisfyindividualinformationalneeds of all the following main types of stakeholders: investors (includingpotentialones); creditors (includingpotential ones); customers; mediators, which take part in production distribution (distributors, retailers); employees, whichdo not belong totop-management (includingpotential employees); society.

In particular, informational tab concerning functioning of the integrated business structure, which will be equally interesting to all types of stakeholders, contains the following information: strategies of the integrated business structure; goals of the integrated business structure; business models of the integrated business structure.

The author shares the idea of specialists of the Financial Reporting Council, presented at pages 20-22 of the «Guidance on the Strategic Report» (2014), concerning the content of information on the strategy, goals and business-model of the enterprise (in particular, the integrated business structure), which must be disclosed in the strategic report.

In turn, the content of information tabs, which contain dataon operation of the integrated business structurewhich satisfy individual information needs of stakeholders, should be consideredseparatelydepending on the type.

The author should also mention the existence of the following two groups of indicators, which will have an individual contentfor each type of stakeholder despite their identical names: significant risks and uncertainties, as well as internal and external factors which influence the effectiveness of the business entityfunctioning.

Information on these aspects will allow all isolated types of stakeholders to assess the possibility of their impact on the speed and completeness of realization of their own strategic goals, the achievement of which is associated with the interaction with this business entity.

In addition, the author should mention impossibility ofdetailing of mentioned aspectsinthisresearch concerningtheirdependence on the type (ortypes) of economicactivity, that areseparate directions of activity (business-directions, business-models) of the integrated business structure.

Thus, one of the most important stakeholders of the integrated business structure are investors and creditors (including potential ones), which are interested in gaining information that will allow them to check the creation of the value of the business, to assess the efficiency of the integrated business structure and its ability to finance implementation of the stated strategies.

Recommended approach to thedisclosure in the strategic report of information aboutthe activity of the integrated business structure, which will be of particular interest to the mentionedtypes ofstakeholders, is presentedin table 1.

Table1

Disclosure of information aboutthe activity ofthe integrated business structuredepending on the sphere ofinterests ofinvestorsandcreditors (including potential ones)

Type of thestakeholder	*Sphere ofinterests of the stakeholder*	*Indicators ofactivity of integrated business structure, which allow stakeholders toassess the ability to satisfy their needs*
Investors (including potential ones)	Growth of thevalue of business. Growth of the profitability of business. Guaranteed obtaining of dividends	- Product line and the share of the consumer market; - The effectiveness of the portfolio of businesses and their competitive position; - Description of the business and its organization; - Liquidity and solvency;
Creditors (including potential ones)	Guaranteed repayment obligations	- Return on activity; - Property status; - Financial independence; - Business activity; - Key risks and uncertainties critical to investors (including potential ones) and creditors (including potential ones); - Significant for investors (including potential ones) and creditors (including potential ones) trends and factors that take place in the market and affect the efficiency of functioning

Source: developed by the author

The next type of stakeholders is clients (customers) that need information about the quality of the product, works and services, provided by participants of the integrated business structure, and information about advantages of its policy of interaction with clients (customers) in comparison with relevant approaches of competitors of this business entity. Recommended approach to the disclosure in the strategic report of information about the activity of the integrated business structure, which will be of a particular interest tothe mentioned type of stakeholders, is presented in table 2.

Table 2

Disclosure ofinformationabout theactivity ofthe integrated business structuredepending on the sphere of interestsof clients

Sphere of interests of the stakeholder	*Indicators of theactivity of the integrated business structure, whichallow stakeholders to assess theability of satisfaction of their interests*
Completeness and quality of satisfaction of their own needs	- Product (functionality, quality); - Business processes of after sales service; - Key risks and uncertainties critical for consumers; - Significant for consumer trends and factors that take place in the market and affect the efficiency of functioning

Source: developed by the author

The next type of stakeholdersisagents (mediators), whichtakepartinsale of the productproduced by the integratedbusiness structure, in particular, distributorsand retailers.

Table 3

Disclosure of information about the activity of the integrated business structure depending on the sphere of interestsof agents (mediators)

Sphere of interests of the stakeholder	*Indicators of the activity of the integrated business structure, which allow stakeholders to assess the ability of satisfaction of their interests*
Presence of uninterrupted supplies of products for further sales to dealers or retail customers. The ability to return the product to the producer, which has been turned back by the dealer or retail consumer	- Product (timeliness); - Operational business processes (warehousing, storage, sale); - Marketing positioning; - Key risks and uncertainties critical to intermediaries involved in the sales process (distributors, retailers); - Essential for intermediaries involved in the salesprocess (distributors, retailers) trends and factors which are taking place in the market and affect the efficiency of functioning of the enterprise; - Trends and factors that take place in the market and affect the efficiency of functioning of the enterprise

Source: developed by the author

These persons are interested in information that will allow them to assess the possibility of quick further sales of the product which they will receive from the participants

of the integrated business structure, and the efficiency of those business processes of the integrated business structure, which are associated with the production of the product and timeliness of its delivery.Recommended approach to the disclosurein the strategic report of information about theactivity of the integrated business structure, which is of particular interest to this type of stakeholders,is presented in table 3.

The next type of stakeholders is employeesofthe integrated business structure, which do not belong to top-management (includingfuture employees). These persons are interested in information, which will allow them to assess the ability of the enterprise to guarantee them decent wages, job retention and to promote their professional development. Recommended approach to the disclosure in the strategic report of information about the activity of the integrated business structure, which is of particular interest to this type of stakeholders, is presented in table 4.

Table 4

Disclosure of information about the activity of the integrated business structure depending on the sphere of interestsof employees, whichdo notbelong totop-management (includingfuture employees)

Sphere of interests of the stakeholder	*Indicators of the activity of the integrated business structure, which allow stakeholders to assess the ability of satisfaction of their interests*
Highlevel of life andopportunity ofprofessionaldevelopment	- Motivation and orientation; - The effectiveness of management of employees; - Social responsibility of business to employees; - Key risks and uncertainties critical to employees who do not belong to the top- management (including prospective employees); - Essential for employees who do not belong to top-management (including prospective employees) trends and factors that are taking place in the market and affect the efficiency of functioning of the enterprise

Source: developed by the author

The last type of stakeholder's issociety, which isinterested ininformation, which allows assessing the contribution of the integrated business structure to thewelfare of bothlocal community and the whole state. Recommended approach to the disclosure in the strategic report of information about the activity of the integrated business structure, which is of particular interest to this type of stakeholders, is presented in table 5.

Table5

Disclosure of information about the activity of the integrated business structure depending on the sphere of interestsof the society

Sphere of interests of the stakeholder	*Indicators of the activity of the integrated business structure, which allow stakeholders to assess the ability of satisfaction of their interests*
Economic growth, social order	- Corporate social responsibility to community; - Key risks and uncertainties critical to society; - Essential for society trends and factors which are taking place in the market and affect the efficiency of functioning of the enterprise

Source: developed by the author

Considering the results of conducted investigation, the author proposesthe following structure of the standard strategic report:

Part 1. Description of business and its organization:

1.1. Overview of business (one should cover the information that gives the idea of the field of the activity of the business entity, types of its products and volume indicators of its production and the organizational structure of the enterprise).

1.2. Business-strategy (provides information on the strategic vision of the business entity and also its strategic goals and objectives that are designed to help to achieve these strategic goals).

1.3. Content and governance structure (one must cover the information which allows getting an idea of the value of the business entity, the structure of management; system of corporate governance; basic principles of management; structure and tasks of the Supervisory Board and also profile committees that are affiliated with it; ethical regulations and standards of business, which must be used by employees of the business entity).

1.4. Businessmodel (one should cover the information that allowsstakeholdersto get generalideaabout the mainbusinessprocessesof the enterprise (in particular, such, asproduction businessprocess, logistics businessprocess, sales businessprocess).

Part 2. Business environment:

2.1. Trends andfactors (one should cover information aboutcompetitive position of the business entity at the market, trends of its development, andalso competitive advantages, whichensure sustainable development of the enterprise in the future).

2.2. Mainrisks anduncertainties (one should cover main risksthat threaten sustainable development of the business entity, disclosereasons of theirappearance, andalso mention measures, which are takenin order to neutralize them or to reduce their impact to minimum. It must be mentioned, that information in the part of risks, which influence sustainable development of the business entity, must be presented in ranked order).

Part 3. Corporate social responsibility:

3.1. Corporate social responsibility (one should cover information that allows to get general idea aboutthe mainstatement of the concept of social responsibility of the business entity (in particular: chosen approach toraisingconstructivemutual relations withkey groups of stakeholders, participation inglobal initiatives etc.) andprioritydirections of furtherdevelopment of its activity in the field of social responsibility).

3.2. Health, security andecology (one should cover information concerning measuresof the business entity in the field ofsaving life andhealth of people as well as respect to environment).

3.3. Employees (one shouldcover the information concerning key parts of the system of management of employees of the business entity (in particular, its corporate culture, training and growth of employees, system of motivation and reward, systems ofsocial protection etc.)

3.4. Society (Programs of regional partnership) (one should cover the information thatallows stakeholders to receive information aboutprioritiesanddirections of realization of social and investment activity by the business entity).

Part 4. Performance:

4.1. Analyses of results andbusiness position (one should provide key financialandproduction indicators of business, whichallowassessingproperty status, performanceandnatural indicators of product production (product line) of the business entity in dynamics).

4.2. Key Performance Indicators ofachievement of strategic goals (one should name key performance indicators (generalized by perspectives of Balanced Scorecard: finance, clients, internal businessprocesses, learning and growth), which allow assessing achievements of strategicgoals of the business entity indynamics).

4.3. Selectedkeyperformance indicators of activity interms of interests of stakeholders (one should providegrouped informationconcerning the activity of the business entity depending on the sphere of interest**ts**ofstakeholders (investors, creditors, clients, agents, top-management, society) interms of separate key indicators).

Conclusions and suggestions

Thus, basing on the results of conducted investigation, the author gave recommendations concerning formation of public accounting and analytical support of strategic management of domestic integrated business structures, which will help top-management to maximize value of the business by means of satisfaction of informational needs of all stakeholders, which are important for their efficient work.

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BUSINESS UNITS' ECONOMIC SUSTAINABILITY AND ITS ADAPTIVE PECULIARITIES

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Abstract. The article is devoted to economic sustainability concept and to peculiarities of its application to business units functioning. It`s proving in the work, that combination of interests is a necessary feature in the process of economic sustainability increasing and growth of profit, oriented to formation of capital, considerable for declaring at integrated reporting. The author grounds the necessity of balance microeconomic models usage, based on the identification of tendency of interaction and interdependence in the development of economic, social and environmental processes, happening during business units activities and effective management decisions making in the field of economic sustainability concept development.

Keywords: economic sustainable development, business unit, capital, balance microeconomic model.

Introduction

Reformation of Russia economy, transition of the whole country economic system to market economy have not reached the desired level of sustainable development almost in every sector of economy. However, it found out the number of problems in the management system. It causes the development of new mechanisms and tools for their solving.Their effective application will enable business units to reach the certain level of sustainable development. It`s important to combine business units interests in profit growth with environmental, social and financial components in distinguish competitive advantages.

Improvement of sustainable development concept requires considerable change in the priorities, as for economy as a whole, so for its separate fields and sectors (complexes), and reconsideration of structural investment policy according to these priorities. New methodology is required, which would not be based on the volume of used natural resources, as current, but would be oriented on final results. It is known, that sustainable development is inevitably affects environment that is why every economic sector should do something in order to minimize negative effects on it. Producing goods and services has a big influence on the environment.

Theoretical and empirical base of research

In modern conditions of economic relations transformation and so called relational capital formation, it is impossible to manage without a balanced combination of environmental, social and economic development. That is why micro- and macroeconomic factors of environmental, economic and social influence should be considered in creating of the sustainable development policy. Optimal combination of these factors is important. It

means that we have to find such a concept of sustainable development, which will let us define reliably the effectiveness of implemented strategies and the influence of economic policy on the environment.

Today sustainable development does not have generally acknowledged definition. It has been actively discussed for a long period of time. It became a sign of socio-economic development for many countries including Russia. Nevertheless, the majority of experts agree sustainable development should consist at least of three components:

− Hicks-Lindahl concept of maximum income is the reason to include economic component in the sustainable development concept. According to Hicks-Lindahl concept, maximum income can be produced on condition of maintaining the aggregate capital, due to which the income is produced;

− Social component is based on fare distribution of welfares and the necessity of human capital maintenance.

− Environmental component is based on unity of biological and physical systems within the framework of natural capital increasing.

Each component can be formed as a capital, used by business units for revealing and declaring competitive advantages to stakeholders.

Every group of business unit partners has its own focus of interest in maintaining a special type of capital. Moreover, a long-term competitive policy is formed with an accent on increasing a definite type of capital, according to made priorities in satisfying partners` interests.

We consider International Integrated Reporting Framework to be the latest development in capital concept. It is created by International Integrated Reporting Council – a global coalition of investors, standards developers, accountants and regulative organs. According to the standard capitals are stocks of value that are increased, decreased or transformed through the activities and outputs of the organization (International Integrated Reporting Framework, 2013).The ability of an organization to create value for itself enables financial returns to the providers of financial capital. This is interrelated with the value the organization creates for stakeholders and society through a wide range of activities, interactions and relationships (International Integrated Reporting Framework, 2013). Therefore, business units have freedom in usage of capital categorization and in declaration it in the integrated reporting. In our opinion, a special feature of capital, declared in the framework, is representing it as a variable category in continuous turnover.

Studying types of capital, marked out in the framework, we should pay out that they represent opportunities for business units to implement in every sphere of their productive, social and environmental activity: financial, manufactural, intellectual, human, social and relationship, natural capital.

Financial capital is a pool of funds, available to an organization for use in the production process obtained through financing, generated as a result of operations or investments.

Manufactured capital – physical objects that are used by organization in the production including those that created by other organizations (roads, port, bridges, water treatment facilities, etc.)

Intellectual capital is refered to intangible assets, as many economists do. But "organizational capital" as a component of intellectual capital rises questions. It contains of "tacit knowledge, systems, procedures and protocols" (International Integrated Reporting Framework, 2013).But how should we estimate them?

Human capital represents people's competencies, capabilities and experience, and their motivations to innovate, including their ability to develop and implement an organization's strategy and to improve production processes.

Social and relationship capital – the institutions and the relationships giving the ability to share information to enhance individual and collective well-being. It represents a concept of an organization's social license to operate. That is totally new in our practice. Having analyzed companies' reports, which present integrated reporting, such item as an organization's social license to operatewas not found.

Natural capital is currently studied by economists in bigger extent, represented in the framework as a common term in modern literature "all renewable and nonrenewable environmental resources and processes that provide goods or services that support the past, current or future prosperity of an organization" (International Integrated Reporting Framework, 2013).This definition is slightly reminds the Brundtland Commission definition of sustainable development introduced in 1987 (Nasheobshcheyebudushcheye) but only transferred from macro- to micro level.

Taking into account the multitasking of distinguished types of capital for declaring in the integrated reports, we can admit that not all types of capital can function at a company moreover some types of capital can have indirect influence. In this case the framework recommends not to mention this type of capital in the integrated report.

During categorization of capitals and their practical usage, the questionoccures: how should a business unit separate its resources and competences into different types of capital???

It is obvious, that for any company, according to the framework, appearance of intellectual capital is the result of interaction with stakeholders. But companies identify it as human or relationship capital. The framework does not give any definite recommendation. It says business units can divide capital into different categories on the condition that capital should be used as a key point while making an integrated report. Any used capital or capital that is under influence of business unit should not be missed.

So in oursopinion sustainable management should be considered:

– In community with the sustainable economy as a whole;

– From the point of the business unit, its structure, composed from different components;

– From the point of interaction of one business unit with another.

According to the International Integrated Reporting Framework and the necessity of defining a sustainable development optimal level for a business unit, which combines opportunities to maintain and increase capitals with different priority level, we suggest using a category of economic sustainability of business unit, based on a state value and identification of economic system transition signs from sustainable condition to unsustainable.

In this case, economic sustainability is business unit`s feature, based on the estimation of external and internalinfluenceon environment factors. As a result it will base the choice of tactic in the external environment, according to internal economic environment factors.

For effective adaptation of economic sustainability concept to peculiarities of business units functioning we need a special procedure of its realization. The procedure can consist of the next blocks: goal-setting, estimation of economic system factors influence; estimation and internal economic environment management; external economic environment estimation and forecasting of composite indexes; implementing the concept of business unit`s economic sustainability.

Economic sustainability is formed under the influence of different factors. With time

influence of some factors is increasing, of other – decreasing, and this courses deviation from the set goal.

Today we have lots of tools for external and internal environment factors analysis. However, not every tool can be used for the business unit. Some of them is aimed at newly-formed business units, other do not maththe peculiarities of functioning in Russian realities (Gushko, Kulishov, 2016).

The analysis of currently implemented assessment tools for internal and external environment of business unit brings us to conclusion that almost every tool is single-minded, helps to study the influence of only internal or external factors or estimates only qualitative features, requiring additional mathematical tools.

We think SWOT-analisys to be the most appropriate. It helps to consider all factors of internal and external environment and to define their influence on achieving economic sustainability of business units in future.

Today it is a common belief that achieving economic sustainability is almost fully depends on formation of "correct" economy. If we consider sustainable development from the influence environmental point of view, it becomes clear that it should provide integrity of biological and physical natural systems. Business plays the main part in saving the world from environmental disaster. Business already understands that it is profitable to take care about environment. Growth caused by "green" production is the priority of many companies, but not everyone knows how to reach it.

According tothis approach it is necessary to carefully analyze the substitutability and complementarity of production factors (or different types of capital) from the standpoint of final results, the possibility of saving natural resources while maintaining and increasing the final yield of the product.

Based onsuch interchangeability of the production factors and the neccesity to identify the real needs in natural resources. It is necessary to evaluate the natural resources and products based on them as a single complex, as an integrated natural-product system. And from the standpoint of the final results of this system functioning to determine the required volume and efficiency of natural resources usage. The load on the natural foundation of the economy can be reduced significantly with an increase in the value of the final product consumption.

Search and implementation of environmental economy alternatives is extremely relevant. There are great opportunities to mitigate the environmental situation in Russia. We can find many options based on the inter-sectorial balances, or other economic instruments such as economic and mathematical models, that reflect the structure of inter-branch relations on usage and distribution of goods in the economy, reflecting the equilibrium state of relations between the sectors. The mathematical modelingchallenge is to learn how to describe theenvironmental systems dynamicsunder anthropogenic influence.

It is possible to solve the problem of optimizing the production, meeting certain environmental standards, with the help of balance microeconomic models. Considering environmental factors in microeconomic we need to turn to value terms in criterion function and to payments for exceeding pollution standards. Let p - the aggregate price of the products and components of the vector (1):

$$\overline{w} = (w_1, w_2, ... w_m), \qquad (1)$$

are costs of pollution eliminationin case of exceeding the relevant standards(in violation of the third condition in (12)).Then the function of production release income $F(\overline{x})$

has the form (2):

$$P = p \times F(\overline{x} - \overline{w} \times \overline{\delta}),\qquad(2)$$

where $\overline{\delta}$ – the vector of "activation" of payment sanctions for pollution elimination (3):

$$\delta_j \begin{cases} 0, z_j \le z_j^*, \\ 1, z_j > z_j^*, \end{cases}\quad J = 1,2,...,m,\qquad(3)$$

$\overline{z}$ - the vector of pollution; z_j^* - components of the maximum permissible pollution(4):

$$\overline{z}^* = \left(z_1^*, z_2^*,..., z_m^*\right).\qquad(4)$$

For simplicity, we assume that the normal costs of business units on the environment are included in the payment for natural resources, that is, the second term in the income function with a minus sign - a payment for excess load on the environment. In this case, wecan consider a production function whose arguments are the resources $\overline{x}$, pollution $\overline{z}$, the maximum permissible limits $\overline{z}^*$ and payment for violations of environmental regulations $\overline{w}$ (Intriligator, 2002.).

Output income optimization model, using the resource vector $\overline{x}$, with technology characterized by the production function F, is defined as follows: find the maximum of the function at an acceptable set of solutions of (5):

$$\begin{cases} \overline{x} \ge 0; \\ A\overline{x}^T \le \overline{b}^T, \end{cases}\qquad(5)$$

with a given restriction (4) on the vector $\overline{z}$.

In this model, there are both possibilities of production (given the matrix A and the vector of the restrictions coefficients and vector $\overline{b}$ of resource restrictions) and regulations of technological influence on the environment and costs of excess consequencesliquidation (vectors $\overline{w}$ and $\overline{z}^*$).

So we can see that with the "taugh" environmental legislation producer would be forced to use advanced technologies to reduce anthropogenic waste − matrix coefficientsCp.This what countries with the developed economy have (Shelukhina, 2014).

Diversified economy balance models are used for modeling environmental and economic systems in microeconomics. Some models suggest to increasethe gross output, so that the increase in output could be directed to remove or reductionenvironment pollution.However, such a formulation of the problem suggests used technologies to stay at the same level, this is reflected in the immutability in the cost matrix A.

Typically, the inter-branch balance matriceshave a significant productivity reserves (Bunkina, 2002). In some cases, we have to spend more resources per unit of output, to increaseintra-branch consumption (for example, the construction of treatment plants, waste treatment process) in order to minimize anthropogenicwaste. This "weights" the coefficients of the direct costs matrix A, which leads to a reduction in its productivity reserve.

Let A–inter-branch balance matrix, $\overline{x}$ – industries gross output vector, $\overline{y}$ – final

consumption vector.

Then the equation of inter-branch balance (6):

$$\bar{x} = A\bar{x} + \bar{y}. \tag{6}$$

Suppose, we need to increase inter-branch consumption to implement environmental activities. In this case, the new matrix of direct costs is the sum of the proir matrix A and some additives (Bergh, Nijkamp, 1991). Accordingly, the vectors of gross output and final consumption change as well:

$$\bar{A} = A + \Delta A, \quad \bar{x}^* = \bar{x} + \Delta\bar{x}, \quad \bar{y}^* = \bar{y} + \Delta\bar{y}. \tag{7}$$

For changed matrix $\bar{A}$ inter-branch balance equation will be:

$$\bar{x} + \Delta\bar{x} = (A + \Delta A) \times (\bar{x} + \Delta\bar{x}) + \bar{y} + \Delta\bar{y}. \tag{8}$$

Aftercollectingterms, we get the equation for changing the gross output vector (9):

$$(E - \bar{A}) \times \Delta\bar{x} = \Delta A \times \bar{x} + \Delta\bar{y}. \tag{9}$$

Consider the particular case of matrix A change, when all its elements are increased in $(1+\alpha)$ times, α satisfies the productivity of satisfies A (matrix $(1+\alpha)A$ productive as well).

In other words, $\Delta A = \alpha A$, then the equation (8), taking into account equation (7) takes the form (10):

$$(E - (1+\alpha)A) \times \Delta\bar{x} = \alpha(\bar{x} - \bar{y}) + \Delta\bar{y}. \tag{10}$$

This equation relates the change in gross output with changes in the consumption of resources and the final consumption vector. This way we obtain an expression for $\Delta\bar{x}$ (11):

$$\Delta\bar{x} = (E - (1+\alpha)A)^{-1} \times \alpha(\bar{x} - \bar{y}) + \Delta\bar{y}). \tag{11}$$

Let's analyze expression (11). Since by the second productivity criterion of the matrix $(1+\alpha)A$ matrix $(E - (1+\alpha)A)^{-1}$ is positive, so even in the case of zero growth in final consumption vector gross output increases, since $\bar{x} - \bar{y} > \bar{0}$.

Recently, the environmental taxes and fines usually offset damage to the environment, which leads to higher prices of products. It is assumed that the volume of gross output and intra-consumption unchanged, ie, the matrix of direct costs A is unchangeable. Let's use the cost model of equilibrium prices. In matrix, it has the form (12):

$$\bar{p} = A^T \bar{p} + \bar{w}, \tag{12}$$

Where $\bar{p}$ и $\bar{w}$ - accordinglyIndustry products prices vector and the added valuevector (Lazareva, 2011).

The funds allocated for the elimination of pollution will increase the components of value added vector $\bar{w}$. Let the vector $\bar{w}_{ec} > 0$ – environmental "load" in the form of taxes, fines, engineering and preventive measures costs and so on. Then the vector of prices for industries products including environmental costs is determined from the equation (13):

$$\bar{p} = (E - A^T)^{-1} \times (\bar{w} + \bar{w}_{ec}). \tag{13}$$

Thus, change in prices for industries production will be (14):

$$\overline{\Delta p} = \bar{p}^* - \bar{p} = (E - A^T)^{-1}\overline{w_{ec}}. \tag{14}$$

Since the components of the matrix $(E - A^T)$, due to the efficiency of the matrix *A*, are non-negative, then $\Delta \bar{p} > \bar{0}$. In this case, the resource consumption for output remains unchanged.

Currently, the experience gained in generalization of mathematical economy and environmentalmodels, let us go to the construction of complex environmental and economic models. These models include blocks, describing economic and environmentalprocesses; each of them necessarily contains equations that relate variables from environmentaland economic sub-systems between them selves(Endres,Kverner, 2004).

Conclusionsandsuggestions

Business units` economic sustainability should be based on optimal correlation of environmental, financial and social components, considering stakeholders and business units' interests in maximum profit growth, leading to the possibility of creating and multiplication of different types of capital flows, reflecting the effectiveness of the production, social and economic activities. Without taking into account the mutual influence of environmental and economic factors, without the knowledge of modelling approaches based not only on optimization methods economic systemsfunctioning, efficient short periods in microeconomic scale, but also on dynamic balance modeling techniques that enable us to display trends of interrelated processes of economic development, social and environmental systems, including trends, associated with a significant increase in negative effect of accumulation of anthropogenic environmental pollution, it is impossible to make a qualitative management decision in designing the economic sustainability concept.

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THE USE OF GRAVITY MODELS FOR MANAGING ECONOMY IN THE CONDITIONS OF INSTABILITY

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Abstract. This article deals with theoretical and methodological aspects of gravity models.A number of economic indicators such as capital investments, the average salary, gross regional product, the income of the population, the volume of the sold industrial outputin Ukraineare described. The gravity modelsused to manage the Ukrainian economy nowadays arepresented.

Keywords: gravity model, modeling the economy, capital investments, the average salary, regional product gross, income of the population, volume of industrial product sales.

Introduction

The defining feature of the economic system of Ukraine nowadays is instability, which may have different origins and is conditioned by the whole set of factors. Reflecting the objective laws of economic system the instability significantly complicates the activities of enterprises or organizations, confuses in choosing strategic priorities, justification of administrative policy and approaches to its formation and implementation.

In the absence of full market institutions, the instability of the environment causes much more real and potential threat to the efficient and competitive development of the enterprises or organizations. This feature clearly distinguishes the economic system of Ukraine. For many years the environment of enterprises or organizations has been characterized by complexity and considerable uncertainty, as evidenced by various international rankings including global competitiveness ranking of the World Economic Forum and the rating of 'Doing Business'. The reason for such situation is the totally inadequate, inconsistent and unpredictable policy of the government as the subject of regulation. Thus, the tasks of finding models of adaptive management companies, which would allow effective resistingthe impact of external destabilizing factors, are becoming much more urgent.

For developing specific policies on trade relations in different regions of the country we need to makethe preliminary analysis of the economy. That is why the task of the comprehensive study of economic relations and Economic Modeling is very important. Therefore, the role and the use of gravity models as the way of research for the best modeling of the overall picture of the development and prospects for the future of the economy of Ukraine will be considered in this article.

The importance of this problemcan be explained by the fact that in times of economic instability the usage of gravity models for modeling economy is rather crucial. It is a fundamentally new factor that can affect positively or negatively the activities of not only Ukrainian enterprises but industries and the economy as a whole. The gravity model describing social and economic interaction between different objects (cities and regions) gives the opportunity to analyze and preserve the economic environment that improves the economic stability in Ukraine. This model is called "gravity" because of its obvious resemblance to Newton's law of universal gravitation. Currently, the model has become widely used for the assessment of trade flows and it is spread thanks to its high empirical accuracy. The advantage of this model is its rigorous theoretical justification. The model has many different versions, which are used to analyze the process of urbanization andstudy export-import relationships, location of industry and population migration.

Theoretical and methodological aspects of gravity models

This article deals with theoretical and methodological aspects of gravity models regarding the economic performance in terms of instability. As we have examined the essence of the concept of "gravity model" we would like to present the classification of gravitational models and the distinctive features of these models.

The most popular directions of the practical use of gravity models relate to valuation of:

- the impact of economic fluctuations;
- the impact of policy variables;
- formation of integration associations.

Among the scientists involved in the developments of gravity models in analyzing the structural transformations of economic systems, are the following: William Ayzard (2009), D. Anderson (1999), D. Berhstrand (2000), B. Moskovkin (2000), D. Stewart (2008) and others.

Gravity models are used to describe and predict various social and economic interactions between the districts of the city and are based on the assumption that the value (force) of their interaction is proportional to the product indicators of the districts population and is inversely proportional to the distance between them:

$$M_{ij} = k \frac{p_i p_j}{d_{ij}^2} \tag{1}$$

where Pi, Pj - the population of districts i and j; dij - distances between the districts i and j; Mij - an indicator of interaction between the districts i and j (for example, the number of trips); k - the normalizing parameter.

The American sociologist F. Kerry in the middle of the XIXth century noted the presence of the analogue of the gravitational force in public events. In 1929, C. Reilly (USA) suggested the retail gravitation law under which with the help of its retail trade the city

attracts the customer base from the surrounding area with the "force" proportional to the size of the city and inversely proportional to the distance from customers to the city center. The border areas of sales of the cities i and j is defined as the locus of points for which:

$$\frac{p_i}{d_{i,x}^2} = \frac{p_j}{d_{j,x}^2} \tag{2}$$

where $d_{i,x}$, $d_{j,x}$ – the distance between cities i and j, according to point x on the boundary.

The theory of gravity model was elaborated by D. Stewart (USA). His idea was that the interaction between people submits to the law, similar to the law of universal gravitation. Together with the concept of demographic forces he suggested the formula for demographic potential calculation:

$$v^x = \sum_i v_i^x \tag{3}$$

D. Stewart designed the maps of demographic potential for the United States. Later similar maps have constantly been updated in many countries of the world. It has been proved that the demographic potential reflects the development of the area better than the generally accepted rate of population density. He also noted a high correlation of demographic potential with the developmentof retail trade, roads and rural employment in non-agricultural sectors.

Gravity models with the appropriate selection of the parameters are widely used to describe the interaction of the migration process. They are well applied for calculation of long distance telephone calls, shopping trips and commuting migration. The development of the simplest gravity model took place in several directions:

1. In addition to the indicators of the population and distances other factors such as the ratio of increases of investments in the districts, the number of vacancies or, on the contrary, the share of the unemployed within working population and the number of vacancies within the way from one district to another (model of intermediate possibilities) were included in the above-mentioned model.

2. Gravity model is used in cases where the indicators of districts' population are given some advantages. A simple example of joint application of both areas provides a model that describes the number of trips between the US states:

$$M_{i,j} = k \frac{(w_i p_i) \cdot (w_j p_j)}{d_{i,j}^2} \tag{4}$$

3. The design of such gravity models is often included in a variety of model complexes for describing the processes of urban and regional development.

To analyze the general patterns of population distribution in accordance with the major system function of the city on its territory the models of urban spatial development are used. The informational modelwas used to solve these problems, so thegraphaccording totheaimofthetaskshows the next parameters:

- concentration of population (depending of the place);
- a number of places of cultural and community or recreational services;
- a number of jobs.

Except the above mentioned application, gravity models are used in logistics, for example, they are applied to search for the place of the location of a single warehouse, which provides supplies for different retail sellers. In this case, the gravity model is represented as an average weighted quantity. The placement of retail warehouses, the volume of transported

goods and the cost of transportation according to the estimated location of the central warehouse are taken into account. On the first step to the solution of this problem several options for placing the central warehouse in the system of coordinates are offered. The beginning of coordinate system and used scale are agreed on the basis of the correct submission of relative distances. This is done, for example, by imposing certain scale grid on the map.

As a result of our studythe classical gravity model regarding regional centers of Ukraine was built, as well as gravitational models were created on the basis of economic indicators. The task of our article was to analyze the economy of Ukraine and to develop a rating of regional centers by means of these models.

The classical gravity model was createdupon using the given formula (1). The calculations of the model helped to make the Grade of the regional centers of Ukraine. In its turn, it gave us the opportunity to have the overall picture of the gravitational forces between the cities. So, the rating of Ukrainian cities is as follows:

Table 1

Rating score of regional centers of Ukraine regarding classical gravity model

№	City	Rating points	№	City	Rating points
1	Kyiv	100	14	Vinnytsia	20,32
2	Dnipro	97,71	15	Cherkasy	19,46
3	Zaporizhzhya	76,17	16	Kropyvnytskyi	18,17
4	Kharkiv	57,47	17	Luhansk	15,74
5	Mykolaiv	57,00	18	Rivne	13,42
6	Kryvyi Rih	44,98	19	Lutsk	12,44
7	Kherson	40,40	20	Ternopil	12,30
8	Odesa	38,25	21	Khmelnytskyi	11,54
9	Donetsk	32,73	22	Sumy	11,51
10	Zhytomyr	25,28	23	Ivano-Frankivsk	9,27
11	Lviv	21,99	24	Chernivtsi	5,52
12	Poltava	21,86	25	Uzhhorod	1,53
13	Chernihiv	20,72			

So, with the given rating we may conclude that the capital of Ukraine, Kyiv, has the greatest gravitational force. The top five includes the following cities: Dnipro, Zaporizhzhia, Kharkiv, Mykolaiv.The classical model made without taking into account any extraneous factors or indicators. was considered above. Next, let us consider the gravity modelsaccording to the economic indicators.

The first model is a gravity model based on the capital investments (4). The capital investments are money allocated for the reproduction of fixed assets, expansion, reconstruction and modernization of enterprises and facilities, technical progress in all sectors of the economy, the construction of housing, schools, hospitals and other social and cultural

destinations, geological prospecting and architectural design. That is, capital investments are mainly the funds used to increase fixed assets, other non-current tangible assets, intangible assets, and for their reconstruction and modernization, leading to the increase of the initially expected future economic benefits. The ultimate goal of the capital investments is the expanded social production.

Capital investments play a crucial role in the economy of the country, the city and any company, as they are the basis for:

- systematic recovery of fixed assets of the enterprise and implementing policies of expanded reproduction;

- accelerating scientific and technological progress and improving product quality;

- structural restructuring of social production and sustainable development of all sectors of the economy;

- creation of necessary resource base for industry;

- civil construction, development of Healthcare, higher and secondary schools;

- mitigating or solving the problem of unemployment;

- protection of the environment and achieving other goals.

Thus, the investments are needed primarily for economic recovery of the city and the country in general, and on this basis for solving many social problems, especially for rising living standards.

As the similar ranking of cities was drafted, with the help of the latter it is possible to estimate in which cities of Ukraine there is a stronger gravitational force based on capital investments. The rating of cities is as follows:

Table 2

The rating system of regional centers of Ukraine regarding the gravity model using capital investments

№	City	Rating points	№	City	Rating points
1	Kyiv	100	14	Donetsk	3,36
2	Dnipro	37,25	15	Kropyvnytskyi	2,25
3	Kharkiv	34,62	16	Khmelnytskyi	2,25
4	Zaporizhzhya	17,90	17	Kherson	2,08
5	Kryvyi Rih	16,78	18	Sumy	1,57
6	Odesa	14,99	19	Lutsk	0,96
7	Mykolaiv	8,70	20	Rivne	0,94
8	Chernihiv	7,09	21	Ivano-Frankivsk	0,64
9	Zhytomyr	6,94	22	Ternopil	0,62
10	Lviv	5,38	23	Luhansk	0,34
11	Cherkasy	4,62	24	Chernivtsi	0,16
12	Vinnytsia	4,55	25	Uzhhorod	0,03
13	Poltava	4,47			

The second model is the gravity model considering the average wage rate (4). The salary is one of the main factors of socio-economic life of each country, staff and people. High wages can make a positive impact on the economy as a whole, providing a high demand for goods and services. Finally, higher wages stimulate efforts of the managers to use workforce carefully and upgrade their production.

Wages is a connecting element between the state, the city, and an enterprise. It is the incentive for productivity growth and an important element of production costs. Wages form the level of the material wellfare of workers. Nowadays the salary remains for the people of our country the main source of income and support of living standards, because wages in aggregate income holds the largest share in average 43%. It is not only an indicator that determines the overall standard of living of workers. The state of wages and forms of implementation, the share of the gross national product depend largely on the possibilities of economic development in general.

We drafted the ranking of cities that allows defining in which cities of Ukraine there is a stronger gravitational force based on the average monthly salary. So, the rating of the cities is as follows:

Table. 3

Rating system of regional centers of Ukraine regarding the gravity model considering the average monthly salary

№	City	Rating points	№	City	Rating points
1	Kyiv	100	14	Kropyvnytskyi	16,35
2	Dnipro	80,43	15	Vinnytsia	16,22
3	Zaporizhzhya	53,03	16	Cherkasy	14,73
4	Mykolaiv	45,36	17	Luhansk	13,28
5	Kharkiv	44,69	18	Khmelnytskyi	10,93
6	Odesa	38,01	19	Ternopil	9,33
7	Kryvyi Rih	31,00	20	Rivne	8,95
8	Kherson	30,09	21	Lutsk	8,61
9	Zhytomyr	25,06	22	Sumy	7,96
10	Donetsk	23,89	23	Ivano-Frankivsk	6,70
11	Lviv	17,04	24	Chernivtsi	4,34
12	Chernihiv	16,88	25	Uzhhorod	1,18
13	Poltava	16,72			

The third model is a gravity model taking into account the gross regional product (4). At the regional level the summary measure that reflects the level of economic development of the region, is the gross regional product (GRP). Its value in market prices is defined as the sum of gross and added value of all economic activities, including net taxes on products (Pribytkova, 2007) The given indicator shows everythingproduced in this region during the

year. Numerous studies show significant disparities of regional development in Ukraine. Gross regional product (GRP) is a summary measure of economic activity in the region, describing the process of production of goods and services.

Without GRP construction of major national accounts is impossible. In Ukraine GRP calculation method is mixed, which means that a piece of data (that usually refers to non-financial corporations, municipal and government transactions) is accumulated by regional statistical agencies and is sent to the center, but some other data are collected by the State Statistics Committee due to other sectors.

Thus, the ranking of cities was drafted which allows to estimate in which cities of Ukraine there is a stronger gravitational forcebased on the gross regional product. The rating of cities is as follows:

Table 4

The rating system of regional centers of Ukraine regarding the gravity model using GRP

№	City	Rating points	№	City	Rating points
1	Kyiv	100	14	Kherson	4,37
2	Dnipro	27,61	15	Lviv	3,93
3	Kharkiv	24,80	16	Donetsk	3,40
4	Zaporizhzhya	16,14	17	Sumy	2,78
5	Chernihiv	14,23	18	Khmelnytskyi	2,35
6	Odesa	12,35	19	Rivne	2,17
7	Zhytomyr	12,34	20	Lutsk	1,31
8	Kryvyi Rih	10,16	21	Ternopil	1,01
9	Mykolaiv	9,90	22	Ivano-Frankivsk	0,89
10	Cherkasy	8,43	23	Luhansk	0,62
11	Kropyvnytskyi	7,87	24	Chernivtsi	0,44
12	Poltava	6,24	25	Uzhhorod	0,06
13	Vinnytsia	5,71			

Having considered all data we can conclude that the level of the most developed economy is observed in Kyiv, Dnipro, Kharkiv, Zaporizhia and Chernihiv.

The fourth model is the gravity model considering the income of population living in given cities (4). The income of the populationis theset of money and monetary receipts to support physical, moral, economic and intellectual condition of people and satisfy their needs.

The incomes are formed due to the payment, the payment of social funds (regional, local, and consumption funds of enterprises and organizations), business income, the income from personal subsidiary house holding and self-employment, as well as from other sources. The sums of incomes and their distribution directly affect the formation, development and use of labor potential of society.

Highly developed countries with high-income andtheir moderate differentiation, as a rule, have powerful employment potential (Canada, Switzerland, Finland, Sweden, Japan, Germany, etc.). The problems of incomes and living standards take a leading position in the

system of labor potential of society. It would be reasonable to consider the gravity model regarding this important indicator.

Thus, the ranking of cities which allows estimating in which cities of Ukraine there is a stronger gravitational force based on the income was built. The rating of cities is as follows:

<div align="right">Table. 5</div>

The rating system of regional centers of Ukraine regarding the gravity model using incomes

№	City	Rating points	№	City	Rating points
1	Kyiv	100	14	Poltava	5,21
2	Dnipro	28,48	15	Lviv	4,86
3	Kharkiv	25,69	16	Sumy	3,68
4	Zaporizhzhya	19,04	17	Donetsk	3,42
5	Chernihiv	16,20	18	Khmelnytskyi	3,22
6	Odesa	16,00	19	Rivne	2,70
7	Mykolaiv	14,41	20	Lutsk	1,73
8	Zhytomyr	12,92	21	Ternopil	1,51
9	Kryvyi Rih	9,14	22	Ivano-Frankivsk	1,12
10	Cherkasy	8,20	23	Chernivtsi	0,87
11	Kropyvnytskyi	8,16	24	Luhansk	0,85
12	Kherson	8,03	25	Uzhhorod	0,09
13	Vinnytsia	6,90			

The fifth model is the gravity model considering the volume of industrial products (4). Industrial production is the useful direct result of industrial and production activities of enterprises in the form of finished products, semi-finished products by means of works and services of industrial character and balance of work in progress. The realized products are products that came in that period to the market and must be paid by consumers. In current conditions the quality of products and services is one of the most important factors in the successful activity of the enterprise or organization.

The data on volume of sales of industrial products of enterprises allow estimating the degree of penetration on the market, formed market situation, competitive position in the market and economic development of the commercial enterprise.

So, the volume of sales of industrial products is one of the determining factors of the efficiency of industrial enterprises, the starting point for determining the resource potential of the company, one of the main factors determining the value of the cost of resources and so on. That is why the model considering the volume of realized industrial production was chosen to determine the gravitational force.

The ranking of cities which allows assessing in which cities of Ukraine there is a stronger gravitational forcebased on the volume of realized industrial production was made. The rating of cities is as follows:

Table 6

The rating system of regional centers of Ukraine regarding the gravity model using the volume of industrial products

№	City	Rating points	№	City	Rating points
1	Dnipro	100	14	Lviv	1,92
2	Zaporizhzhya	56,22	15	Kherson	1,69
3	Kyiv	42,99	16	Kropyvnytskyi	1,54
4	Kharkiv	36,30	17	Sumy	1,11
5	Kryvyi Rih	26,95	18	Luhansk	1,03
6	Donetsk	13,88	19	Khmelnytskyi	0,64
7	Poltava	6,71	20	Rivne	0,53
8	Odesa	5,02	21	Ivano-Frankivsk	0,32
9	Mykolaiv	4,77	22	Lutsk	0,28
10	Cherkasy	3,17	23	Ternopil	0,17
11	Zhytomyr	2,78	24	Chernivtsi	0,09
12	Vinnytsia	2,10	25	Uzhhorod	0,01
13	Chernihiv	2,09			

Conclusions

As a result, six gravity models that allow making a qualitative analysis for the future, concerning the development and prospects of regional centers of Ukraine and the economy in general, since the analysis of small towns has no importance, were built. On the basis of data obtained the graph that shows the ratio of calculated ratings of regional centers of Ukraine was built.
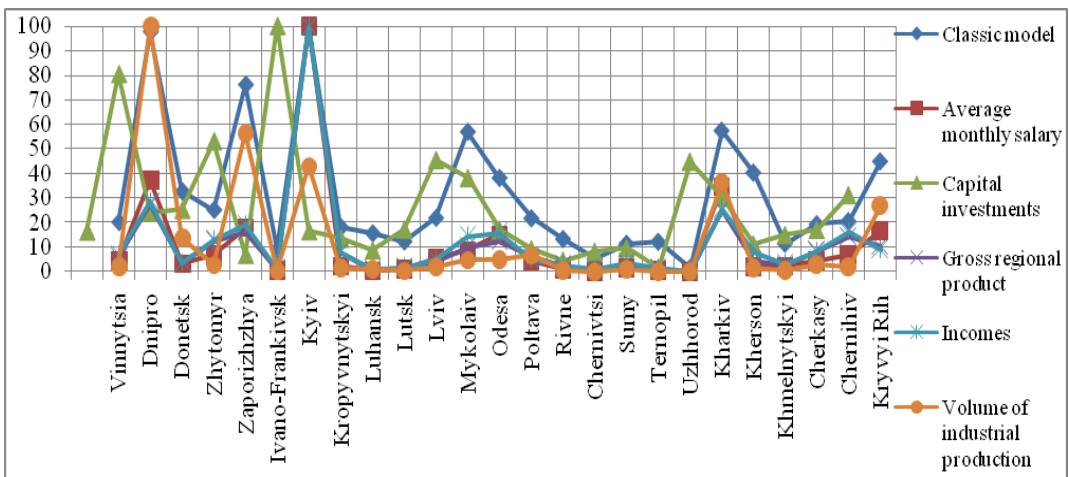
Fig. 1. The rating graph of regional centers of Ukraine

From the graphthree city leaders can be revealed. They are Dnipro, Zaporizhzhia and Kyiv, they have the highest results. Kyiv is leading in almost every rating assessment and has got 100 points that is the maximum rating. Only the model based on the volume of the implemented industrial production shows its 42.99 points. The other three cities: Mykolaiv, Kharkiv and Kryvyi Rih also have got good points. Uzhgorod takes the last place regarding all economic indicators that showsthe low level of the income and standards of living.In the given article the role and use of gravity models as the research method for the best modeling of the overall picture and prospects for the future concerning the economy of Ukraine were considered. The use of gravity models to model the economy is rather important and fundamentally new factor that can affect positively or negatively the activities of not only Ukrainian enterprises but industries and the economy as a whole.

Thus, the study of gravity models allows making conclusion about their widespread use in modeling trade relations, not only at international but also at other levels,for instance, regional and city ones.

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METODOLOGICAL BASES OF IT PROJECT MANAGEMENT
WITH SIMULATION MODELLING TOOLS

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Abstract. The article deals with the problematic aspects of the IT projects' management and the systematized methodologies and modelling tools of the IT projects' risk managements.

It is proved that the problems of management requirements and team collaboration are critical and require the use of simulation models at all stages of the development in order to reduce the project risks.

The author proves the feasibility of using the agent-dynamic modelling approach at different levels of the hierarchy to improve the implementation of the IT projects.

Keywords: IT project, process modelling, the agent-dynamic modelling approach.

Introduction

The implementation effectiveness of the modern IT projects is the creation foundation of an integrated management model based on a new type of the information flows' analysis, business processes' reengineering, ensuring continuity and integrity of the enterprise systems' operation.

However, the development and the implementation of the information systems today are complex, lengthy and costly projects, related to the large risk exposures. One of the features of the modern IT projects is the availability of changes that can be applied not only to the conditions of the project, but also to the purpose of the project itself or its qualitative characteristics. It requires an adequate methodology for modelling as a prerequisite for good governance of the term, costs and risks of the IT projects, the increased manageability and predictability of the project.

The problem of the project management at the theoretical level is examined in the works of I.I. Mazur, V.D. Shapiro, S.Voropaeva, S. Paipe, K. Kucherenko; management of the software projects - in the works of R. Fatrella, F. Donald Schafer, K. Larmana, A.V. Matvienko.

Plenty of standard methodologies for the process of the software manufacturing are developed: ISO9001, ISO12207, ISO15504, CMM (Capability Maturity Model), MSF (Microsoft Solution Framework), RUP (Rational Unified Process), SCRUM, XP (eXtremal Programming) (Beck K., 1999), Crystal Clear, ASD (Adaptive Software Development), Lean Development (Schwalbe K., 2011). However all attempts of formalization have failed, the uniqueness of the software projects highlights the choice problem of methods, practices and rules of the project risks' reduction.

The integration problems of the system dynamics and the agent-based modelling were noted by N. Shyrits, A. Hrosler, A. Borshchiv, V. Veykland, G. Fihuredo, William Aikelin

and others. The features of an IT project were examined in the works of K. Schwalbe, John Sodhi, E. Turban, L. Volonino and McKinsey & Company.

The problems of the collaboration improvement between business and IT were paid attention by B. Brown, David M. Kaplan, T. Weber, J. Laarts, E. and A. Monnuaye Sherdin. The problems of the project life cycle and a system development were focused in the works of Kerznera G., J. Rothman, R.D Archibald, A. Koubern.

At the same time, these works are not considering a number of the methodological problems, reflecting the specific behaviour of agents within a complex system-dynamic IT project environment. We can attribute an un-formalized approach in determining the integration mode of the system dynamics and the agent-based modelling, the lack of a unified methodology to integrate the approaches to the modelling systems and the lack of the applied character of the process modelling for the systems' management, to these problems.

The study is an analysis of the characteristics and risks of today's IT projects and a systematization of the methodologies and modelling tools for the management of the IT projects, the formation of the theoretical and methodological framework and elements of the integrated methodologies to create the models of the IT project on the basis of the process, system and agent-dynamic approach of simulation.

The task of the IT project management in general follows the methodology of the project management, but it has some significant differences that are generated by the task

The differences in the ways of the problem solvation require a special methodology for the IT project management and project risks. There are various international, industry and large IT companies standards in the world, but they are all rather a recommendation, summing up the successful experience in the IT projects' implementation. Unfortunately, the statistical analysis of the projects' success in the IT field within 10 years with the small fluctuations has been stable in the range of 20-30%. The successful projects are those projects which accomplished all the planned scope of work on time and in the frames of the budget.

In Ukraine, according to the researchers, only 4% of IT projects are completed on time, which is one of the lowest indicators in Europe. The leaders here are Sweden (44%), Switzerland (22%), Czech Republic (20%), Germany (19%) and Denmark (16%). Only 16.2% of the projects, completed on time, did not exceed the planned budget and implemented all necessary features and capabilities; 52.7% of the projects ,completed late, exceeded the cost of the planned budget, the required features were not implemented in full; 31.1% of projects were cancelled before the completion. For the projects, completed late or cancelled, the average project budget was exceeded by 89%, and the deadline - by 122% (Chaikovska, Zharova, 2014).

The main reasons for this situation are the following general trends:

1. Inconsistency of the created software and requirements of business objectives.

2. Selection of an inappropriate technology for the project.

3. The problem of understanding the project participants (especially the internal and the external ones for the organization).

4. Violation of the interaction processes in the project team.

5. Failure to follow roles and acceptable functional compatibility of the project team members.

6. The use of inflexible processes at the creation of IP.

7. Insufficient affordance of such risk categories as political risks, which, along with the main risks of IT projects, have a significant impact on results.

The features of IT projects are directly concentrated in the field of high uncertainty and weak demands of clarity. The requirements have different stakeholders, their requirements are not always accurate and often contradictory, not ranked. In addition, the requirements may change during the project, it is difficult to adequately assess the scope and the cost of the project at the early stage (estimated difference is up to 4-5 times), causing difficulty in rating of the resulting products (functional specifications and ready modules) (Chaikovska, 2015).

The product competence, directly attributable to the problem, has the following structure:

- Evaluation process; knowledge of standard processes;
- Definition of products;
- Evaluation of alternative processes;
- Management requirements;
- Management of subcontractors;
- Initial assessment;
- Selection of methods and tools;
- Fitting processes; tracking the quality of products;
- Understanding of actions for the product development.

The analysis of the project management competencies demonstrated that the technical difficulties are not a priority, giving up to the human factor. To implement a system in the company, three functionally important groups are formed: a group of developers, an implementation team and a group of users. The success of the project is determined primarily by the chosen methodology of interaction, skills of the development team and only then by the tool which they use.

The model and parameters of the software industry are largely dependent on the type of the projects that can be classified as:

- Product design writing on demand;
- Continuous customer service project;
- Making replicable product;
- Outsourcing.

The most sensitive type of the project is the first one because of the need in constant searching for new customers. The risks are critical due to the high dependence on the number of contracts.

Among the reasons, causing the failure of the first group of projects at the competence development in tracking quality is the paramount belonging to the Initial Level, which increases the following factors, specific to the domestic projects:

- Lack of discipline and interest of the project participants in the final result (due to the poor motivation of the intended project participants);
- The lack of consideration of the developer values' specific local scale, which does not directly apply to the Western standards;
- Weak documentation of development (which is the reverse side of the spiral model of the information system life cycle);
- Piecemeal development process (due to the need in the implementation of complex projects in a short time);
- Incorrect methods of communication; instability of teams;

- Problems at testing (as opposed to the Western standards, adopting the ratio of 1: 2 of the developer-tester, in the Ukrainian projects the situation is reversed: 2 to 1, which reduces the quality of the product significantly).

To reduce the risk of this group, a process approach and a system-dynamic approach simulation should be used; to monitor the requirements of the management process, the UML models should be created by using variants and attracting the customers for the models' discussion, clearly defining the scope of the project to formulate criteria for a project.

Figure1 gives a piece of the discrete simulation model of the IT enterprise that was built, according to the system-dynamic principle and implemented in iThink. It is a decision support system as it allows to combine several functional spaces into one organization and provide the organizational and quantitative basis for the development of the more effective management policies.
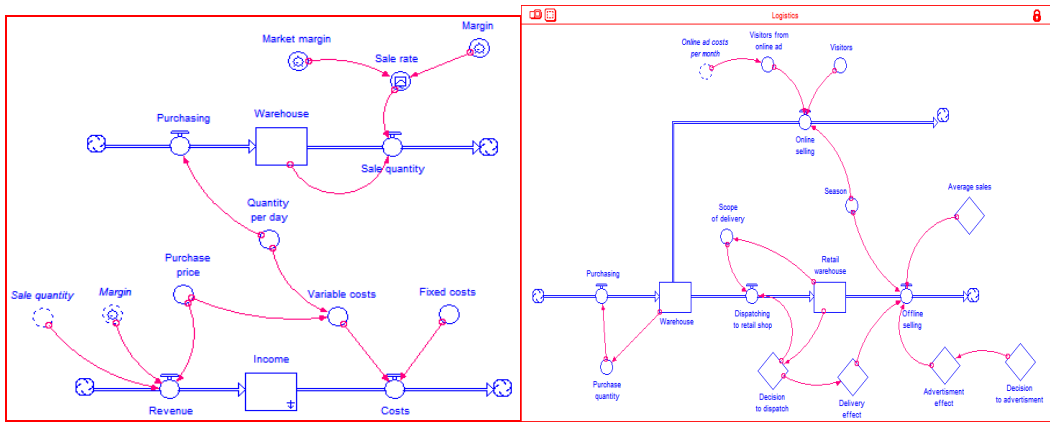
Fig. 1. The Model of Financial and Product Blocks of IT Company
(Compiled by the Author)

The results of experiments with the model are shown in Figure 2.
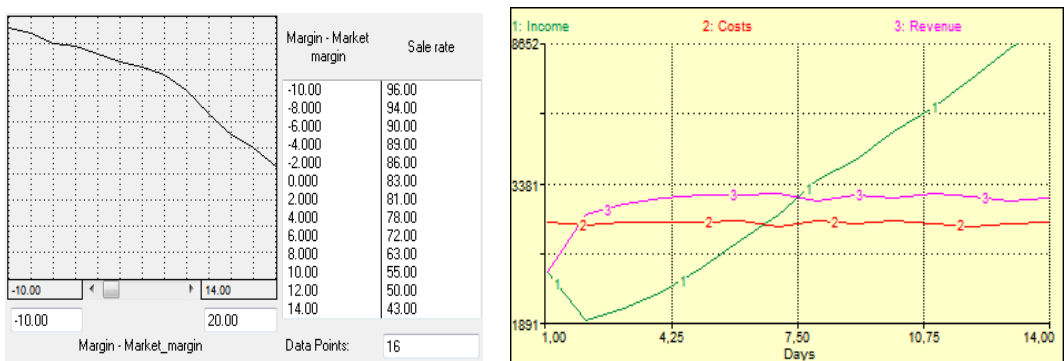
Fig. 2. Dynamics of Changes in Model Parameters (Compiled by the Author)

The simulation experiments with a model with the uniform and the exponential distribution of orders' flow led to the following conclusions:

- On optimization directions of the IT workers' loading.

- On optimization of the production cycle (when increasing the flow of orders by 20%, the production cycle increases).

- On the profitability factors of the IT project (the level of orders' flow, revenues and expenses, profits, wages).

Thus, the most critical risks of the IT projects are the related requirements' risks. The main way to combat these risks is to control the management process requirements, the creation of UML models by using variants and attracting the customers to discuss the models, a clear definition of the project boundary and the concepts of the project quality.

The quality of the IT project is usually seen through the prism of the software quality, which has such attributes as correctness, flexibility, efficiency, community, interaction between operations, opportunities for support, portability, reliability, re-use, testability.

Some researchers replaced the concept of quality with the concept of complexity, highlighting the logical (cyclic) complexity, the complexity of data, the complexity challenges by using a jump, functional complexity. Japanese companies add the time, required to remove defects after the product release, to the overall development time and use it as a key factor in determination of the key factor.

We believe a project can be considered a quality product if it meets the expectations of a customer; satisfies the constraints of the project; meets the needs of users; provides the ability to use it; ensures its smooth deployment.

A necessary condition for the quality performance of the IT projects within the current models is the use of the effective tools for modelling at the early stages of the IT project: determination, formalization and approval of requirements for IP.

The application scenario approach allowed identifying the areas of modelling: the process approach and the simulation modelling, including the agent modelling.

The simulation modelling allows us to study the problems of the complex systems for which there is no analytical solution.

It includes the following four approaches:

- system dynamics (Roberts, 2012),
- dynamical systems (MacCormack, 2013),
- discrete-event (McLeod, Jordan, 2012),
- agent modelling (Eamonn, 2008).

However, when the system that represents the company needs to be examined from a global point of view, or when the disparate elements of the system are to be examined together, the use of only one approach will not work. In this case there is a need for a comprehensive combination model. The most promising area for it, in the author's consideration, is the integration of the system dynamics (SD) and the agent-based modelling (AM) into a single agent-dynamic approach. Unlike the system dynamics, in the agent modelling, an individual group of members, such as firms in the economy or people in a social group, are represented explicitly, not as the aggregate object. The combined CD and AM approach, namely the agent-dynamic modelling (ADM) is a more versatile approach to the business modelling that takes into account the structure of a high level with a lot of active objects and the complex behaviour that meets the specifics of the IT projects (Chaikovska, 2014).

The agent-dynamic models can be used at different levels of the company hierarchy: strategic, tactical and operational.

At the strategic level the model can be established for the preliminary testing of different strategies or global solutions and policies. The advantages of this simulation are as follows. Firstly, it reduces the risk of the disastrous decisions that have led to the negative consequences of the company. Secondly, the management of the company improves the understanding of the relationship of individual units and processes in the company and the operation of the company as a whole.

At the tactical and operational levels, the employees' awareness of the importance of their particular executable process, the importance of their work in the areas of processes throughout the company occurs. As a result, the personal motivation of the employees, the corporate responsibility and the productivity of the whole company increase too.

To create a simulation model, it is advisable to model the IT project team consisting of such agents as: a project manager, a project management team (the Management Team, which helps project manager), analytical and technical experts. The analytical professionals include business analysts and system analysts. The technical experts include developers, programmers, testers, etc. This group is made for the easy modelling of project participants as replicated agents and does not necessarily imply at combining the roles of the participants (Chaikovska, Hmelevska, 2015). To build a model of the IT project's internal relations, AnyLogic is used, being a tool for the simulation modelling (IM), which supports all approaches to the development of simulation models,- the process-oriented (discrete-Event), the system dynamics, the agent-based, - and any combination approach of the agent-based modelling.

The model includes a population of agents, "Management", "Project Manager", "Logistician" and "Technical Service" (Figures 3, 4):
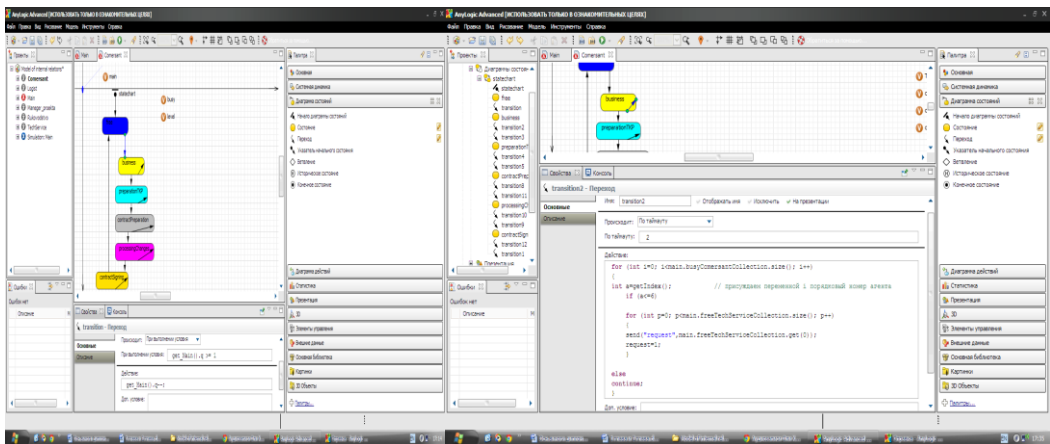
Figures 3, 4. Transition from the Free State to the State of Business
(Compiled by the Author)

Figures 5, 6, 7, 8 show the diagrams filled with class agents:
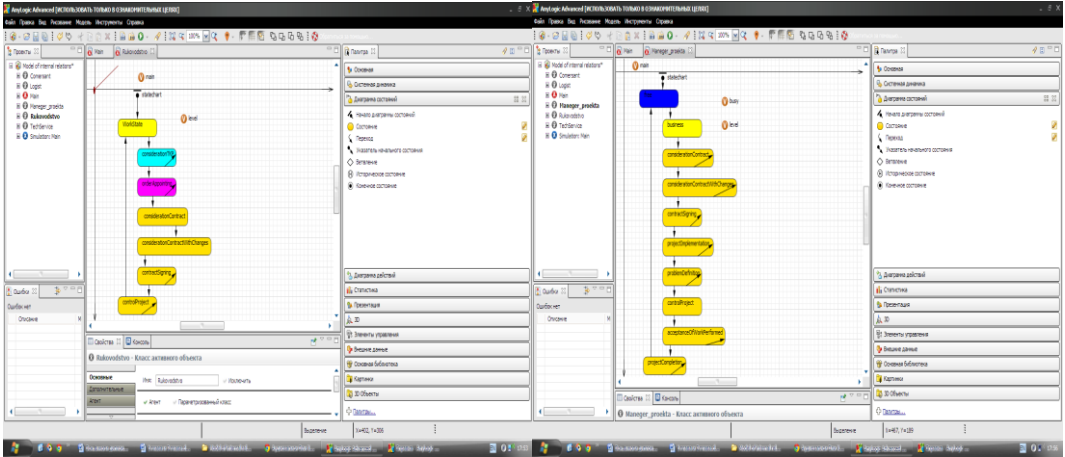
Figures 5, 6. The Model Diagram of the Class IT-Project Manager
(Compiled by the Author)
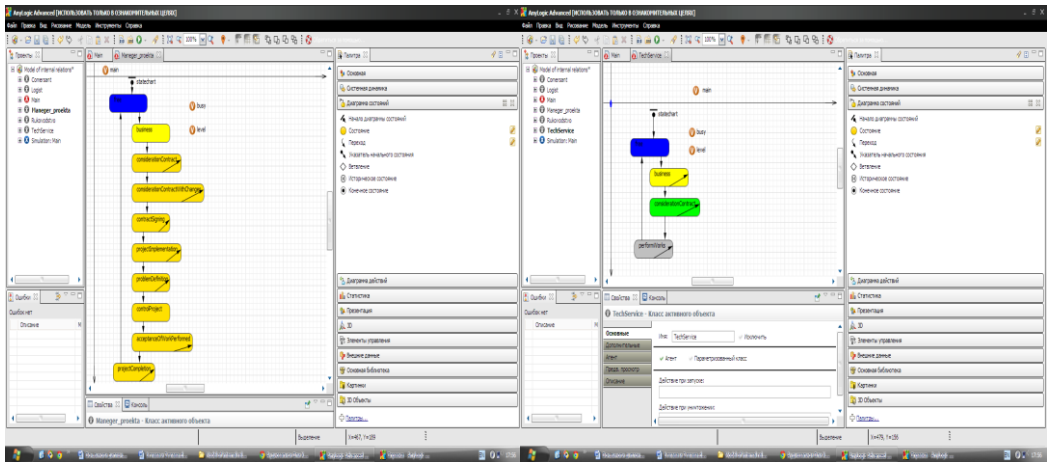
Figures 7, 8. The Model Diagram of the Class Technical Service and Logistician
(Compiled by the Author)

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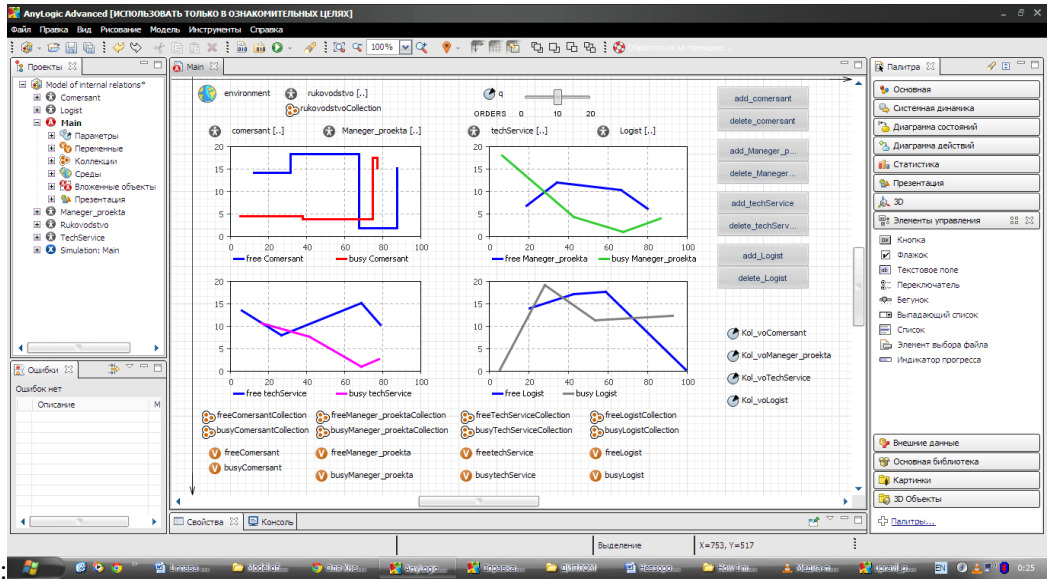
Fig. 9. The Interface Model of the IT Project Internal Relationships
(Compiled by the Author)

Figure 10 presents the model simulation's results with default settings.
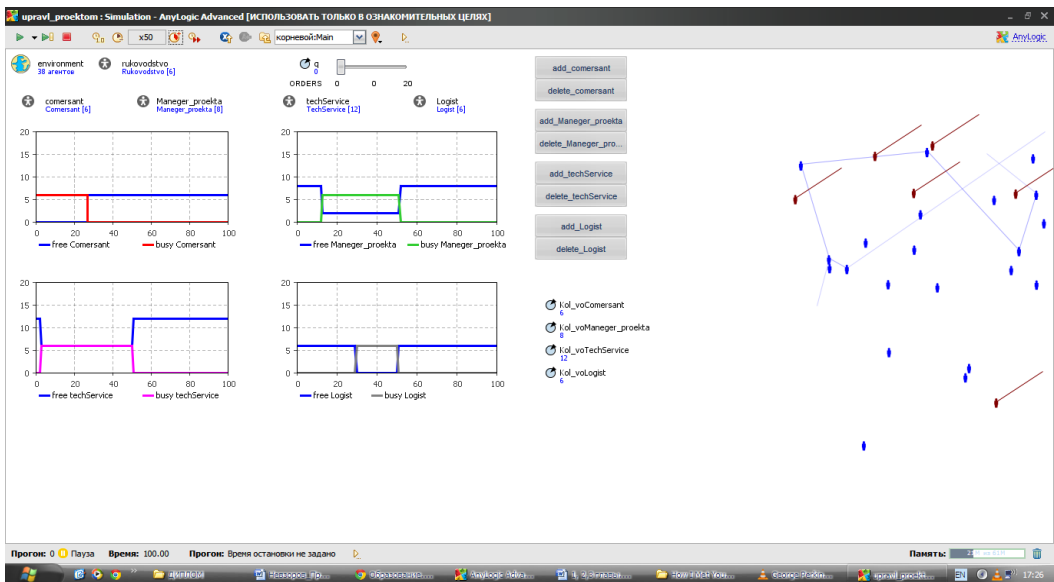
Fig. 10. The Simulation Process Running with the Standard Parameters
(Compiled by the Author)

The results of the model simulation allowed analysing the dynamics of changes in the number of employees in the IT projects, costs, profit performance and execution of orders.

The results of model experiments with changing the number of employees are represented in Figures 11, 12:
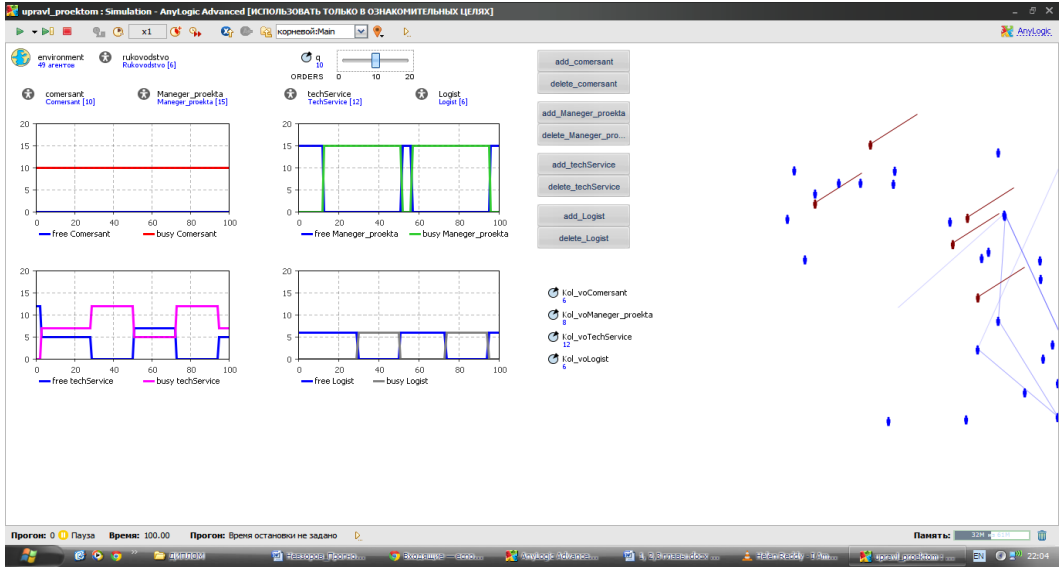
Fig. 11: Model Experiment with the Orders' Number Increase
(Compiled by the Author)
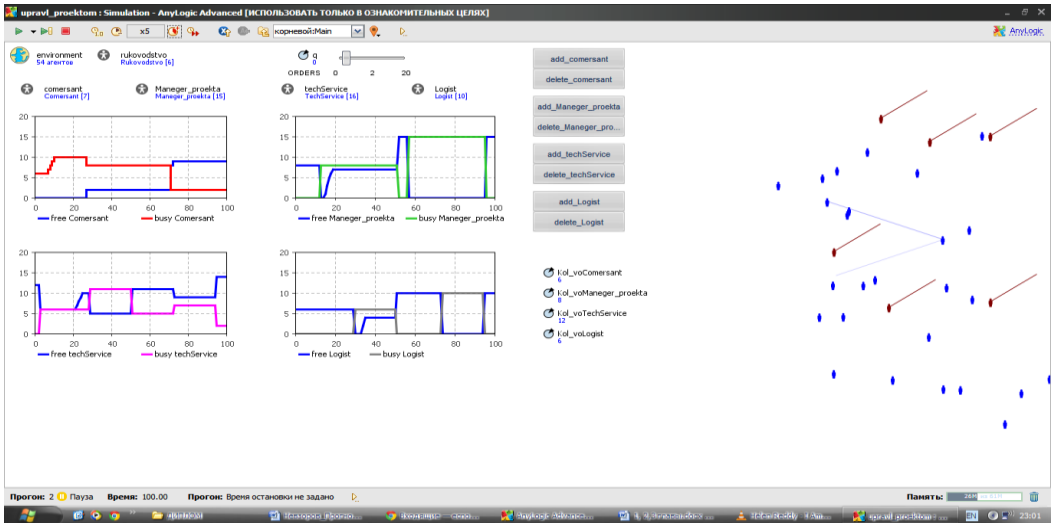
Fig. 12. Model Experiment with the Orders' Number Decrease
(Compiled by the Author)

The interaction of the IT project team with the external agents can also be viewed through the prism of the project life cycle's phases. This chart, giving the opportunity for the agents to display all the relationships in terms of stages, is also useful in the process of modelling, because it allows you to check whether all the relations between the agents are reflected in the created models.

To create an agent-dynamic model of the IT project, providing the IT simulation project for the life cycle of the project, it is necessary to identify the main processes, modelled at each stage.

The evaluation of project boundaries is completed by the project manager and in some cases by the sponsor. But as the future model is be the project manager's auxiliary tool in the project management, then the whole process of modelling should be done in terms of the project manager. Thus, during the project initiation it seems appropriate to create an additional simulation model to assist the project manager in the evaluation of the project boundaries. To solve this problem it was proposed to use the method optimization in software environment AnyLogic with the built-in optimizer OptQuest, which systematically changes the model parameters to minimize or maximize the objective function value.

The goal of the optimization is to find the optimal strategy for the implementation of the IT project to exercise a given content to a certain point of time at the lowest cost to meet a customer demands. To configure the functional optimization, the minimization option is used, as the objective is to minimize the cost and timing of the project. As the target functionality is minimized, such variables as the amount of expenses per a month (InitialMonthlyCost) and the amount of time per a month (InitialMonthlyTime) are used, in which the Project is implemented (InitialScope). The content of the project serves as the limit of the optimization parameters that are checked before starting the experiment. As an additional requirement, presented for the decision search after the experiment running, a customer satisfaction is used, which is expressed as a percentage.

Thus, we can conclude on the relationship of the involved risks and the initial level of work on the project management methodologies, the priority interaction and human factors over the technology. The necessary condition for quality performance of the IT projects is the use of the effective tools for modelling at the initial stages of the IT project definition, formalization and approval requirements for ICs, allocation of relationships and goal-setting of the IT project, according to the business plan of the company.

The use of the effective agent-based modelling tool at the stage of the IT project harmonization allows to realize the interconnected chain: the development of the management model - the formation of project documents – the confirmation with the developer - the consent of the client - update, which allows the detailed determination of functional requirements of IP, significantly reduces the project cycle timing and lowers the risks, implements the following measures, improving the quality of the IT project:

1. Gives the possibility of changing requirements during the project, as more often the initial targets of the project did not fully reflect the needs of a customer and there is a need to clarify or modify the system of requirements already during the development.

2. Controls the iteration design requirements and permits the system adjusted according to the requirements change. The monitoring compliance at all stages of the project is a part of the quality system.

3. Prototyping of business logics, the functional style and the user interface gives an opportunity to test the system, being not completed yet, to a customer and to identify and

eliminate the non-compliance, which reduces the time and cost of the system development at the early stages of the project.

4. The use of visual modelling, design diagrams, illustrating the functioning of the system that allows the project participants to find the common ground at all stages of the system development.

5. To reduce the period of the system "break-in" at the trial operation stage and during the warranty it is important for the developer to get information on the detected errors.

To reduce the risks associated with the project implementation and to guarantee the quality of execution, along with the experience in development and sufficient resources, a model, based on the agent-based modelling methodology that provides a predictable result of agents, a transparent development process and helps to attract a customer into the process of development, is needed.

Conclusions and Suggestions:

As a result of this study, the theoretical and methodological framework for the agent-dynamic model creation of the IT project management was prepared. It reveals the principles of the agents modelling in the system-dynamic environment as the interaction complex of the internal and the external members of the IT project, according to the certain rules at different life stages of the project, taking into account the life cycle of the system development.

The agent-dynamic model will improve the understanding of the modelled system structure and its dynamic processes as well as the principles of the elements' interaction in the complex. As a result, we may not only improve the quality of management decisions, but also reduce the costs significantly. The agent-dynamic model will also play the different versions of the project, change the main constraints of the project, leverage and see how it will affect the results of the project. Using this tool, the project manager can review the project before its implementation, compare the projected results of the project alternatives with each other or with the results of the similar projects and choose the best of them.

The scientific novelty of the proposed approach is the symbiosis of the process and the agent-dynamic modelling areas that can be shown in the model created by the relationship between the agents. It allows to consider the interaction between the IT project teams and the external agents in the light of the life cycle phases of the project, not only showing the agents' relationship in terms of the stages, but also helping to increase the understanding of the cognitive nature of the IT project, the principles of the elements' interaction in the complex.

The results can be used in all phases of the IT projects, giving the opportunity to realize the interconnected chain: the development of the management model - the formation of project documents - the confirmation with the developer - the consent of the client - update, which allows the detailed determination of functional requirements of IP, significantly reduces the project cycle timing and lowers the risks, implements the measures which improve the quality of the IT project.

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INCREASE OF ENERGY EFFICIENCY OF THE UKRAINIAN ECONOMY: PROBLEMS AND PRIORITIES

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Abstract. The article deals with the factors slowing down the energy efficiency processes of Ukraine's economy. To identify existing problems the structural-functional and value engineering analysis of energy consumption dependence on conditions of economic environment has been made. The priority directions and instruments to intensify energy efficiency policy in Ukraine have been suggested.

Keywords: energy efficiency, energy consume, sector of the economy, share of energy, cost of energy.

Introduction

Modern paradigm of normal functioning of the economy determines a plenitude of demands for energy resources as one of the dominating factors for almost all the countries. The solidity of energy needs can be achieved by having sufficient and stable resource and energy base, on the one hand, and by providing efficient use of energy resources, with improvement and development of energy supply, on the other hand. The phenomenon of the world economic experience, such as the "resource curse" and "Dutch disease", shows the advantages of the second way of meeting the energy needs of the economy.

Ukraine is characterized by high unit costs of energy resources in almost all the fields of economic activities. Besides, Ukrainian economy has a significant dependence on import of energy and hydrocarbons. Despite some progress in energy efficiency, which has occurred recently, the processes of implementation of projects and activities to improve energy efficiency occur rather slowly, selectively and not systematically. Therefore, there is a need for a detailed structural analysis of complex trends of energy consumption of the Ukrainian economy. It will help to identify topical problems and suggest priorities for improving energy efficiency.

Key trends of energy efficiency in Ukraine

Research of energy efficiency requires the selection of adequate methodology for analyzing and building the relevant indicators. According to the International Energy Agency (IAE) methods, energy expenditures are measured in millions or thousands tons of oil equivalent (Mtoe, Ktoe). Major indicators of energy efficiency evaluation are the total primary energy supply (TPES) per one-dollar GDP and per one-dollar GDP at purchasing

power parity (TPES/GDP, TPES/GDP PPP). Thus, the difference of the currency rate embedded in the calculation of purchasing power parity can significantly affect the efficiency indicator. Together with the total primary energy supply, energy balance provides information about the total final consumption (TFC) that allows performing calculation of the final energy expenditures per GDP (TFC/GDP, TFC/GDP PPP).

The trends of specific indicators of energy expenditure for 2008-2014 shows a slight increase of efficiency of Ukrainian economy (fig. 1). In 2014 GDP amounted to 134.02 billion 2010 USD that is 1.15 times less than in 2008, and TPES amounted to105.68 Mtoe, or decreased compared to 2008 1.27 times. However, TFC for this period decreased by 1.35 times. Thus, the ratio of TFC/TPES decreased from 0.62 in 2008 to 0.58 in 2014, reflecting the negative impact of the effect of scale on energy efficiency *(Shevtsov, 2014)*. It should be noted, that the ratio between final consumption and primary energy supply is characterized as a conversion efficiency of energy resources, and specific types of economic activities in the country. In particular, in 2014 the ratio of TFC/TPES for individual countries wasas follows: Germany–0.71, France–0.61, Poland – 0.69, Belarus–0.73. However, in the context of a comparison of individual European countries TPES and GDP statistics are not for the benefit of Ukraine. Therefore, in 2014 TPES in Germany totaled 306.07 Mtoe, which exceeded the Ukrainian one by 2.89 times, while GDP of Germany was 3624.17 billion of 2010 USD, surpassing value of Ukraine by 27.04 times. France (2.29 and 20.37) and Poland (0.89 and 3.99), correspondingly, give a similar ratio.

Besides the above said, low energy efficiency of the economy worsens due to the weakness of the national currency *(Ukraine, 2012)*. In 2014, the divergence of energy efficiency for TPES/GDP and TPES/GDP PPP was 2.55 times for Ukraine, for Germany – 0.89 times, France – 0.9 times and Poland – 1.64 times. On the one hand, decline of hryvnia creates favorable conditions for export-oriented sectors of Ukrainian economy, but,on the other hand, leads to non-motivation energy efficiency in industry.
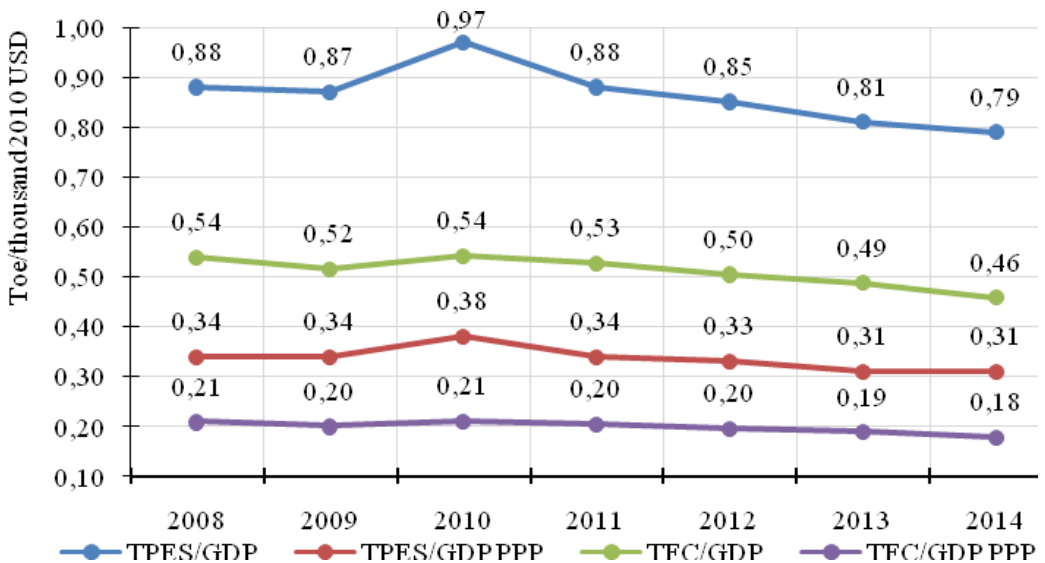
Fig. 1. Ukrainian energy efficiency in 2008-2014
(IEA statistics)

Taking into account the share of imported energy in the structure of energy supply, the following adverse implications are displayed in economic activity and   welfare of the population.

The changes of energy supply and consumptionin Ukraine

The dynamics of energy efficiency essentially depends on changes in types and product structure of energy use. In 2008-2012, the basic sources of primary energy supply were coal and natural gas, which are used both for conversion to other forms of energy and for final consumption, and nuclear energy, which is converted into electricity. Against the falling trends of the energy from coal and natural gasproduction, the volume of oil products increased (table 1).

Table 1

Share of TPES and TFC in 2008-2014

Indica-tor	Ukraine								Germany		France		Poland	
	2008		2010		2012		2014		2014		2014		2014	
	Ktoe	%	Ktoe	%	Ktoe	%	Ktoe	%	Ktoe	%	Ktoe	%	Ktoe	%
TPES, total	134642	100,0	132428	100,0	122512	100,0	105683	100,0	306070	100,0	242642	100,0	94018	100,0
coal	41799	31,04	38251	28,88	42545	34,73	35576	33,66	79602	26,01	9288	3,83	49313	52,45
crude oil	11166	8,29	11497	8,68	5073	4,14	3043	2,88	94012	30,72	55459	22,86	24640	26,21
oil products	3202	2,38	1682	1,27	6559	5,35	7645	7,23	7000	2,29	14790	6,10	-2655	-2,82
natural gas	52805	39,22	55229	41,70	43019	35,11	33412	31,62	63356	20,70	32585	13,43	13401	14,25
nuclear	23566	17,50	23387	17,66	23653	19,31	23191	21,94	25312	8,27	113748	46,88	0	0,00
hydro	990	0,74	1131	0,85	901	0,74	729	0,69	1684	0,55	5403	2,23	188	0,20
geothermal, solar, etc.	4	0,00	4	0,00	53	0,04	134	0,13	8842	2,89	2350	0,97	698	0,74
biofuels and waste	1689	1,25	1597	1,21	1695	1,38	1934	1,83	29179	9,53	14792	6,10	8218	8,74
electricity	-579	-0,43	-349	-0,26	-987	-0,81	-725	-0,69	-2914	-0,95	-5778	-2,38	186	0,20
heat	0	0,00	0	0,00	0	0,00	745	0,70	-3	0,00	5	0,00	29	0,03
TFC, total	82872	100,0	73933	100,0	72548	100,0	61460	100,0	216322	100,0	147652	100,0	65271	100,0
coal	10068	12,15	7987	10,80	8717	12,02	9180	14,94	6787	3,14	3158	2,14	11861	18,17
crude oil	0	0,00	10	0,01	9	0,01	8	0,01	0	0,00	0	0,00	0	0,00
oil products	13532	16,33	12548	16,97	12481	17,20	10141	16,50	92099	42,57	67305	45,58	20952	32,10
natural gas	34147	41,20	28396	38,41	26605	36,67	20955	34,10	49942	23,09	28228	19,12	10406	15,94
nuclear	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00
hydro	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00
geothermal, solar, etc.	0	0,00	0	0,00	0	0,00	0	0,00	709	0,33	129	0,09	37	0,06
biofuels and waste	1207	1,46	984	1,33	1030	1,42	1201	1,95	13532	6,26	10898	7,38	5744	8,80
electricity	11612	14,01	11526	15,59	11839	16,32	11041	17,96	44104	20,39	35718	24,19	10824	16,58
heat	12306	14,85	12481	16,88	11865	16,35	8933	14,53	9148	4,23	2217	1,50	5446	8,34

(Calculations are based on IEA statistics)

The positive trend was the growth of the share of alternative sources of energy (geothermal, solar, etc.) from 4 Ktoe in 2008 to 134 Ktoe in 2014, but this share was only 0.13%in the primary balance in2014, which is inessential. At the same time the share of alternative sources in Germany amounted to 2.89%, in France to 0.97%, in Poland to 0.74%.

The differences of fractions of biofuels and waste as energy sourcesis very illustrative. In period from 2008 till 2014 this share was only 1.25-1,83% in Ukraine with relatively little change in the volume of biofuel proposals (from 2008 to 2014 growth was 15%). In 2014 in Germany the share of biofuel and waste amounted to 9.53% of primary supply, in France - 6.1%, in Poland – 8.74%. Despite the fact that the primary supply in Poland was by 1.12 times less than in Ukraine, initial supply of biofuel prevails by 4.25 times.

Structural changes for theperiod of 2008-2014, which occurred in TFC and TPES, do not show trends of optimization of energy consumption due to the impact of situational factors of economic environment. The largest share of TFC is accounted for industrial and residential sectors: 33.47% and 33.17% correspondingly, the share of transport amounted to 16.8%in 2014.In Ukraine industrial and residentialsections are identified as the sectors, which have the biggest potential for energy savings. Industry is the largest final consumer of coal (91.59%). The largest final consumers of electricity are residential section (43.62%), industry (35.73%), commercial and public services (18.26%). Natural gas in final energy consumption accounted for most on the residential section (56.04%) and industry (15.86%). In industry, the natural gas consumption dropped from 9687 Ktoe in 2008 to 5272 Ktoe in 2012, and 3324 Ktoe in 2014.This reduction is primarily associated with a decrease in the volume of industrial production and with the modernization of individual enterprises of metallurgical complex. In particular, the gross added value of industry from 2008 to 2014 in terms of comparable prices decreased by 42.5%, industrial consumption of electricity decreased by 18%, but industrial consumption of coal increased by 7%. Besides, the share of biofuels and waste used by Ukrainian industry varies on the level of 4-4.5%, while in Germany it is 27.59%, in France – 11.89%, in Poland – 31.96%.

Volumes and dynamics of the vertical structure of TPES and TFC indicate that the potential for energy efficiency is being implemented slowly, despite all efforts of the government, public and support of international organizations *(Uglublennyy, 2013)*. State Energy Efficiency Program for 2010-2015, developed with the support of international organizations, intended to achieve a number of objectives, including:

– reduction of the energy capacity of GDP by 20% compared to 2008;
– increase of the share of renewable energy up to 10%;
– reduction of the cost of natural gas for the production of heat by 60%;
– reduction of energy costs for government agencies by 50%;
– increase of the annual replacement of imported natural gas from other sources by 12.2 Mtoe.

However, the efficiency of the economy depends on technical and technological characteristics of the consumption and the cost of energy. Thus, according to analytical estimates the cost of 1 toe of imported energy resource in 2008 amounted to 349.8 USD, in 2012 – to 563.0 USD, in 2013-2014 there was reduction to 21.8%. These trends have a negative impact on the overall value of the imported energy supplies, such as leveling the physical reduction of import (*Melnyk, 2016*). Correspondingly, the capacityof energy policy is not only a necessity for technical optimization of energy use, but also an opportunity to change the comparative value of energy in terms of potential consumer. Activation of energy efficiency is to create conditions of economic interest to businesses in maximizing the useful

output from each unit of energy resource.

Specific character of energy use in different sectors of the economy

The level of energy consumption by individual sectors of the economy depends on a number of technical and economic factors. The combination of key parameters, such as availability, price, quality, interchangeability, direction and flexibility of the applicationform the demand for energy resources and specific characterof their use. From a consumer perspective the entity role of each resource (including energy) is determined through the complex of a particular set of characteristics. Therefore, the improvement of energy efficiency in terms of a business entity is not the goal but strategy or means of achieving economic interests and benefits.Extensive strategy, as a rule, is carried out at the expense of expanding involvement of energy resources in production process. These resourceshave less absolute and/or specific value according to the source of technical and economic characteristics. The substituteresources have related or identical properties for the economic relevance of the economic process, the purpose of the economic activities, using as a factor of production or the nature of consumption in economic activity (fig. 2). In contrast, intense strategy is carried out by increasing the efficiency of energy use by introducing innovations and achievements of scientific and technological progress, enhancing existing and establishing new production and business operations, processes and forms of organization of economic activity.
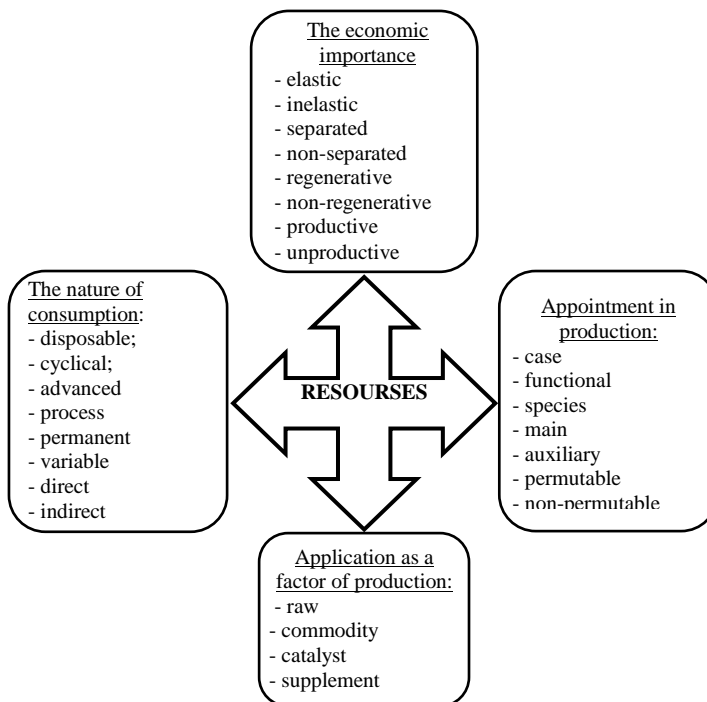
Fig. 2. Resources systematization according to their value in economic activity
(developed by the authors)

Together with the quantitative and structural differences in energy consumption between Ukraine and Europe, there is also substantial difference in prices for energy resources. Studies point to the issue of thefunctioning of the market mechanisms for stimulation, namely, excessivegovernment regulation of the energy market. Therefore, in Ukraine tariffs for industrial consumers are significantly above the market price and tariffs for the population does not cover a half of the costs, while in the EU the alignment is opposite: in France the average price of electricity for households is by 1.85 times higher than price for industrial sector, in Germany the figure amounts to2.24 times. The average EU household pays for electricity 2.16 times more than an industrial entity. The average cost of natural gas for households (at the exchange rate on November 2015) in Europe is 2.52 times higher than in Ukraine. In particular, in Germany it is 2.57 times, in France – 2.66 times, in Sweden – 4.29 times. Price of gas for industry is almost the same in EU and exceedsthe Ukrainian price only by 4%/ (Yevropeyskiy, 2015).

This price disparity reflects the strategy of European countries to stimulate the productive use of energy resources and optimize non-productive consumption. The level of economic development and the welfare of its citizens corresponds to energy needs. The rising cost of energy would promote more dynamic transformations and increase energy efficiency of the Ukrainian economy.

The analysts of the German Advisory Group (Mayssner, 2012) highlights the main issues that are to be be resolved at the government level:

− administrative pricing, subsidies and cross-subsidies which distort prices of energy resources;

− lack of competition and inefficient use of energy as a result of existence of state property and vertically integrated monopolies;

− lack of proper legislative framework governing legal relations in the residential sector and other energy-related areas.

Along with the above factors, there are general conditions of business activity, trends, specific economic terms and conditions of significant influence. They are reflected on the horizontal structure of energy consumption (table 2). By approximate calculations cost of 1 toe of electricity (scaled according to the NBU exchange rate and to the established prices and tariffs) in Ukraine amounted to the following figures: in 2012 – 185.54 USD for residential section and 577.78 USD for the industry; in 2014 – USD 143.54 for residential section and 465.69 USD for the industry. Cost of 1 toe of natural gas in 2012 was 169.19 USD for residential section and 611.39 USD for the industry; in 2014 – USD 134.69for residential section and 416.81 USD for the industry. It caused the growth of the prices on energy resources in hryvnia equivalent.

For export-oriented enterprises, which receive currency earnings, such a situation does not stimulate the implementation of comprehensive and systematic measures of energy efficiency. Correspondingly, actual cost of energy for residential section and domestic businessfalls.The latest trends in energy price increase occurred with the growth of the rate of USD.

Thus, the cost of energy for 1 toe in 2016 was as follows: 160.07 USD for electricity in the residential section and326.90 USD for the industry; USD 336.96 for natural gas in the residential section and 321.12 USD for the industry. More accurate and probable calculations require taking into account all the scenarios of energy consumption, market dynamics, and the economic efficiency of production and the welfare of the population. It will allow getting adequate evaluation and forecast of energy efficiency. Therefore, along with exceeding

Ukraine on GDP, the EU has the highest standards of life of the population, which is reflected in the greater energy consumption per capita in the sector of commercial and public services. That is why the increase of electricity consumption can revealnot reducing of energy efficiency, buta greater level of residential section needs.

Table 2

Share of energy consumption by sectors of the economy in the period from 2008 to 2014

Indicator	Ukraine				Germany	France	Poland
	2008	2010	2012	2014	2014	2014	2014
Industry	**100,00**	**100,00**	**100,00**	**100,00**	**100,00**	**100,00**	**100,00**
coal	26,01	27,29	31,08	40,88	10,54	10,69	26,27
oil products	4,68	5,46	5,19	4,48	5,14	8,75	5,03
natural gas	32,08	25,81	21,98	16,16	34,09	38,54	22,57
biofuels and waste	0,18	0,16	0,19	0,23	6,80	5,01	12,96
electricity	19,12	22,73	22,62	22,74	35,85	37,01	29,18
heat	17,94	18,55	18,94	15,52	7,58	0,00	4,00
Transport	**100,00**	**100,00**	**100,00**	**100,00**	**100,00**	**100,00**	**100,00**
coal	0,22	0,21	0,10	0,07	0,00	0,00	0,00
oil products	61,65	68,24	75,74	70,80	92,30	90,65	91,53
natural gas	32,19	25,57	17,39	22,01	0,82	0,21	2,31
biofuels and waste	0,00	0,00	0,00	0,40	5,07	6,67	4,51
electricity	5,95	5,98	6,77	6,72	1,81	2,46	1,66
heat	0,00	0,00	0,00	0,00	0,00	0,00	0,00
ResidentialSection	**100,00**	**100,00**	**100,00**	**100,00**	**100,00**	**100,00**	**100,00**
coal	3,31	2,00	3,04	1,42	1,12	0,40	33,47
oil products	0,42	0,34	0,24	0,16	23,62	16,61	3,22
natural gas	60,51	59,00	58,68	57,61	35,67	28,88	16,58
geothermal, solar, etc.	0,00	0,00	0,00	0,00	1,19	0,23	0,14
biofuels and waste	4,76	3,83	3,99	5,25	9,54	16,31	13,29
electricity	11,75	13,26	14,08	16,44	21,73	34,44	12,75
heat	19,25	21,56	19,97	19,12	7,14	3,13	20,54
Commercial and public services	**100,00**	**100,00**	**100,00**	**100,00**	**100,00**	**100,00**	**100,00**
coal	4,64	3,81	2,62	1,57	0,16	0,51	8,60
oil products	1,23	1,59	1,56	2,29	21,45	10,89	5,58
natural gas	10,82	7,50	9,25	17,93	30,29	29,07	20,65
geothermal, solar, etc.	0,00	0,00	0,00	0,00	0,30	0,14	0,13
biofuels and waste	0,87	0,26	0,54	0,60	6,44	2,25	2,77
electricity	39,50	35,41	39,54	43,23	37,34	53,85	49,88
heat	42,91	51,41	46,49	34,40	4,03	3,30	12,39

(Calculations are based on IEA statistics)

Analysis of the horizontal structure of the TFC in industry shows that during the period from 2008 to 2014the shares of coal and natural gaschanged significantly. In 2008 the share of

natural gas was 32.08% and coal amounted to 26.01% in energy consumption. In 2014, it changed to 16.16% and 40.88% respectively. On the contrary, theshare of electricity increased from 19.12% to 22.74%.

In Germany and France, the share of coal does not exceed 11%, but in Poland it is up to 27%. For the residential section the main source of energy is natural gas (60.51-57.61%), heat energy (about 20%) and electricity (11.75-16.44%). Despite the higher relative cost of 1 toe of electricity to natural gas, households are inherent to the substitute of natural gas byelectricity. The substitution process caused by the rising cost of energy in UAH in 2012-2014: it was 14.97% for electricity and 18.31% for gas. It resulted in saving energy and changing the structure of energy needs. In 2014-2016, the price for the electricity in residential section increased on average by 2.36 times, fornatural gas –by 5.3 times. Therefore, the costs changes lead to further structural shifts in energy consumption.

Thus, the indicators of the energy efficiency should be built and corrected taking into account technical, economic, organizational, financial and market features of the functioning of certain sectors of the economy. Application of this methodological approach will accurately delineate the impact of intensive and extensive factors of energy consumption.

Conclusions and suggestions

The Ukrainian energy policy needs to improve the coordination of interaction in the kind of "energy resource is a sector of consumption". The determinationof the tools of effective cooperation is possible byusing the functional approach, which based on the intersectoral connectionof economic activity. The process of social production is represented as a technological chain, applying a functional approach which proves the key directions of efficiency growth both in the field of generation and in the creation of tangible and intangible benefits.

The main factors of energy efficiency growth are to improve the quality features of the economic environment such as competition, business climate, investment attractiveness, innovation activity. It will create the proper level of motivation for entrepreneurial initiatives in energy efficiency, prevent ineffective government intervention and excessive administrative influence in the energy sector, and, eventually, ensure the gradual performance of Ukraine at the best practices of effective energy consumption.

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SMALL BUSINESS CLUSTERING AS A MEANS OF COMPETITIVENESS IMPROVEMENT

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Abstract. The article deals with the problem of formation and development of a small business cluster in Ukraine through the internal-territorial cooperation. The cluster efficiency is determined primarily by the competitiveness level of the products manufactured by small enterprises. Two clusters of a small business are built. A methodology was developed for the effective functioning of the cluster and the companies belonging to it.
Keywords: competitiveness, small business, enterprise, cluster, estimation, clustering.

Introduction

The competitiveness estimation, probably, has recently become the biggest problem, the solution of which depends on the prosperity level of the small businesses themselves and the national economy as a whole. In this regard, the development of the theory and practice to ensure the competitiveness of a small business has now got not only the theoretical but also the very practical importance.

The majority of economists examine the problem of competitiveness in relation to a material object – a product and the enterprise itself which produces it. This approach is incorrect, since any economic process, including the development of the competitive products, bears the features of the general and special, the essence and the phenomenon. Therefore, the consideration of products' competitiveness in isolation from the processes of the competitiveness provision of an enterprise is hardly possible and justified. If we consider the competitiveness of the closely related enterprises, i.e. a cluster, together, we analyse not only the manufacturer but also the suppliers of raw materials, consumers, etc.

The advantage and novelty of the cluster approach lies in the fact that it attaches a high importance to the microeconomic component as well as the territorial and social aspects of the economic development. In addition, it offers the effective tools for the regional development stimulation, manifested in the increasing employment, the competitiveness improvement of the regional production systems, the growth of budget revenues, etc.

To build the cluster, small businesses were selected, as they have such several advantages:

- the mobility and flexibility of the transition to the new environment;
- the ability to quickly switch to another activity;
- the strong motivation, as the successful implementation of the new project will provide the opportunity to realize the entrepreneurial ambitions and so on.

Short Review of Researches and Publications

For the first time the phenomenon of clustering for the industrial enterprises was described by the eminent scientist Michael Porter. He believed that a cluster is a group of the geographically interconnected companies and related organizations (Porter, 2008).

In the course of his research, Michael Porter analysed the competitive capabilities of over 100 industries in ten countries. It appeared that the most competitive multinational companies usually are not haphazardly scattered in different countries, but tend to be concentrated in one country, and sometimes even in the same region of the country. This is due to the fact that one or several firms, achieving competitiveness at the world market, extend their positive impact on the immediate environment: suppliers, consumers and competitors. The success of the environment, in its turn, affects the further growth of the company's competitiveness.

This problem has become of great importance in the works of such scholars as Wolfgang Price, S. Sokolenko (2004), V. Cherhanova and I. Bryzhan (2002), O. O. Tarasova (2007) and many others.

Most scientists, who examine the advantages of clusters, first of all distinguish innovations. Cluster members have an access to new technologies, working methods, and the like ones. The main feature is the presence of the venture capital, which funds the majority of innovations, in clusters.

Task and Its Relevance

Clustering in the economic practice of Ukraine is a poorly studied phenomenon: there is no information which allows to identify the components of the cluster, there is no harmonized system to measure the effectiveness of its activities, the assertion proof of the various internal and external parameters' impact on the operation success of this organizational structure of the regional production is required. Actually, the very fact of the successful clusters' existence in Ukrainian conditions requires proof.

The insufficient development of the theoretical, methodological and practical researches on these problems leads to the determination necessity of the competitiveness problems of a small businesses' cluster.

The aim of the study is the clustering of small entrepreneurship in the Ukrainian conditions.

The main objective is to develop a methodology for the estimation of the cluster competitiveness.

Highlights of Research

According to the theory of Michael Porter, a cluster is a group of the geographically related companies (suppliers, manufacturers, etc.) and connected with them organizations, operating in a certain area and complementing each other. (Porter, 2008: 89).

M. Porter proposed the following system of the competitive advantages' determinants (Fig. 1):
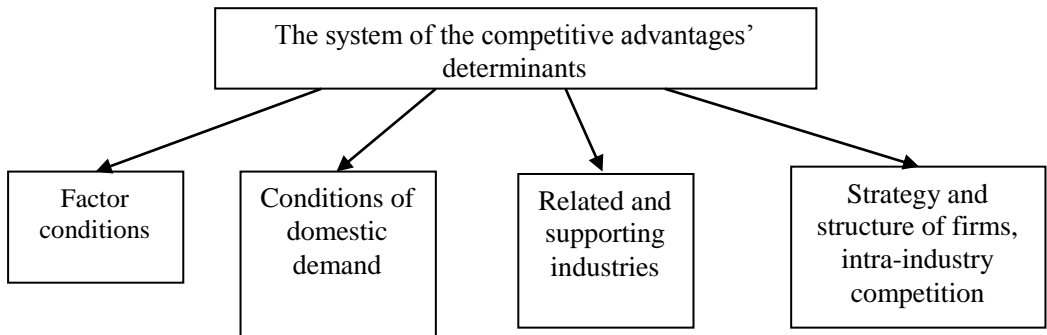
Fig.1: The system of the competitive advantages' determinants
(after M. Porter, 2008)

The factor conditions include the human and natural resources, the scientific and information capacity, the capital and infrastructure, including the life quality factors.

The domestic demand conditions include: the quality of demand, the conformity to the tendencies of the demand development at the world market, the development of demand volume.

The related and supporting industries (clusters of industries) include the flow areas of raw materials and semi-finished products, the scope of the equipment arrivals, the scope of the raw materials' usage, facilities and technologies.

The strategy and structure of firms and intra-industry competition include the goals, strategies, methods of organization, management of firms and intra-industry competition.

In the end, a "cluster" is formed - a community of firms, closely related industries, which promote the competitiveness growth of each other mutually. For the whole state economy clusters act as the growth points of the domestic market. The first cluster most often gives rise to the new ones, and as a whole, the international competitiveness of the country is growing. It keeps its strong positions due to the individual clusters, whereas outside them, even the most developed economy can give only moderate results. In the cluster a benefit extends to all areas of relations:

- New producers that come from other industries accelerate their development, stimulating scientific research work and providing the necessary tools for the new strategies' implementation;

- There is a free exchange of information and the rapid spread of innovations through the suppliers or consumers, who have contacts with numerous competitors;

- The relationships within the cluster, often absolutely unexpected, lead to the new ways of competition and generate completely new opportunities;

- Human resources and ideas form new combinations.

The cluster companies reveal favourable opportunities for coordination in the sphere of common interests without the threat of competition or limit on the intensity of competition. Public or private investments bring benefits to many firms at the same time. The peculiarity of clusters is the presence of the flexible entrepreneur structures of small businesses in their composition, especially a venture that provides the opportunity to create the innovative "points of growth".

Competitiveness is a complex phenomenon that cannot be described with the help of the separate partial characteristics that can vary quite contradictory (Mahomedov, Mahomedova, 2002: 48).

The competitiveness factors are considered to be the phenomena and the processes of the industrial - economic activities and the social-economic life of a society, which cause a change of the absolute and relative costs 'values of production and sales, and as a result, bring changes into the level of competitiveness.

The factors can influence both directions of competitiveness - increase and decrease. The factors are those that contribute to the transformation of possibilities into realities. The factors determine the means and methods of the competitiveness reserves' usage. But the presence of factors only is insufficient to ensure the competitiveness. Obtaining a competitive advantage on the basis of the factors depends on how effectively they are used and where, in what industry they are applied (Factors and reserves of competitiveness of the enterprise, n.d).

The evaluation specificity of the cluster competitiveness makes it necessary to use a number of indicators, the analysis of which can't be avoided in the overall estimation of the enterprise's production and economic activity. These figures primarily indicate the degree of stability, the ability to produce goods that are in demand among consumers and ensure a steady income to them. Such indicators should include the following:

- the ratio of the sales' total value to the value of the unsold goods, indicating a drop in demand for the company products and overstock of the finished products;

- the ratio of the profit to the total sales, indicating the improvement of the enterprise competitiveness;

- the ratio of the sales' cost to its amount for the current period, which determines the factor due to which the sales have increased - due to the price increases or an increase in sales;

- the ratio of the costs' magnitude to the total amount of profit, which allows us to detect the unnecessary costs throughout the distribution chain from a seller to a consumer.

To identify the nature and extent of the relationships between the elements of the potential cluster with the process of the competitiveness improvement, it is recommended to carry out the rating evaluation on the   application basis of the correlation and regression analysis, which ensures the accuracy of the calculations (due to the necessary and sufficient number of variables, describing the competitiveness) and a high degree of the statistical reliability, as well as the methods of the cluster analysis.

As for the cluster analysis algorithm, it is proposed to use one of the so-called agglomerative hierarchical algorithms. All algorithms of this class proceed from the matrix of distances (differences) between the grouped objects, each of which is initially treated as a separate cluster. Next, at each step the two closest clusters merge and therefore a distance matrix is created, the distance to each of the clusters that have merged is excluded from it, and the distance between the newly acquired clusters and all the rest is added. The algorithm ends when the items are combined into a single cluster.

Next, while using the cluster analysis, a typical group of small businesses in terms of their competitiveness are highlighted. The established classification is of great importance, because the place of the enterprise in a series of similar productions is defined by a set of indicators, characterizing their competitiveness.

The use of the cluster analysis as a method of the multivariate statistical groupings in the analysis of the enterprises' competitiveness allows us to:

     − highlight the entire set of those enterprises which are very different in the complex of their objective conditions of functioning;

     − form groups of the interrelated variables in an adequate statistical model's construction of the competitiveness indicators;

     − form groups of the enterprises with the similar performance results and highlight the typical groups of the advanced, middle and lagging enterprises for their subsequent comparison.

     Ward's method was selected as a basis for clustering of small businesses. It is grounded on the fact that the distance between the clusters is the increase in the sums of squares of the object distances from the cluster centres, obtained as a result of their merging. This method uses the methods of the variance analysis. We choose the City-block (Manhattan) distance as a distance measure.

     The calculation formula for the Manhattan distance is the following (Kupalova, 2008: 489):

$$\rho(x, x') = \sum_{i}^{n} |x_i - x'_i|$$

                                                             (1)

     The totality of Ukraine small enterprises were divided into many groups, and then were reallocated to the clusters by a hierarchical method of grouping. The following indicators were selected for the cluster analysis: the employment, the number of small businesses and the volume of sales in the regions of Ukraine. After the completion of all regrouping, the following vertical dendroid gram has been received.

     As it can be seen in fig. 2, the entire set was divided into two large clusters. As the dendroid gram shows, one cluster was formed in the city of Kyiv, i.e. in the city of Kyiv there is a large cluster, integrating the small enterprises, which interact with each other.

     The second cluster includes small businesses in Kharkiv, Odessa, Lviv, Donetsk and Dnipropetrovsk regions. The relationships between the companies in the region are well traced on the tree diagram.

     There are several regions where small business is developed at the low level. They are Rivne, Zhytomyr, Volyn and Vinnitsa regions.

     It should be noted that there are prospects for the clusters' creation in almost all regions of Ukraine, as the country's specialization in manufacturing of various industries can be clearly seen. However, today there is a list of the objective reasons that prevent the creation of clusters in Ukraine, namely:

     - the lack of cooperation relations between the enterprises, research institutions, infrastructure organizations, local government bodies;

     - the awareness lack of economic agents on the advantages of the cluster form of cooperation;

     - the absence of the legal framework, regulating the relations of the public-private cooperation, in Ukraine; the lack of special regional bodies, responsible for the innovative development and clustering, the low efficiency of trade unions;

     - the insufficient quality and availability of industrial and innovative infrastructure;

     - the lack of experience in strategic planning of the cluster development, etc.
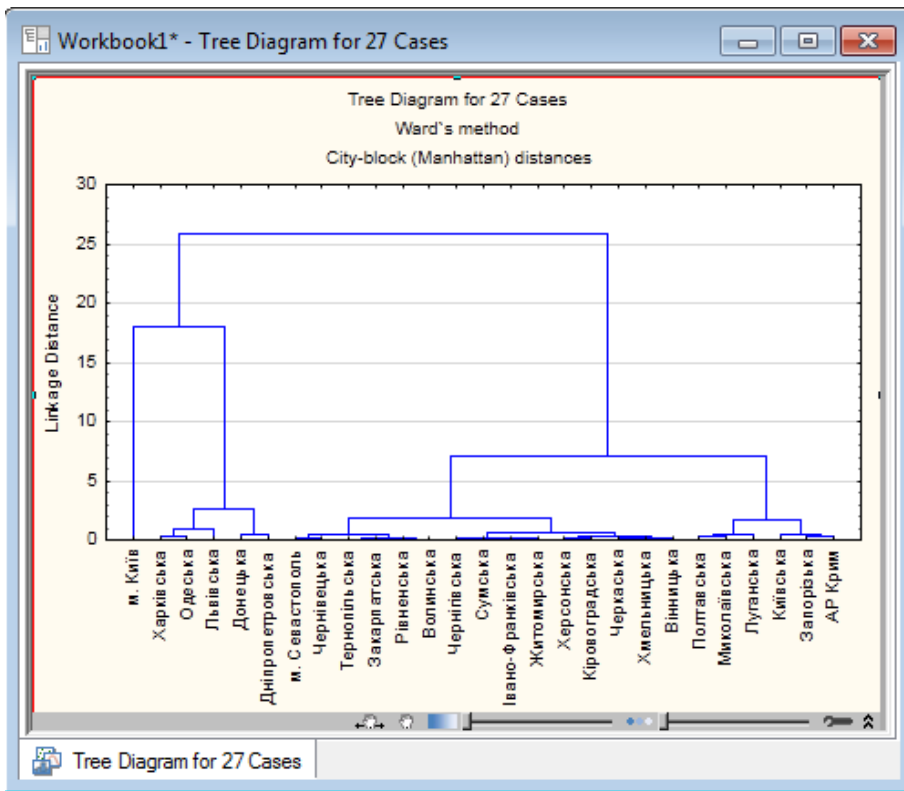
Fig.2. Hierarchical clustering. Dendroid gram of small businesses, according to regions

The clusters of small enterprises can be formed on the basis of self-organization as a result of natural integration and cooperation of production or through the state.

The self-organization of the entrepreneurs, as a rule, is carried out on the initiative of the entrepreneur-leader.

The enterprises, included into one cluster, can produce similar goods or services and can be the competitors to each other. In this regard, the entrepreneurs have concerns that their business would be lost.

The mechanism of clusters' formation and development in Ukraine includes the following stages (Stimulation of innovative activity of small enterprises in the context of ensuring competitiveness of the economy, n.d):

1) the initiation – it involves the rationale for a cluster's creation in the region, defining the objectives, priorities and the type of a cluster, the capacity estimation of clustering, determining the territorial boundaries, analysing the barriers and opportunities for the cluster development, the analysis of the value- added production chain and the possibility of the competitive advantages' obtaining;

2) the development of the clustering strategy – it requires the development and the plan of actions on the implementation of the cluster development strategy, the definition of a cluster's projects set, the formation of the future structure of the cluster, the key participants and the establishment of the effective communication between them;

3) the implementation of the clusters' development program - it is the formation of the specialized structures, the conclusion of a multilateral cooperation agreement, the establishment of the necessary infrastructure (market, industrial, innovation, social ones), the communication between the key participants of the cluster, and the establishment of mechanisms for the subcontracting relations, the activities' coordination of the cluster participants, the introduction of mechanisms to encourage the cluster development, the promotion of innovation and cooperation, as well as the mechanisms' implementation of entering a foreign market;

4) the efficiency estimation – it involves the analysis and evaluation of the clusters' efficiency as well as adjustments in the development of clusters by using the methods and instruments of the state cluster policy.

To implement the first and the second stages, the main tool is considered to be a set of consulting and educating activities with the invited leading experts, the potential participants and the interested parties. These activities may take place in the form of seminars, round tables, conferences, meetings and may also include a series of educational courses, the creation of specialized Internet resources and the issue of thematic publications. The information technology can also be used for searching and creating of new jobs. Thousands of the companies practise a distant job and put big bets on earnings in the Internet.

The implementation of the third and the fourth stages of the cluster development requires first of all the creation of the favourable conditions from the state for the promotion of small businesses within the cluster.

We believe it is appropriate to use the following instruments of the small entrepreneurship's activity stimulation in the cluster system in the regions of Ukraine:

- government guarantees and programs to reduce risks and to reimburse risk losses;
- targeted subsidies, research and development;
- partial or full compensation of the interest on loans for the introduction of innovations.

At this, the amount of certain benefits, subsidies or compensation should depend on the region of the cluster location, its specialization and advantages. Thus, the parameters of the cluster policy tools should depend on the regional characteristics and the regional economic policy.

Conclusions and Suggestions

The fundamental importance for the small businesses is the cluster formation processes, which modify and reduce the capacity of the regional economy in one unit, ensure the efficiency and competitiveness.

The identification of clusters and estimation of their efficiency is connected with a number of problems, the main ones are as follows:

- the absence of the statistical data' necessary organization at the area level, in particular, the inter -sectorial product flows in the fractional industry classification;
- the divergence between the spatial boundaries of clusters and territories that are subjected to the collection of the statistical data;
- the lack of information for many qualitative characteristics of clusters' activity;
- the lack of a single agreed list of measuring instruments of clusters' activity, etc.

In this respect, the most appropriate method of the identification and estimation of the regional clusters' activities in Ukrainian conditions is presented in an approach that fits to the

definition of clusters, based on the nature of economic activity in certain areas and grounded on data obtained mainly by means of an expertise.

The cluster approach to enhance the competitiveness of small business is a combination feature of the territorial and inter-sectorial management principles. At the regional level of the entrepreneurship clusters exist as single agents of a network and competitors, which allow them to speak on equal terms and to resist the destructive tendencies of the global competition.

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COMBINED ASSURANCE AS AN ELEMENT OF EFFECTIVE CORPORATE GOVERNANCE

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Abstract. This article deals with understanding of combined assurance, its benefits, objectives and models of combined assurance and its implementations.

Keywords: combined assurance, audit, assurance providers, defense models

Introduction

As organizations expand and become more complex, so does the number of functions required to ensure that the board can properly perform their duties for effective control and risk management in the organization.

In this case, there is the problem of how to prevent management become overwhelmed by information, thereby creating a "assurance fatigue". Combined assurance is an instrument of solving this problem by integrating alignment processes in the company, controlling effectiveness, and optimizing overall assurance for audit.

In accordance with the King III (The International Standards for the Professional Practice of Internal Auditing, 2013: 23) report of the combined assurance is considered as the process of integration and harmonization of support in the business to help ensure maximum risk management and oversight and improve management efficiency, and optimize overall assurance to the audit Committee and risk, taking into account the relevant risk expectations. In addition, combined assurance should help to improve the understanding of the General levels of confidence and how to solve and / or mitigate areas of risk (The small business environment, 2012: 16). Benefits from the implementation of the combined assurance model include such factors as coordinating and related processes which have to ensure a focus on key risks; minimizing operational failures of business, improving reporting and accountability and possible reduction of expenses on provision. In addition, it was discovered that a combined assurance model will provide a better understanding within organizations, whose assurance providers are confident in some areas of work.

This view is further illustrated by Felix (Felix, Gramling, Maletta, 2001), who found that the coordination of internal and external activities to ensure the audit has a diminishing effect on external audit fees. This inverse correlation between the fees of external audit and coordination of only two assurance providers can therefore possibly be enhanced through coordination of all providers of software, i.e. the combined provision.

Combined assurance: understanding, models and it's applying in corporate governance

Combined assurance is an important area of research due to the requirement for boards of directors to comment on the effectiveness of their risk management and internal

management system for all types of risks. In the shell, the main idea of combined assurance is to provide complete assurance to the Council on the effectiveness of systems of risk management and internal control through coordination the provision of different sources of support.

Organizations have traditionally used numerous providers to help their boards of directors fulfil their responsibilities for the control and effective methods of management, legal departments, quality control, compliance, health and safety, corporate social responsibility and internal and external audits etc. As assurance providers carry out measures to ensure isolation, check, control and cost governing bodies may suffer from fatigue and assurance gaps that lead to their inefficient reporting. After receiving several opinions, the Board therefore is not able to perform its oversight role effectively. As a result, coordination among these various assurance providers is necessary. Bringing many assurance providers together to perform assurance activities helps to rationalize combined assurance and makes it more efficient, where amount of parties involved in the provision of assurance and their activitieswill require coordination and harmonization, as you can see on the Fig. 1.

In management zone, people are responsible for ensuring robust risk of management and control system so deviations are identifiable in time and adequately fixable. In internal assurance providers'area, people are responsible for auxiliary controls such as risk management, internal controls and internal audit. In external assurance providers'area, people are responsible for the independent external audit, such as external financial audit etc.

Through the effective use of combined software, a number of combined assurance could be implemented:
- more coordinated and relevant assurance efforts focusing on key risk exposures;
- eradication of assurance fatigue;
- a possible reduction in assurance costs;
- a common view of risks and issues across the organization is created;
- improved reporting to the Board / Accounting committees, including reducing the repetition of reports being reviewed by different committees;
- minimizing business/operational disruptions;
- cost savings.
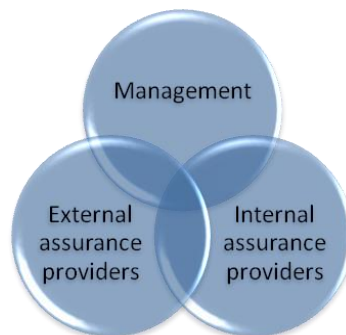
Fig. 1. Parties Involved in the Combined Assurance

Specific recommendations on how best to implement combined assurance are limited. However, there are several international standards of the IIS International Standards for the Professional Practice of Internal Auditing (Standards) indirectly related to the needs of

effective support. The following information describes these standards and provides an overview of different ways of combining assurance, including special attention to the role of the internal auditor in particular to ensure the independence of auditors. The applicable standards and guides are made according to the Three Lines of Defense model.

The Standards are included in The IIA's International Professional Practices Framework (IPPF), which provides internal audit professionals worldwide with authoritative mandatory and recommended guidance. Although there is no specific standard in the IPPF on how combined assurance should be provided, several standards are closely related (see figure 2).

Standard 1000: Purpose, Authority, and Responsibility
- The purpose, authority, and responsibility of the internal audit activity must be formally defined in an internal audit charter, consistent with the Definition of Internal Auditing, the Code of Ethics, and the Standards.

Standard 2050: Coordination
- The chief audit executive should share information and coordinate activities with other internal and external providers of assurance and consulting services to ensure proper coverage and minimize duplication of efforts.

Standard 2060: Reporting to Senior Management and the Board
- The chief audit executive must report periodically to senior management and the board (...) Reporting must also include significant risk exposures and control issues, including fraud risks, governance issues, and other matters needed or requested by senior management and the board.

Standard 2100: Nature of Work
- The internal audit activity must evaluate and contribute to the improvement of governance, risk manage

Fig. 2. IIA Standards (about Combined Assurance)

These standards certainly support the philosophy of combined assurance. Different typesof coordination can be used, due to details below, however, concerning standards.

There are various methods and ways of combining assurance and standards do not offer their specificdefinition. When it comes to the type of coordination, variations depending on the specific requirements and kind of integration of individual organizations are the following:

1) Integrated audits. Coordination takes place through audit activities; specifically, performing audits togetherwith supporting functions and/or the external auditor.

2) Process of integration. Coordination is through planning and reporting. The risk-based audit plan fully meets second-line management functions. Integrated reporting may be internally or externally focused. International Integrated Reporting Standard Council describes an integrated report as externally oriented andcomplex report. It is considered to be

a short message on strategy of organization, management, efficiency, and prospects in the context of the environment, leading to the creation value in the short, medium and long term.

3) Alignment through activities. Coordination is made through coordination activities or on structured or ad hoc basis.

4) Functional integration. Coordination takes place on hierarchical lines by combining internal audit functions, providing management, such as risk management, internal control and compliance standards.

Internal audit is separate from other control features: the first three methods of combined assurance are comprehensive audit, process integration, and coordination activities. Thus, these methods do not mutually exclusive and should be seen as complementing each other.

Combined Assurance and the Three Lines of Defense Model. The IIA endorses the Three Lines of Defense Model. Each of the three "lines" plays a distinct role within the organization's governance framework. The different lines of defense within the organization may be described as follows:

1) First Line of Defense (examples on Figure 3):

Nature of Assurance: Line management is accountable and responsible for the management of risk and performance. A key element of this activity is the extent of management reviews and Nature of Assurance: Corporate functions provide support to line management in executing their duties. These include functions such as HR, procurement, compliance, risk Nature of Assurance: Internal audit, Certifications, Regulator reviews, External Audit, Technical Audit, Forensic Investigations, external asset etc. Combined Assurance is the extent of management reviews and the actions that follow. Management can establish a system of self-assessment/audits to inform them on the adequacy of risk management activities

Reporting lines: Executive Management Committees and Operational Committees providing direction, guidance and oversight focusing on the areas.
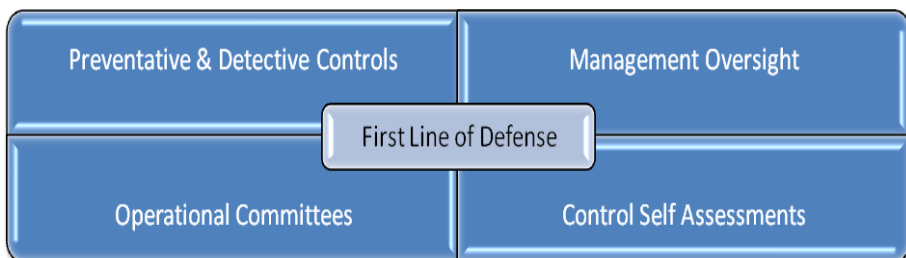
Fig. 3. First Line of Defense

2) Second Line of Defense (examples on Figure 4):

Nature of Assurance: Corporate functions provide support to line management in executing their duties. These include functions such as HR, procurement, compliance, risk management, quality assurance, Health and Safety, SOX, Tax, Engineering, Forensic (Fraud Risk Management), OEMs, Insurance, Actuaries.

Reporting lines: Risk Committees, Compliance Committee, Audit Committees, Regulatory Forums, HR Forums, Health and Safety briefings.

Fig. 4. Second Line of Defense

3) Third Line of Defense (examples on Figure 5):
Nature of Assurance: Internal audit, Certifications, Regulator reviews, External Audit, Technical Audit, Forensic Investigations, external asset management reviews (e.g. Matrix), valuators, culture climate surveys, assessment of ore/ mineral reserves (SRK).
Reporting lines: Regulators, Board and Audit Committees, (objectivity is a key criteria), C Suite

Fig. 5. Third Line of Defense

Primary responsibility for maintaining reliable control and enforcement procedures and legislation lies with management. However, increasingly selected tool was created to support and monitor these control activities. At the same time, increasing number of functions in the organization can cause management to become overwhelmed by information and the report. To avoid this, internal audit can:
- Coordinate and harmonize the activities of assurance participating in joint inspections or integration planning and reporting various assurance providers;
- Give confidence in management by reviewing the effectiveness of the so-called second line protective functions.
With the implementation of the combined software, one of the main objectives is to align various activities, methods work, determination and evaluation of various combined assurance.
Combined assurance is not the thing which can be achieved in one day. Key things are in statements below:
- internal audit plays a key role in managing implementation;
- the expected value should be formulated first of all;
- all participants must reach consensus on taxonomy;
- grade control and risk assessment should be standardized;
- the level of maturity of different players in combined assurance area should be defined.

Some scientists recommend the following steps when implementing combined assurance:

1. Make a business case. Talk about the benefits of introduction of combined assurance and evaluation project cost for this.

2. Make a list of providers of assurance. List the players who can help to control providing assurance on risks and control of the organization.

3. Map providers of risk assurance. Map risk universe and associate it with assurance providers, monitoring these risks.

4. Design verification plan. Determine who will provide assurance set of risks, including the role of internal audit, stating who will be assurance providers.

5. Create an implementation roadmap. Define a roadmap with key milestones. One of these must be to align the definitions and risks ratings used among the assurance providers to lay the foundation for implementing an effective combined assurance model.

6. Plan continuous improvement. Rate model of software on a regular basis, identifying areas for improvements and deciding how information and services to ensure the management can be further optimized.

Conclusions and suggestions

According to various authors, the definition of combined assurance is a process of integrating and aligning various assurance processes with each other and to the organization's risk expectations. Combined assurance is not a new concept. Assurance providers are required to provide feedback on all the processes within the organization. These processes can be divided into various activities namely: finance-related activities, strategy-related activities, environmental and culture-related activities, economic efficiency and governance processes/ activities, and operational activities. The assessment of the internal control environment and risk management is the primary responsibility of internal audit that is required to provide an assessment of the effectiveness of internal control and risk management, as well as a written assessment of the effectiveness of internal financial controls. These above-mentioned activities should then be further defined and categorized taking as a basis their risk exposure. Business world continues to evolve at an accelerating pace and new risks arise as a matter of course. The combined assurance given by all participating assurance providers can benefit the organization by mitigating these significant risks with which organizations are faced.

To achieve sound corporate governance, combined assurance may be implemented in any organization and should address the requirements of that specific organization. Various models may be used to implement combined assurance. The model that is used should be specific to the organization's needs and appropriate to the requirements of the industry in which the organization operates. The combined assurance model that is used should address, link and utilize all the lines of defense present in the organization, in cases where the defense model is used. Similarly, in cases where the assurance model is used, all the assurance providers should be appropriately and effectively drawn into a single team.

To conclude, the role of internal audit is integral to the combined assurance process. The following key concepts were noted pertaining to combined assurance:

- combined assurance is a process of integrating and aligning the various assurance processes with each other and with reference to the organization's risk appetite;

- combined assurance should optimize overall assurance feedback to the audit committee, particularly as it pertains to the significant risks with which the organization is faced;

- internal audit should play an advisory role and should be seen as the custodian of the combined assurance process within the organization

- the combined assurance process should be seen as one of internal audit's key responsibilities within the organization;

- the audit committee should approve the combined assurance model that is to be used by the organization;

- effective combined assurance has the potential to eliminate silos and enhance decision-making within the organization.

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MECHANISMS OF ENERGY EFFICIENT PROJECTS' FINANCIAL SUPPORT BY INTERNATIONAL FINANCIAL INSTITUTIONS IN UKRAINE

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Abstract. The financial support of the energy efficient projects in Ukraine due to the financial support provision by the international organizations is examined in the article. The financing system of the projects on the energy efficiency rise, funded by the international financial institutions, has been studied. The sources and methods of the energy efficient projects' financing have been analysed. The comparative analysis has been performed to highlight the conditions of the energy efficient projects' financing by the international financial institutions in Ukraine.

Keywords: energy efficiency, energy saving policy, financial support mechanisms, international financial institutions, methods of the energy efficient projects' financing in Ukraine.

Introduction

The key condition for the successful implementation of the energy efficient projects is the sufficient funding. According to the Strategy of Ukraine for the period till 2030, it is provided to spend 1045.0 billion UAH on the energy saving. But in the previous years, the target values of funding have not been reached in Ukraine. In terms of the investment plan to spend 30 billion UAH on the energy efficient projects, only the amount of 10 billion was used, and only 5% of the above sum have come from the state budget. This situation can cause the total dependence of all sectors of our economy on energy resources. The state and local budgets of the country in the current financial situation cannot cover even 10% of the planned measures. Therefore, to implement more energy saving projects, we have to seek for help of the international financial donors that will be able to intensify the economic growth of our country.

The sources formation of the energy saving measures' funding is the basis for the successful implementation of the energy saving policy. The investment into the energy efficiency is often understood in Ukraine as the improvement of the existing system: insulation (modernization) of buildings, new equipment of boiler stations, implementation of the alternative and renewable energy sources, etc.

Particular attention should be paid to the use of the energy saving technologies and techniques in the new buildings construction that will ultimately optimize or reduce the energy consumption (Information of Bevz V.V.).

Basic Material

Defining the scope and sources of funding should be based on the investment project's data, which should contain the determined structure of the project, target indices of energy efficiency, project suggestions, estimated costs and resources saving. It is advisable to determine the possibility of the co-financing attraction from multiple sources. For example, the available own budget funds can be used to finance the project development, energy audits and project management, but the borrowed funds or grants can be used for the implementation of the project.

In addition, enterprises and organizations should decide for themselves how valuable for them the "deep" projects are, involving larger investments and longer payback periods, but in future providing more significant savings. Sometimes the projects that promise a quick payback, may, at first sight, seem more attractive, but in future it may happen that they are not justifying either the related transaction costs or the time spent on them. This decision depends not only on the size of the benefits, but also on the strategic goals of the project.

The energy efficiency projects can be financed by using various mechanisms and through various sources (funds receiving entities), but all the spending units should act in the concert with each other in terms of the technology or methodology. Therefore, the important role here is played by the agreed action program, at least at the regional level, and the creation of the infrastructure elements, such as the information and advisory centres of energy saving (Information of EU-ASE: Alliance to Save Energy).

The following table provides an outline of the existing mechanisms that could be used to finance the energy efficient companies.

Table 1

Funding Mechanisms of the Energy Efficient Projects
(Information of EU-ASE: Allianceto Save Energy)

Finance mechanism	Used for:	Available for:	Advantages	Drawbacks
Local/ State budget funds	All types of projects	Local/state authorities	Independence in taking decisions	Insufficiency of funds; may turn to be unavailable for the large-scale projects
Preferential credits	Use the lower interest rate than the market one, to reduce the cost of the loan funds' attraction	State, banks (sometimes within the frame of IFI), loan funds, supported by the international and multilateral organizations.	Grace period of interest payment, longer credit payment period	Public utility companies do not know particular procedures and requirements of the organizations
Commercial banks' credits	Granted to enterprises and organizations by banks, credit	Local and foreign commercial banks	Can be received faster, than funds, linked to the state or donor programs.	If an enterprise or a company is not solvent, credit guarantees will be

Finance mechanism	Used for:	Available for:	Advantages	Drawbacks
	unions and finance companies with the market interest rates			required
Grants	Granted by IFI, through local and international SPA, international development agencies, responsible for implementation	Authorities (central and local); donors (linked with the particular development promotion programs); state-owned banks (to promote commercial financing and to open the market of the energy efficiency financing)	Do not require any payback, less strict criteria of projects selection	May delay the process of the energy efficiency commercializing
Partial credit guarantee	Providing credit in case of the Borrower's default	Special guarantee mechanisms, sovereign guarantees provided by the state.	Possibility occurs to receive credit from a financial institution, that in a reverse situation would be unavailable	Labour-intensive procedure of the finance documentation preparation
Performance contracts	Projects, providing money savings, sufficient to perform payments on the project due to the energy consumption reduction	The contract, concluded between the enterprise and the energy supplying company, for example, the energy service company (ESCO), EU Energy centre, SPA or an advisory company. Funds can be attracted through the local self-government bodies, a services supplier or through a third party.	An enterprise, in this case, does not require any opening capital to finance the project at the initial stage.	Money savings due to the project should be shared with the services supplier. A sufficient number of devices is required for measuring energy resources, used to determine the basis and to monitor the savings, grounded on the comparison with the basis.
Lease	Permits firms to receive assets lease with their further buy-out without using credit	Private companies willing to lease out their energy-supplying assets. Equipment manufacturers and sellers willing to enter the market.	Payback period from 3 to 20 years; equipment is used immediately and it can be paid later on; funds are released for another purposes.	Besides the payment for the equipment use, the additional lease payments are performed.
Supplying company's credit	Buying the equipment, enterprises pay for	Suppliers of equipment	Helps create a credit reputation if an enterprise is not	

93

Finance mechanism	Used for:	Available for:	Advantages	Drawbacks
	it during a short-term period.		solvent; it is easier to receive it than a bank credit; it is broadly recommended by the suppliers; the interest is absent	
Revolving fund	Accumulates money savings due to the projects' energy efficiency for self-financing of further investments into the other energy efficiency projects.	SPA, state authorities, international donors	Self-sustainability after the primary capitalization	Legislative and institutional barriers raise difficulties for the budget organizations to accumulate money savings

International financial institutions (IFI) such as the World Bank (IBRD and IFC), European Bank for Reconstruction and Development (EBRD) and the Asian Development Bank (ADB) also support Ukraine.

MFU supports public sector's projects with the benefits in terms of the energy efficiency, using the following tools:

- debt financing (denominated in dollars or euros or, in exceptional cases, in local currency);

- funds investment into the equity: share in ESCO or utility companies;

- technical assistance;

- partial guarantees on behalf of the state organization.

At the estimation of the energy efficiency projects, the problems, not related to the energy performance, should also be examined. The most important ones are: financial performance, non-energy benefits (e.g. environmental ones), possibility of attracting funds, whether public or commercial ones. These characteristics play an important role in supporting energy efficiency programs and in providing the documentary display of all advantages.

While using the financing mechanisms of the energy efficiency projects, let's examine the algorithm of the financial mechanisms' choice to launch the energy-saving projects with the priority for the customer, the entity of the energy saving project with the minimal dependence on the borrowed funds. (Fig. 1) (Sahno, 2013).

This algorithm is a guide for the customer, the entity of an energy saving project, where it should run the gamut from the least costly financial sources in terms of the additional payments to the most onerous compound interest of banks in order to launch an energy-efficient project.

The developed algorithm can become guidance or guidelines for the selection of financial mechanisms to launch the energy-saving projects with the usage priority of the first available and cheaper funding sources, and then the other alternatives. Another famous promising solution for business and industry is to create a system of energy management.

Every company independently selects the mechanism of the energy efficiency projects financing by means of which the given transaction will be performed, but the major aspect of funding provided by the international organizations are the requirements, being put to the projects.
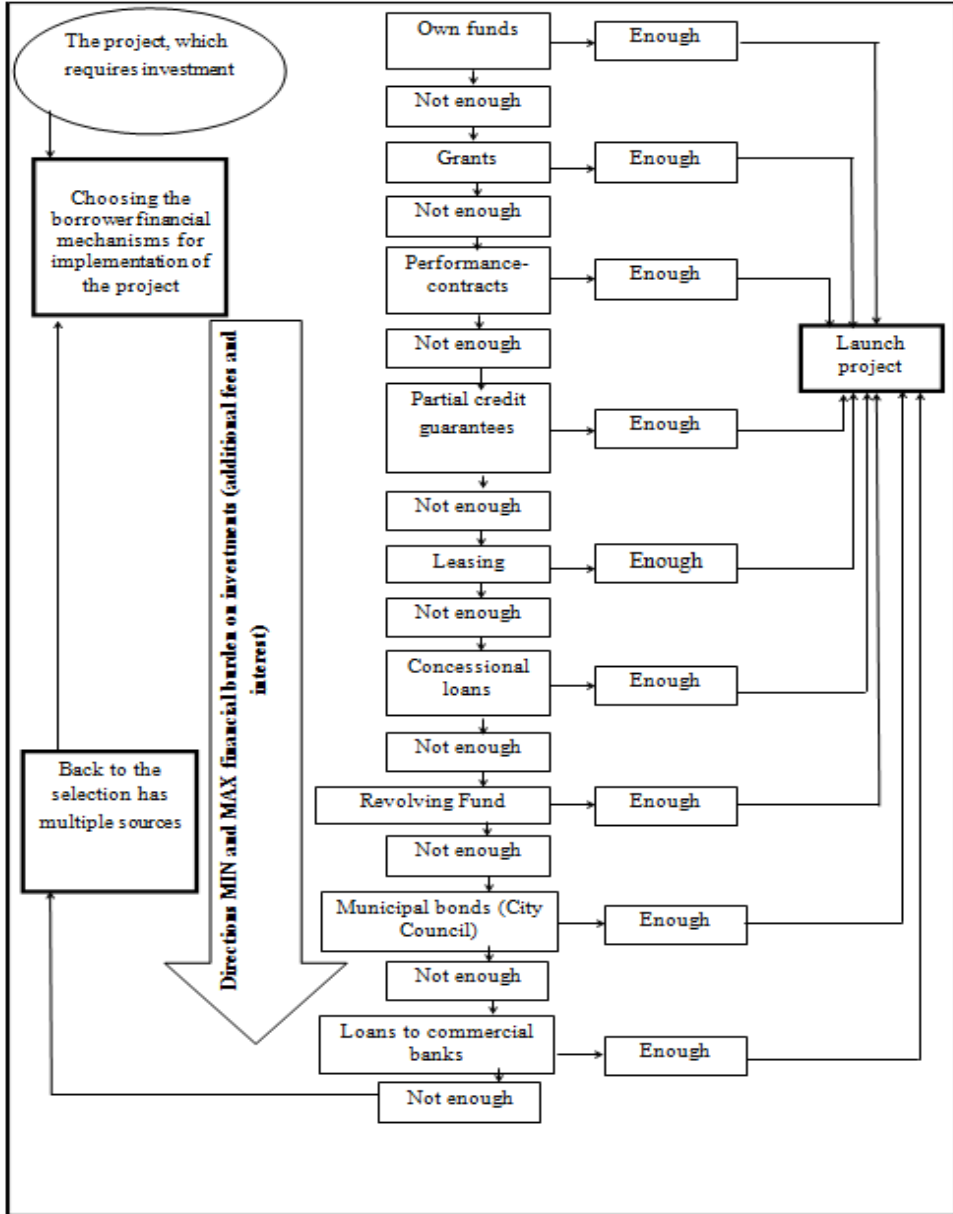
Fig. 1. Algorithm of financial mechanisms' choice for an energy efficient project
(Sahno, 2013)

NEFCO

NEFCO includes three programs ("Energy Saving" credit program, "DemoUkraina" program, "Pure Production" credit program). The procedure of receiving funds for the energy efficient projects from NEFCO is shown in Fig.2.

To obtain a positive decision, there is a preliminary approval procedure, which should answer two basic questions: what are the environmental benefits; what are the financial benefits (the payback period should not exceed 6 years).

Only after the project application is deemed to meet all the requirements, NEFCO Kyiv sends a proposal to NEFCO in Helsinki for the preliminary approval. After that, the development of the detailed business plan starts, including the following certain stages:

1. Energy audit is a prerequisite to ensure that measures to be used are correct.

2. The developed Business-plan should demonstrate: compliance of social and environmental benefits with NEFCO requirements, ability to reimburse the loan.

3. Obtaining the municipal guarantees from the government.

4. Obtaining the information on the procedure.

5. Approval and permission of municipal guarantees.

1.Previous reconciliation	• Submission of proposals for a special pattern NEFCO • Discussions with NEFCO to complete offers
2.Development of a detailed business plan	• Conducting energy audits • Business plan
3. Obtain municipal authorities to guarantee	• Getting information on • Reconciliation and permit municipal guarantees
4.Financing	• Examination conducted by experts NEFCO • A loan agreement • Payment of loans • Environmental, financial and legal reports

Fig. 2. Crediting stages according to NEFCO (Information: NEFCO home page)

After the business plan adoption by NEFCO and approval of municipal guarantees the financing stage is starting.

E B R D / E 5 P F u n d

EBRD is working with the large-scale investment programs in each sector (e.g. EBRD can finance water supply, drainage and sewage utility companies not only for the procurement

of pumping equipment, but it can also provide a comprehensive investment program). There is a possibility to fund the municipal solid waste (MSW) landfills if the minimum project cost is equal to 8-10 million Euros.

The critical problem for EBRD is the guarantee. Providing loans should be material, and EBRD normally requires government guarantees for the municipal loans.

The main stages of financing by EBRD are shown in Fig. 3.

1. Preliminary coordination	• Special pattern there • Information about the content of project finance, investment needs
2. Preliminary assessment of EBRD	• The ability to return and warranty • The level of CO2 emission
3. Detailed analysis of EBRD	• Negotiations with EBRD • Comprehensive analysis according to the criteria of selection of investments
4. Commitments to work	• The roles of the parties • Signing a letter of mandate
5. Develop a detailed business plan	• Business Plan and various studies carried out by independent experts
6. Obtain municipal authorities to guarantee	• Getting information on • Reconciliation and permit municipal guarantees
7. Funding Agreement	• Examination • Alignment list of conditions • Prepare legal documents • Financing

Fig. 3. Financing stages of the energy saving projects with the help of EBRD
(Information of EBRD in Ukraine)

For submitting proposals to the EBRD there is no special template. The following data are required:

1. Description of the project concept;
2. General financial / accounting calculations (if applicable):
- Tariffs
- Number of clients
- The level of fee payments
- Potential warranty
3. List of investment needs;
4. Pre-feasibility substantiation of the project, if it has already been performed (e.g. Local actions plan for the municipal solid waste (MSW) sphere, with the support of the

project "Improving the quality of municipal services» (GIZ) and the group of Luhansk region towns and districts).

EBRD estimates the following aspects:

1. Credit reimbursement ability:
- Total net revenues should exceed 8 million Euros
- Debts should be equal to less than 50% of the current income (*current income = total income - income from capital*)

2. The level of CO_2 emissions' reduction (depending on the subject matter, e.g.. at least 30% for the central heating)

3. Guarantee.

EIB/ E 5 P Fund

The Fund "Eastern Europe Energy Efficiency and Environmental Partnership" (E5P Fund) is a fund with the total amount of 90 million Euros (several donors included in a single fund), which is administered by the EBRD. It was created to promote investments into the energy efficiency in Ukraine and other Eastern European countries.

The Fund was created on the initiative of the Swedish government during the EU presidency in 2009.

The Fund complements loans for the energy efficiency projects provided by financial institutions, including EBRD, EIB, NEFCO, the Nordic Investment Bank and the World Bank Group.

Grants from the E5P fund are provided in four priority spheres: central heating, different energy efficiency projects, environmental projects in Ukraine and other Eastern European countries' projects.

In addition to promoting the principles of the energy efficiency in the projects on central heating, the Fund will also support the other investment projects aimed at achieving significant energy savings. Environmental projects in the fields of sewerage or renewable energy are also the subjects to grants financing.

Stages of EIB funding are somewhat similar to those of EBRD, but there are some differences (Fig. 4).

The peculiar feature of this international organization is the preliminary submission of a group of projects in the region.

Compliance is required with the criteria of EIB.

1. Sphere of the project:
- waste;
- water supply and sewerage;
- central heating;
- energy efficiency;
- SMEs;
- education.

2. Amount of the loan:
- The cost of a group of projects should not exceed 50 million Euros;
- The group should include 10-12 projects;
- Only 50% of the total project's cost can be financed by EIB; the rest of the project should be financed from another sources (borrower, budget, grants from donors);
- A short list of projects is submitted to Minregionbud.

3. Socio-economic criteria:
- The project should improve the quality of life;
- The project should have a positive environmental impact.

Stage	Details
1. Preliminary presentation of group projects by region	• Compliance with the criteria of the European Investment Bank • Write a brief description of the project • The inclusion in the short list of area
2. Preliminary evaluation of the European Investment Bank	• Continuation of the previous evaluation European Investment Bank
3. A detailed analysis of the European Investment Bank	• Negotiations with the European Investment Bank • Comprehensive analysis according to the criteria of selection of investments
4. Commitments for cooperation	• The roles of the parties • Signing a letter of mandate
5. Development of a detailed business plan	• Business Plan and various studies carried out by independent experts (be financed EPTATF)
6. Getting permission from the authorities on municipal guarantees	• Obtaining information on the procedure (may be government's guarantees)
7. Funding Agreement	• Examination • Alignment list of conditions • Prepare legal documents • Financing

Fig. 4. Financing stages of the energy saving projects with the help of EIB
(Information obtained from E5P Fund presentation)

IFC/ E5P Fund

IFC is an investment bank and its principles and procedures are very similar to those of the EBRD.

IFC advises, conducts tenders and provides funding. There are legal aspects that limit the work with municipalities:
- amount: the loan cannot exceed the amount of two development budgets;
- currency: IFC loans in US dollars or euros, but not in the local currency;
- purchase: IFC does not recognize tenders at the city level in cases when it is required by the Ukrainian legislation; IFC requires exceptional conditions for each project.

Only inter-municipal projects in the field of MSW comply with the criteria of IFC loan amount. The two main problems are to be examined:
- Who will be the formal borrower?
- Municipal guarantees will be required from several cities (from each city participating in the project).

The steps are similar to those of the EBRD.

IFC encourages the creation of the public-private partnerships to solve the above mentioned problems.

The consideration of these international organizations in the field of the energy efficiency projects' financing permitted to evaluate the funding criteria of each organization, which is displayed in the table (Table. 2) for easier perception.

Conclusions and Suggestions

Thus, the above presented material testifies to the fact that each organization has its own priorities in the energy efficiency projects financing, each of them comprises the steps of this procedure, which have some similarities, but also differ, particularly in the amount of the provided support, payback period and the field of financing.

It should also be noted that nowadays the financing energy efficiency projects, funded by IFI, has acquired a significant importance for Ukraine. It not only promotes economic transfer to the market economy, but also stabilizes the economic progress of the country. Today there is a positive trend concerning the forecasts for IFI funding in the energy efficient projects. The performed integrated analysis demonstrates that Ukraine cooperates actively with IFI and it is this particular cooperation that will contribute to the implementation of the energy efficient projects.

Table 2

Possibilities of financing by IFI in the field of energy efficiency

		Institution/ Program	Type/ amount	Priority sectors	Criteria	Notes
1		2	3	4	5	6
LOANS						
NEFCO/E5P Fund	1a	NEFCO/Credit Program «Energy Saving»	Up to 3 million UAH, interest rate- 3%.	Social sphere buildings and street illumination.	Payback period up to 5 years	Implemented in co-operation with the State Agency on Energy Efficiency and Energy Saving of Ukraine.
	1b	NEFCO/ "DemoUkraina"	Loan up to 400 thousand euros+ grant from SIDA in the amount of 300 thousand euros, interest rate – 6%, for 4 years maximum.	Central heating for the cities with the population exceeding 100 thousand people, since the end of 2011, for 10 projects.	Minimum 30%of energy saving, payback period up to 4 years, guarantees for 400 thousand euros.	Implemented with the official support of Minregionbud, decisions are taken by NEFCO and SIDA. SIDA provides a technical support for the project development (feasibility analysis, information)
	1c	NEFCO /Pure Production	Loan up to 350 thousand euros, interest rate – 6 %, for 5 years	Upgrading, repair works (any replacements, exception for the new	Payback period up to 6 years, social and environmental benefits should	Funding may be provided to private companies and municipalities. A project application template exists. New applications won't be

		maximum.	equipment).	meet NEFCO's policies.	admitted unless the already submitted ones are not processed by the employees of NEFCO.
2	EBRD / E5P Fund	Co-financing from 12 million euros (1/3 is a grant, 2/3 is a loan), interest rate: LIBOR plus % (= < 3-4 %).	Infrastructure, including municipal services, primarily central heating (co-generation, bio-fuel, thermal air pumps, MSW).	Credit reimbursement ability, reduction of minimum 30% of CO^2 emission, warranty.	The unified application template does not exist. As a rule, EBRD first requires concept of the project.
3	EIB/ E5P Fund / EPTATF	From 20 million euros for the separate projects, interest rate: LIBOR plus % (= < 3-4 %), up to 25 years.	Waste, water supply / sewerage, central heating, energy efficiency, SME, education.	Raising the life quality level, positive environmental effect, warranty.	There is a possibility to combine 10-12 projects, in this case the loan amount makes from 50 million euros and more.
4	MFC/ E5P Fund	From 10 million USD (there is no formal threshold), interest rate: LIBOR plus % (= < 3-4 %), up to 12 years.	Farm business, infrastructure, energy efficiency/ pure production, finance markets.	Development of the long-term economy growth impact.	Funding can be provided for private companies and municipalities.

	GRANTS			
	International institutions			
1	EC/ Various	Various amounts		Energy saving projects funded by EC
	Other donors/ various	Various amounts		Other donors provide grants less often. Among them, USAID most often provides grant funding.

	STAGE OF DEVELOPMENT			
	ЄK / CIUDAD	Grants for the local administration bodies, from 400 to 650 thousand euros (grant from UC should not exceed 80% of the total project cost).	Environmental stability, energy efficiency, stable economic development and social inequalities reduction, Efficient managemen	Should be developed in cooperation with a EU institution and another ENP partner; other basic criteria: topicality,	A very detailed application template exists (strict requirements). 5 projects being implemented in Ukraine. The best project is the town of Ukrayinka, which was

				t and planning of the stable city development.	efficiency, feasibility and stability.	named a model-town of the local authorities.
2	State energy efficiency program		The amount threshold is not strictly determined, (the mean amount at the last competition in November, 2011, made 1.3 million UAH).	Heat pumps, electric heat-accumulation heating and water supply, upgrading with the use of the renewable or alternative energy sources, thermal upgrading of municipal buildings (insulation and heating equipment).	Reduction of pollution, energy saving, the short term of grant depreciation, the short term of the project's implementation.	Requires a long preparation period due to a great deal of formal requirements (the main one is that the project application should comply with the current legislation, in this case, to the procedure of Minregionbud). Project applications are to be submitted to the regional state administration. The deadline for submitting applications to the regional state administration is within 2 weeks after tendering.
3	Minregionbud – pilot projects		The amount threshold is not strictly determined	Improvement of housing and communal sector's management, energy efficiency in the field of housing and communal sector.	Co-financing, developed design estimate documentation, compliance with national, regional and local strategic programs, implementation within the current year, payback	Minregionbud is acting in compliance with the rules and procedures of the Ministry of Finance and the Ministry of Economic Development and Trade of Ukraine (MEDT). Project applications are to be submitted to the regional state administration.

					period up to 5 years.	In case, if the project is not completed within the current year, the Contractor has to provide an additional financing of the project at his own expense.
4	Minregionbud – «Drinking water»	Total amount of funding for 2011-2020 makes 2.2 billion UAH, the amount threshold is not strictly determined.	Water supply/ sewerage, special emphasis being put on the drinking water's quality and sewage purification.	Co-financing, developed design estimate documentat ion, compliance with national, regional and local strategic programs.	Minregionbud is acting in compliance with the rules and procedures of the Ministry of Finance. Funding is provided for the state / municipal enterprises of water supply / sewerage. Project applications are to be submitted to the regional state administration. by the respective municipal organs.
5	Derzheko (State Ecological Inspection of Ukraine) – investment agency program	Various	Reduction of the greenhouse gases' emission.	Complianc e with• the United Nations Framework Convention on Climate Change (UNFCCC)	The project application template exists. The project is to be implemented within the current year. The Project should have a broad social impact.
	Kyoto Protocol program			national, regional and local strategic programs.	Approval of the local authorities on the territory of the project's implementation is required.

| 6 | Competition under DFSMS (State Fund for Local Self-Government Promotion) | From 100 thousand to 1.5 million UAH in dependence on the amount of population (covers up to 80% of the total project cost) | Various ones, including: -housing and communal sector's reforming, -energy efficiency in the field of housing and communal sector. | Specific conditions for each area (Toolkit for participants). | 20% of funds should be attracted from various sources. Administrative expenses should not exceed 7% of the project's total cost. |

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INTERNATIONAL LEGAL REGULATION OF THE WORLD OCEAN PROTECTION FROM POLLUTION

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Abstract. The article is concerned with the scientific study of international cooperation aimed at preventing marine pollution and protecting it from contamination with legal support. The paper gives an analysis of international legal acts regulating the main directions of cooperation in the protection and preservation of the marine environment.

Keywords: marine environment, environment protection, pollution, the international legal regime, oil, hazardous substances and waste, dropping, reimbursement.

Introduction

The waters of the oceans are a holistic system that directly affects the planet's climate, the flora and fauna and the processes of human life. But in his turn man actively impacts on the ecological state of the marine environment, and unfortunately, the technological revolution has led to a number of adverse effects in the ecosystem of the world ocean.

Intensification of navigation, the use of seas and oceans for the disposal of industrial waste and by-products of other forms of human life, marine pollution as a result of river outflow led to the emergence of acute problems related primarily to the pollution of the world ocean. Therefore, the effectiveness of measures to protect and preserve the ecosystems of the oceans and seas can be ensured only by international legal means.

Thus far, there has established and continues to develop a comprehensive international legal regime for the protection and preservation of the marine environment, including regulation both horizontally (depending on the source of contamination), and vertically (global and regional).

The methodological basis of the study is dialectical and systematic approach to the analysis and evaluation of legal regulation of relations in the sphere of activities of the legal regime of protection, conservation and the prevention of marine pollution

Results and conclusions are derived from general and specific methods of scientific knowledge: formal-logical, comparative-legal, system-structural and others.

In addition, general scientific research methods are used: observation, generalization, comparison. Formulation and substantiation of theoretical positions, practical recommendations and conclusions are made using proven methods applied in sciences in international, administrative, civil, environmental law and ecology, philosophy, geography, government, economy.

The theoretical basis of the research consists of works by S.V. Kivalov, E.V. Dodina, S.O. Kuznetsova, O.A. Zharkova, M.M. Kalenchenko and others.

The normative base of research is international treaties and conventions in the field of marine environment, national legislation of Ukraine

Conducting a comprehensive analysis of the legal regime of protection, conservation and the prevention of marine pollution, detection of essential peculiarities of the legal regime of marine areas for the realization of effective international cooperation, requires solving the main task - to study the main international instruments of protection and preservation of the marine environment.

International legal regulation of protection of the marine environment from pollution at the universal level - is primarily a huge number of agreements. The history of international treaties begins in the middle of the twentieth century.

Every year seas and oceans fill up with a huge amount of garbage, waste, oil. The interests of ensuring the protection of biological resources of the sea, the interests of rational use of bio-resources require the use of concerted actions by all the participants of sea fishing.

This question was studied in detail by the United Nations in 1949-1951. At the initiative of the UK government in 1954, in London there was summoned an international conference on the prevention of pollution by oil. As a result of discussions, the Conference adopted the International Convention for the Prevention of Pollution of the Sea by Oil (OILPOL, 1954). This is the first multilateral agreement reached in order to reduce pollution of the marine environment, which in fact was the first international treaty in the field of marine environment.

A significant threat to the marine environment has always represented accidents of ships, especially tankers loaded with oil. In 1967 there was one of such largest accidents, which resulted in the tanker Torrey Canyon to throw 100 thousand tons of oil to sea. In this regard, in 1969 under the auspices of the International Maritime Organization, there was summoned Diplomatic Conference in Brussels, wherethe International Convention on Civil Liability for Oil Pollution Damage (CLC) of 1969 was adopted (The International Convention on Civil Liability for Oil Pollution Damage, 1969). Subsequently, Protocols in 1976, 1984, 1992 and Amendments in 2000 were adopted in Convention of 1969.

This convention marked the beginning of international legal regulation of preservation and protection of the marine environment.

The Convention of 1969 provides the states participating in it with the right to take, on the open sea in respect of vessels of other member states of the Convention in the event of serious accidents, any necessary measures to prevent, reduce or eliminate serious and imminent danger that represent for their banks and the respective interest of contamination or threat of oil pollution at sea as a result of the event. This provision introduces significant removal to the principle of exclusive jurisdiction of the flag state of the vessel at sea.

The Convention is based on the principle of strict liability of the ship owner for damage caused by oil pollution and provides for a system of compulsory financial security of such liability.

For full compensation to victims of the damage after the pollution after the preparatory work within the International Maritime Organization in Brussels in 1971 there was summoned the Diplomatic Conference that adopted the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FUND) of 1971 (The

International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971). Further Convention of 1971 was changed in already mentioned Protocols of 1976, 1984, 1992, and Amendments of 2000.

The owner of a tanker carrying more than 2,000 tons of oil in bulk as cargo is obliged to provide insurance or other financial security to cover their liability under the Convention. On board the tanker there should be a certificate confirming the existence of such financial security responsibility.

Only the states that have become parties of the Convention on Civil Liability can become participants of the FUND Convention.

The main objectives of the Convention on the Fund are to provide additional compensation to those who could not obtain full and adequate compensation for the damage from pollution of the Convention on civil liability and also compensation to the ship owner of liability incurred under this Convention.

Today, the compensation paid by the Fund in connection with the incident, is limited to the amount of 135 million. SDRs - units of Special Drawing Right.

In 2000, the Legal Committee of the IMO adopted amendments to the limits of liability in the Protocol of 1992 to change the International Convention on Civil Liability for Oil Pollution Damage, 1969, which entered into force on November 1, 2003 and the Protocol of 1992 to the Convention Fund of 1971.

The International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) of 1990 (The International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990) entered into force on 13 May 1995. According to this Convention the parties individually or jointly take all appropriate measures in accordance with the provisions of this Convention and its Annexes of preparedness in the event of an incident causing oil pollution and the fight against it. The Convention does not apply to any warship; a military auxiliary or other ship owned or operated by the state and is used only on government non-commercial service. However, each Party shall ensure, through appropriate measures that do not hinder the operation or operational capabilities of such ships owned or operated by it, that such vessels were in compliance as far as it is reasonable and practicable, in accordance with this Convention.

At the International Conference on the control of harmful anti-fouling systems held on 1 - 5 October 2001 at the headquarters of the International Maritime Organization, the International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS Convention)was adopted (The International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2011). Until 2001 there were no international rules for the control of harmful anti-fouling systems. At the same time, some used on ships anti-fouling systems create a significant risk of toxicity and other chronic effects on ecologically and economically important marine organisms and can also cause damage to human health as a result of eating seafood. The new Convention complements the existing international rules of protection of the marine environment, including MARPOL 73/78 (The International Convention for the Prevention of Pollution from Ships, 1973).

In 1996 there was adopted the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS) (The International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996), developed under the auspices of the International Maritime Organization. Until now, the Convention has not gained force, though eight states are involved in it. The 1996 Convention on liability and

compensation for damage caused by shipping hazardous and harmful substances established the international legal regime of liability and compensation for damage caused by shipping hazardous and harmful substances. The economic consequences of damage, caused by such transportation, are shared between the ship owner and the receiver of hazardous and noxious substances carried by ship as cargo. The Convention of 1996 is based on the same principles as the Liability Convention of 1992 and the Fund Convention of 1992.

The Convention on Civil Liability for Oil Pollution Damage caused by sea hazardous and harmful substances carriage of 1996 requiresthat a vessel carrying dangerous and hazardous substances had a certificate on the financial security of civil liability for pollution damage caused by shipping hazardous and noxious substances.

According to the Convention on Civil Liability for Oil Pollution Damage caused by shipping hazardous and harmful substances of 1996, when compensation paid by the owner of the vessel is insufficient or they are generally exempt from responsibility, the international hazardous and noxious substances Fund pays the compensation to the aggrieved taking into account the compensation paid by the ship owner for the loss. Such an international Fund, established in accordance with the Convention of 1996, is formed at the expense of contributions from importers/receivers of hazardous and noxious substances.

In 1972 at the intergovernmental London Conferencethe International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter was concluded. The London Convention of 1972 (sometimes it is called dumping, from the English dumping – unloading, dumping, flooding) confirms that harmful waste products are buried in the World Ocean deliberately. All the categories of hazardous waste or materialsare listed in two different applicationswhich offer either theirabsolute prohibition (Annex I: Organohalogencompounds.Mercury and mercury compounds. Cadmium and cadmium compounds. Persistent plastics and other persistent synthetic materials. Crude oil, fuel oil, heavy diesel oil, and lubricating oils, hydraulic fluids, and any mixtures containing any of these, taken on board for the purpose of dumping. High-level radio-active wastes or other high-level radio-active matter. Materials in whatever form (e.g. solids, liquids, semi-liquids, gases or in a living state), or a special permit validity (Annex II:arsenic, lead, copper, and their compounds, zinc, organosilicon compounds, cynanides, fluorides, beryllium, chromium, nickel and their compounds, vanadium).

The Convention offers two types of deliberate burials: The discharge of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea; Vessels, aircraft, platforms and other artificial structures submersion.

17 Feb 1978 the International Convention for the prevention of pollution from ships, 1973, adopted the Protocol, which, according to MARPOL 73, is considered a stand-alone document and the new Convention in fact. The Convention for the prevention of pollution from ships, 1973 is replaced by the Protocol of 1978 (MARPOL 73/78), which entered into force on October, 2, 1983. MARPOL 73/78 consists of articles of the Convention itself, the Protocol which contains issues concerning harmful substances discharge, the Protocol on arbitration and six annexes containing:

1. Regulations for the prevention of pollution by oil;
2. Regulations for the control of pollution by noxious liquid substances in bulk;
3. Regulations for the prevention of pollution by harmful substances carried by sea in packaged forms, or in freight containers, portable tanks or road and rail tank wagons;
4. Regulations for the prevention of pollution by sewage from ships;
5. Regulations for the prevention of pollution by garbage from ships;

6. Regulations for the prevention of pollution by atmosphere from ships.

Assuredly, the basic Treaty in the international legal standard systemaimed at the protection and preservation of the marine environment is The United Nations Convention on the Law of the Sea(UNCLOS) 1982 (The Convention on the Law of the Sea, 1982), which has madea significant contribution to the development of the protection and preservation regime for the marine environment. The 1982 Convention considers issues of environmental safety in the context of the global regulation of all activities of States on the World ocean use and study. Part XII "Protection and preservation of the marine environment" sets the cooperation principles of different States to prevent, reduce and control pollution of the marine environment. Most sections of the UN Convention on the sea law1982 contains importantinternational law standards , while Part XII «Protection and preservation of the marine environment» sets the cooperation principles of States to prevent, reduce and control pollution of the marine environment, thereby creating a legal basis for international community interactingto protect the oceans from contamination. The basis of this mechanism is broad and multifaceted cooperation of all the States to achieve safe, both for the marine environment and international navigation as well (Zharkova, 1996: 89).

Thus, the international community has developed numerous international instruments to prevent the pollution of the marine environment, established procedures, measures and obligations for all the States to ensure the preservation of the World Ocean. Searching for ways of unitingefforts of the States to successfully solve the environmental protection problems and problems of rational use of naturalresources should be carried out taking into consideration theuniversally recognized international legal principles of cooperation, what is the legal duty of States, regardless of their form, the state system, cooperationon the international peace and security maintenance , and even contribution into the international environmental law improvement.

Conclusions and suggestions

Studyingthe main international legal marine environment protection and preservation ways allows us to conclude that there are rules for the environmental protection,rules for world and regional States cooperation directly or via competent international organizations to formulateand elaborateinternational rules, standardspractices and procedures according tothe UN sea law Conventionof 1982 for the marine environment protection and preservation, taking into account characteristic regional features (Kalenchenko, 2008: 20). However, despite a number of positive achievements in the creation of legal mechanisms for global and regional cooperation in the marine environment protection and preservation, there are many provisions that cannot be applied due to their General nature, their uncertainty or inconsistency. Institute of sanctions for violations of international norms and standards for the marine environment protection and preservation has not still been developed adequately in any international legal acts. It demonstrates the necessity of further development and improvement of international legal instruments to ensure environmental security of the World Ocean. Special conventions on the marine environmentprotection established an effective mechanism to preventmarine pollution, determined procedures, measures and obligations of States to ensure the preservation of the oceans. A big number of international treaties concerning the protection of the marine environment suggest that today the principle of the marine environment protection has already been formed in the international sea law. Greening is becoming more and more a characteristic feature of the modern international sea law. This

is especially true in the merchant shipping field, where the most clear and consistent implementations of international legal standards are aimed at the environmental protection.

International legal World Ocean protection is characterized by the most developed system of appropriate rules and institutions. Exactly sea Conventions and the mechanisms of their rules implementation and enforcement are a good pointer to continue carrying out effective international legal measures aimed at the marine environment protection and preservation.

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DEVELOPMENT OF LONG-TERM SUSTAINABILITY PROGRAMMES FOR UKRAINIAN MINING ENTERPRISES UNDER UNSTABLE ECONOMIC CONDITIONS

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Abstract. The article deals with developing long-term sustainability programmes as a means of ensuring the effective functioning of mining enterprises. The authors focus on specific problems of Ukrainian mining enterprises activity, substantiation of implementing environmentally sustainable natural resource management. The system of strategic factors for ensuring sustainable development of mining enterprises under unstable economic conditions has been formed.

Keywords: sustainable development, sustainability, mining enterprises, mineral commodity base, economic instability.

Introduction

The current mineral reserve base (MRB) of Ukraine does not meet the world market demands as to its qualitative parameters and industrial and economic significance. The low efficiency of the base is explained by worn out and obsolete production facilities causing low labour efficiency and profitability in mining, additional expenses for raw material mining and processing and high energy consumption of production. The problem of MRB competitive ability enhancement is extremely urgent, its solution affecting the future of many Ukrainian mining enterprises in the view of their poor financial potential.

One of the main reasons of negative tendencies in the country's MRB development is the lack of the necessary funds to support and develop it. High capital intensity of mining accompanied by long terms of capital circulation and the global economic crisis define the strategic goal of Ukraine's MRB development, namely, attraction of necessary investments. However, Ukrainian enterprises' strategies targeted at maximum possible investments do not possess any adequate mechanisms to ensure their optimum distribution among mining enterprises, and, which is more important, inside them.

While evaluating the mining industry's development prospects, one should underline that in general its conditions are rather challenging. It is the result of low competitive ability of most iron ore deposits in case of their mining and further mining at deep horizons, considerable obsolescence of basic industrial funds and low sustainability of the technologies applied. A number of serious problems facing an enterprise are due to the discrepancies in the designed capacity of main production areas and that of technological cycles. That is why, the

search for the prioritized investment objects at basic technological cycle stages at mining enterprises is a strategic scientific and practical task. It is obvious that this task solution demands some other principles of investment distribution considering the specific technical and economic conditions of different technical cycle stages. Besides, one should take into account a potential competitive ability of the whole technological chain starting from ore mining to end product manufacturing which allows us to detect some weak points and production reserves of basic technological cycles, these facts forming the basis of the investment policy.

Sustainability issues have been under careful consideration of many well-known Ukrainian and foreign scholars including Joseph Schumpeter (2007), M. Kondratyev (2002) (long-term equilibrium models), R. Kerry Turner (1993) (weak and strong sustainability), Herman Daily (2002) (economic theory of sustainable development), V. Herasymchuk (2007), O. Rayevneva (2006), B. Danilishin (1999), O. Yefremov (2008) and others. The analysis of these works indicates that in spite of their great theoretical and practical significance there appears a real necessity to extend the existing studies concerning long-term programmes for mining enterprises' sustainable and efficient development under unstable economic conditions.

The research aims at developing long-term sustainability programmes as a means of ensuring mining enterprises' efficient functioning under unstable economic conditions of the iron ore market.

Material presentation

One of the strategic tasks of our age is a necessity in the synthesis of a mining enterprise's optimal management strategy within the framework of a large-scale company (for example, PJSC "ArcelorMittalKryvyiRih"), which takes into account the specific features of technological cycles functioning under unstable conditions of the internal and external environment. The analysis of several mining enterprises' activity has revealed that, on the one hand, there is some internal uncertainty of expenses, volume and quantity indicators of technological cycles. On the other hand, one can see an external uncertainty in terms of demand for iron ore products accompanied by the reduced market prices for them (during 2016 1t of direct shipping ore cost maximum $48 and that pellets cost $62, compared to $135 in 2011). Experts say that by the end of 2016 the prices for iron ore products will fall by 10%. On the other hand, the strategic management methods applied at Ukraine's enterprises do not take into account a probability-based nature of mining and the technical and economic significance of technological cycles that leads to extremely high exploitation and, which is more important, investment expenses. For example, the cost price of 1t of concentrates (65% of iron content) makes $22. Under these conditions, the formation of a diverse mining enterprise's sustainability management strategy and its optimization calls for applying the decision theory and system analysis methods, the statistical analysis methods and models combined with heuristic and intellectual methods. At the same time, mining enterprises' economic efficiency within the framework of a large-scale company depends on the correspondence (adequacy) of the volume-quality indices of technological cycles and the cost-price of the end products (the basic indices forming potential profits) to the changeable market conditions. These indices form an enterprise's strategic goal, and possible ways of its fulfillment (development directions) are strategic alternatives under certain time and money expenditures. To achieve a strategic goal in case of the formed strategic alternatives it is

necessary to realize a package of investment projects at various stages of the technological cycles in mining. Thus, consideration of technical and economic significance of the cycles will allow us to increase an enterprise's efficiency by means of effective investment distribution.

Taking into account the above mentioned, long-term development plans are to predict and substantiate organizational, technical and financial measures in order to support and develop a mining enterprise's MRB (open-pit or underground mining) and to ensure the sustainable and efficient mining for the period of 10-15 years. That is why, the development plans look like MRB development strategies and programmes, business-plans and investment projects of further mining for certain iron ore deposits. A mineral reserve base is interpreted not only in terms of increasing mineral reserves, but it also includes the technical means for their mining and processing under unstable economic conditions as well as under unstable world market demands for Ukrainian products.

Basic technological goals of long-term and prospective planning of mining at modern mining enterprises include the following tasks:

- predicting mining intensity of deposits and sites mined; substantiation of a mining enterprise's designed efficiency and development of efficient mining schedules for an open pit or a mine;

- developing a long-term priority programme-schedule of mining the prospected and reserve deposits and their sites including the ones with relatively small reserves;

- predicting the raw material quality and concentration in terms of time as to every MRB element of an enterprise as well as the search for the premises for managing the reserves and the end product quality;

- determining the basic parameters of every mining facility forming a general ore flow to be concentrated, substantiating the main ways of complex mineral usage and producing new types of iron ore products;

- predicting mineral reserves growth including the ones previously excluded from the list of the industrial reserves; substantiating the amount of the main deposit's further prospecting as well as the sequence and methods of further investigation of targets and areas with evaluated undiscovered resources;

- predicting the ways of mineral delivery to the places of processing; substantiating the methods of deposit opening-up and mining systems, mining operation schedules and open-pit field mining procedure;

- substantiating the mining methods and technologies for deposits and their sites to develop the resources efficiently, predicting the necessity in technical means for mining as well as the necessity to update mining equipment and facilities, defining the ways for further technical advancements, improving a technological cycle structure;

- predicting the necessity to withdraw extra lands to dispose an enterprise's facilities (open pits, dumps, tailing ponds, subsidiary production, etc.) taking into account obligatory mined-land reclamation.

Strategic economic and management goals of long-term planning for developing mining operations at Ukrainian open pit mining enterprises include:

- finding the sales markets and determining the range of products, developing marketing forecasts;

- evaluating an enterprise's long-term financial activity, predicting current expenses and profits, calculating financial flows and investment efficiency;

- substantiating the amount of production reserves of various kinds and mining supplies and utilities regulation, an enterprise's structure, functions and hierarchy of elements of the production and labour management system, geoinformation flow schemes;

- predicting the personnel number and labour efficiency, planning payroll and financial rewards;

- developing and introducing modern energy efficient and sustainable measures and technologies for further deep horizon mining (400m and more) in further open pit mining to the designed levels;

- ensuring labour safety, developing general methods of industrial safety control to meet the current world standards.

The substantiation of mining enterprises' perspective MRB disposal is performed under uncertain conditions that is often explained by quite a large number of deposits or complex structured deposit sites aimed for mining, further mining or demanding preliminary exploration. Mining objects vary in reserve size and reliability rate. Every evaluated site is characterized by a unique mineral and qualitative ore composition, which determines its concentration rate that is raw ore consumption to produce a concentrate of the fixed quality. However, ores of certain deposits contain an irregular amount of basic and associated components, both useful and harmful. Infrastructure and production availability of various deposit sites is not the same, so the routes of the mined mineral transportation to the concentration sites can also vary in length. In most cases, main and assembly transportation to the production site of a mining enterprise is by railway, etc. Long-term planning task solution includes the substantiation of distributing capital works and operational expenses amount in terms of time to realize a mining enterprise's reconstruction and sustainability programme including environment-oriented measures to ensure sustainable development of mining and processing operations.

A general priority of the directed search for strategies of a mining enterprise's MRB support is often chosen by using a variance method. To perform the feasibility study of a deposit mining and further mining a number of operations is performed, the results of which should be presented in a form of a tree of goals, which includes separate significant stages of investigations and calculations. Algorthmization is the most difficult part of goal tree formation. To solve this problem, we suggest using an algorithm, the flow-diagram of which is on Fig. 1. The substantiation of the necessary volume of mining production is one of the most complicated and crucial points in long-term planning.

In particular, the open pit mining designing theory testifies to the fact that an open pit's capacity is determined as maximum as to its mining and technical indices under the maximum mining intensity as well as according to the demand in mineral commodities. In our case, this approach denotes that the necessary amount of the end products (A_{ep}) should be substantiated and approved by the person in charge (an enterprise's owner or manager considering the market investigations as to the prospects of iron-containing products sales.

In any case, it cannot exceed an enterprise's economic efficiency (A_e) which is maximum possible one as to mining intensity and geological conditions of a deposit:

1	Input Main specific function of a system	8	Preparation of data store to realize the model
2	Goal formation and statement	9	Algorithm formation to realize the model
3	Choice of strategic technical and technological variants of long-term programmes for a mining enterprise efficient	10	Preliminary estimation of the model correspondence to the mining production demands

	functioning to reduce production energy consumption		
4	. Formation of a structured formula of an economic and mathematical model of a mining enterprise sustainable development	11	Computer programming and realization of the model
5	Analysis of connections between the subsystem elements of the modeled system of mining production as to processes and production areas and local models formation	12	Result analysis and calculation visualization
6	Synthesis of local models	13	Evaluating the model correspondence to the current economic system
7	Forming a system of restrictions of the sustainable resource usage goal to ensure the minimum toxic and mining waste emission into the air	14	Choosing optimal technical and technological variants of a mining enterprise's sustainable development under unstable economic conditions and uncertain demands at the iron ore market

Fig. 1. Algorithm flow-diagram of "goal tree" formation in the strategy development of sustainable resource usage to ensure a mining enterprise's sustainability

In particular, the open pit mining designing theory testifies to the fact that an open pit's capacity is determined as maximum as to its mining and technical indices under the maximum mining intensity as well as according to the demand in mineral commodities. In our case, this approach denotes that the necessary amount of the end products (A_{ep}) should be substantiated and approved by the person in charge (an enterprise owner or manager considering the market investigations as to the prospects of iron-containing products sales.

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$$A_{ep} < A_e,$$

$$A_e = h_o \cdot S_a \cdot \frac{1 - L_m}{1 + P};$$

$$A_e = V_a \cdot L_b \cdot N_{ben} \cdot H_{ben};$$

$$A_e = Q_e \cdot \frac{L_{rm}}{\dfrac{L_b}{(1 + R_{cur})}}$$

That is why, at the preliminary stage one can perform a technological analysis of the designed decisions and the actual parameters and the mining intensity indices formed before the beginning of the planning: mining operation lowering rate (h_o); mineral loss (L_m) and pollution (P); working area advance velocity (V_a); block length (L_b); excavator block number at the horizon (N_b); working bench number (N_{ben}), bench height (H_{ben}); excavator capacity (Q_e); working area length along the rock mass (L_{rm}); current overburden ratio (R_{cur}); active mining area (S_a). Besides, the accumulated experience, previously conducted research and

promising iron ore mining technologies are analyzed and compared to the conditions formed at an enterprise. It allows us to substantiate the technical goals for further technological and economic calculations to define the prospects of ensuring and immediate introduction of mining enterprises sustainability strategies. An economic strategy development provides for a detailed analysis of the external environment changes, the results being compared to the formed internal potential of a mining enterprise to find extra possibilities and neutralize potential threats.

Considering the above-mentioned, the staged solution of scientific and practical tasks and the order of the search for MRB support and sustainability strategies based on the application of geoinformation systems and innovation research methods, nano- and neurotechnologies, in particular, is in Fig. 2.

Substantiation of iron-containing product amount

Initial data	Analysis of known mineral deposits and ore targets. Evaluation of iron ore mining technologies	Analysis of mineral processing technologies for competitive products manufacturing
1. Preliminary analysis of a mineral reserve base (MRB)	Data adequacy evaluation. Rejection of MRB objects as to their exploration degree	Evaluation of manufacturing technologies for end products and their mineral structure
2. Finding systematically important elements of a mining enterprise MRB	Evaluation of mining methods and technologies, mining and technical possibilities and mined ore quality	Analysis of technological balances of ore concentration at explored deposits
3. Formation of priority limit variants of deposit mining	Evaluation of mining priority of the explored deposits	Substantiation of restricting the mined raw ore amount and quality
4. Preliminary formation of a mining enterprise MRB support strategies	Technological evaluation of mining and reclamation schedules for explored deposits	Substantiation of the amount and processing technologies of raw ore and end products
5. Exploration programme formation	Evaluation of explored deposits amount and mining priority	Prediction of mineral processing technologies (including technology-related materials)
6. Investment proposals as to MRB development programme	Feasibility study of timing variants for mining output, capital works, prospecting, iron ore transportation directions	

Fig. 2. Directed search order of iron ore deposits' support and further mining at Ukrainian mining enterprises

Conclusions and suggestions

Thus, the proposed approach to the development of long-term and current sustainability programmes for Ukraine's mining enterprises will make it possible to enhance their production and economic efficiency and competitive ability considering the factors that ensure their further sustainable functioning (Fig.3) even under current unstable economic tendencies at the iron ore market. It will also facilitate the introduction of sustainability culture in mining according to the current highest international standards (Level BS Series 8900:2006; BS 8901:2007 «Sustainable management»). It will allow us to develop and introduce scientifically based complex strategies for Ukraine's mining enterprises in the nearest future.

Factors ensuring a mining enterprise's efficiency		
Availability and observance of current standards in mining: ISO 14001: 2004 "Environmental Management Standard" ISO 9001: 2008 "Quality Management Systems. Requirements" ISO 50001: 2011 – "Energy Management System" OHSAS 18001: 2007 – "Labour Safety Management Systems - Requirements"		
Technical: - standard and actual lifespan of technological equipment; - obsolescence ratio; energy consumption of production according to similar indicators of the world's iron ore producers; - equipment reliability; unit flexibility - shift-working ratio; number of hours of accident-free and fault-free operation	**Technological:** - innovation of technological processes (energy efficiency and sustainability) and integrated mineral resource development; - correspondence of the end product quality to the market demands (iron content increase and harmful admixture decrease including that of sulfur, phosphorus in iron ore products); - availability of iron ore reserves ready for mining; observance of mining system parameters and indicators according to the previously approved projects	**Organizational, including social**: - high qualification of a personnel (skills and abilities); - introduction of scientific principles of labour organization in mining; - observance of technological design standards and safety requirements; introduction of effective models of labour motivation and social security; - nonproductive loss elimination; technological maintenance quality and major repairs of mining equipment; - application of modern geoinformation systems and GPS technologies at every production stage to increase competitive ability of Ukrainian products at the iron ore markets under unstable economic conditions
Financial and economic: availability of one's own financial resources; designed and actual expenses level per 1 UAH of the end products in relation to the main competitors producing similar products at the mineral market segment; capital productivity and capital-labour ratio; business environment indices; an enterprise's financial indices; minimum penalties for environment pollution; production profitability; stable increase of a mining enterprise's assets cost		

Fig. 3. Indicators ensuring Ukrainian enterprises' further efficient iron ore mining under unstable economic conditions (compiled by the author)

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PECULIARITIES OF FORMATION OF ECOLOGICAL CONSCIOUSNESS OF POPULATION

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Abstract. The article considers the problem of formation of ecological consciousness of the population of the industrial area.The authors have defined the main objectives and aspects in the context of possible trends of development of ecological consciousness and culture of the population. The study has revealed the factors influencing the ecological condition of modern industrial city.

Keywords: ecological consciousness, adult population, ecological behavior.

Introduction

The problem of human interaction with nature disturbs humanity has disturbed since ancient times,when thinkers and philosophers studied the relationship between man and environment. This problem was escalating as a result of scientific and technical revolution at the end of the 19th century. The rampant development of manufacturing output led to devastating effects on the ecological situation of large areas of the planet as a whole and Ukraine in particular.

The problem of relationship between man and the environment

Environmental issues are global in today's social development.Ukraine topped the list of states in the number of deaths caused by air pollution in relation to the total population. The most polluted cities are in the eastern and central regions, including Kryviy Rih. Therefore, the question of improving the ecological situation is one of the priority directions of development of health promotion and safe environment. Formation of ecological consciousness and culture of the population should be an important aspect of the introduction of advanced environmental technologies and scientific achievements. Great attention has been paid to the adaptive procedures for assessing the environmental situation and decision-making

in environmental management in recent years.The reason for this is the facts that have been extensively studied in theory and proven in practice. These facts show:

- the relationship of social, demographic, economic and ecological processes is complex and dynamically changing in space and in time. For this reason, the judgment of the upcoming changes in wildlife are unreliable, even if they are based on currently detected trends of individual processes;

- industrial and ecological systems, having the property to change and to organize themselves, maintain their fitness and ability to heal themselves only within certain limits, beyond which they pass into a qualitatively different state;

- losses from poor planning and deviations when implementing environmental policies are too large to be able to generate and implement them in a mode of trial and error, a limited response to the violations that have taken place without the whole system self-learning.

These circumstances make fragile hopes for the development of the "ideal" of environmental policies, which would remain stable for a long time. Changes that are made to such strategies must be based on a more profound scientific theories and models of dynamic optimization. The supervisory and corrective mechanism of environmental policy should provide superior and efficient changes in environmental action. The mechanism should have a "memory" not only on trends in objective data, but also have a "knowledge base" of the systems of arguments and attitudes, which in the past led to or contributed to the success of errors.The mechanism should also take account of the "price" and the effects of positive and negative experiences of environmental policy.An adaptive approach to environmental management is one of the most important preconditions for its effectiveness. Adaptation of control mode is applied in two ways. Firstly, the adaptation is carried out by adjusting the establishment of environmental management strategies and operational decision-making mechanism in accordance with the changes and providingadequate conditions.Secondly, environmental policy can and should have an active influence on the formation of favorable conditions for its further development - in particular, by increasing the level of environmental education of society, capacity-building and more.Thus, it is not adaptable and active adaptation, which is achieved through targeted changes in the environment in accordance with the long-term goal of protection and rational use of natural resources.

In both of these approaches environmental policy in the mining sector should actively use the natural adaptation processes in the environmental management system, or resist them - depending on the focus and results.

Despite the perfection of engineering methods of nature protection and environmental legislation, mining companies will not use them if it is not profitable for them. It should be noted that conservation does not give profits, except for recycling from sewage and gases emitted into the atmosphere. Most of the seized substances is a valuable raw material (sulfur, a dust and non-ferrous metals, etc.) and can be used in the production process, which would produce additional revenue. Another reason for the lack of interest from the mining industry to the field of environmental protection is the difference between environmental pollution and damage to the environment as time damages the environment in another form

Fines should provide conditions under which violations are disadvantageous in terms of the economic interests of nature. As a rule, penalty payments are set by multiplying the relative statutory indicator of the board or of the value of lost profits.

Fees for above-limit and irrational use of natural resources (wild plants, animals, mineral mud, water, etc.) are collected in fines from the profits remaining at his disposal, and from his private funds.

Much better is the way of economic incentives, when the state through a variety of instruments (prices, payments, tax credits and fees) creates the conditions for the profitability of compliance with environmental legislation, as well as losses from its breach.

The study of category of ecological consciousness is underrepresented in reference books. Much more common is the notion of consciousness, whose definition is often borrowed from other human sciences (sociology, philosophy, pedagogy, etc.). According to psychologists S. Deryabo, V. Yasvin, ecological consciousness is a set of ideas about the relationships in the system "man - nature" and in the very nature of the relationship to nature, as well as the respective strategies of interaction with it. (Oglyad pro stan zabrudnennya navkolishnogo prirodnogo seredovischa na teritoriyi Ukrayini za danimi sposterezhen gidrometeorologichnih organizatsiy u 2015 rotsi.).

E.V.Girusov understands environmental consciousness as a set of beliefs, theories and emotions, which reflect the problems of the relation of nature and society in terms of their optimal solutions according to the specific needs of society and the capabilities of nature. Thus, ecological consciousness is based on the ideological and moral values, but requires their personal judgment. It is formed from knowledge and belief in the relationship between society and nature, attitude to natural resources, the ability to apply scientific knowledge due to the decision in relation to the nature. It displays an individual experience with natural systems (Vikonkom Krivorizkoyi miskoyi radi Ukrayini. (2016). Proekt Strategichnogo planu rozvitku mista Krivogo Rogu na period do 2025 r.).

In our view, ecological consciousness should be referred to as a certain set of beliefs, thoughts and emotions that reflect the specific way of relating to nature, which is based on the ratio of the corresponding specific needs of the society / group / human and natural features. It should be noted that in the majority of publications devoted to the problems of ecological education, emphasis is made on the formation of the skills of ecological culture of school age students.These publications do not disclose issues related to the organization of ecological education system for adult population.

The purpose of this article is to establish trends of development of ecological consciousness of the adult population that lives in the city with high pollution levels.

According to open sources of information, today Ukraine is in a state of profound environmental and economic crisis. In 2015, the list of cities with the highest levels of air pollution included 15 cities - Kryvyi Rih, Kherson, Dnippodzepzhinsk, Dnipropetrovsk, Odesa, Kramatorsk, Lysychansk, Slavyansk, Mykolaiv, Mariupol, Kyiv, Zaporizhzhia, Uzhgorod, Lutsk, Rubizhne (Fig. 1).

High levels of air pollution in these cities are associated with the increase in the content of specific contaminants - formaldehyde, phenol, hydrogen fluoride, ammonia, major impurities - suspended substances, nitrogen dioxide, carbon monoxide

The largest number of cities with a high level of air pollution is in the Dnipropetrovsk region - 3 cities (one of them with a very high level of pollution), in Donetsk region - 3, in the Luhansk region - 2 cities. Other cities are seven regional centers and the capital of Ukraine.
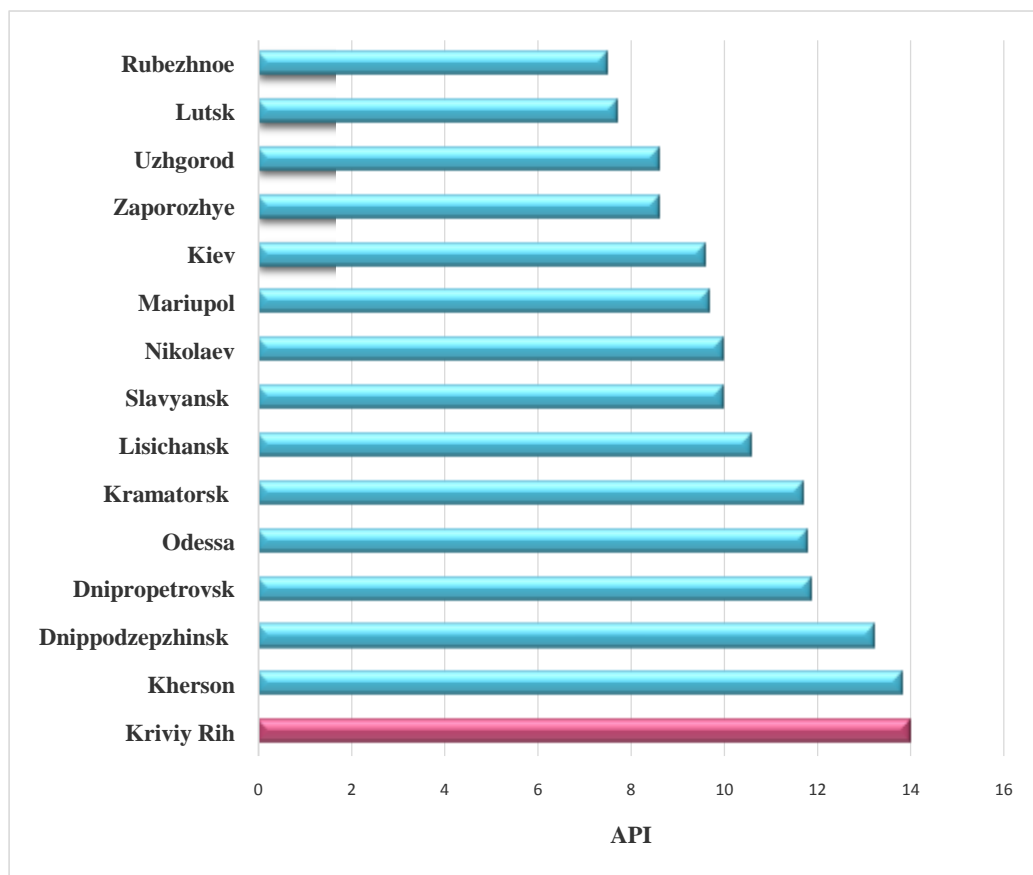
**Fig. 1. The value of air pollution index (API) in the most
polluted cities of Ukraine in 2015**
(Oglyad pro stan zabrudnennya navkolishnogo prirodnogo seredovischa na teritoriyi Ukrayini
za danimi sposterezhen gidrometeorologichnih organizatsiy u 2015 rotsi)

Iron ore basin of Kryvyi Rih is one of the leading industrial centers of Ukraine with powerful development of the steel industry, mining and chemical industries. At the same time, Kryvyi Rih is on the list of the 20 most polluted cities in the country.Factors that affect the environmental situation in the cityare:

- large concentration of mining and mineral processing and metallurgical complexes;
- the use of outdated technologies and equipment, which requires changing;
- unresolved issue of fugitive emissions (in industrial processes, mass emissions during drilling operations in mines, mining enterprises, etc.);
- lack of cleaning apparatus for gaseous components;
- problems associated with the storage, disposal and dumping of toxic industrial waste;
- the absence of effective state control over the use of the Nature Conservation Act and the system of effective penalties for harm to the environment (Deryabo, 1996).

- The greatest damage to the natural environment of the city caused by OJSC "ArcelorMittal Kryvyi Rih", OJSC "Southern GOK ", PJSC "Northern GOK ", OJSC "Heidelberg Cement Ukraine", PJSC "Central GOK", OJSC "Kryvbasszhelezrudkom", PJSC "Ingulets GOK" , PJSC "Evraz Sukha Balka", PJSC "MMK named. Ilyich" GOK "Ukrmehanobr" (Dobrovolskaya, 2012).

According to the data of mining and metallurgical complex of the city, pollutant emissions into the air in 2014 amounted to 327,300 tons, which is 7% less than in 2013. For 9 months of 2016 (Dobrovolskaya, 2012):

- emissions of pollutants into the air amounted to 252 thousand tons;

- more than 142 million tons of waste were formed, 96 million. tons were placed in the environment.

As you can see, there is a tendency to reduce the emission of harmful substances into the atmosphere.As indicated in the project "Strategic Development Plan of Kryvyi Rih in the period up to 2025":

- Kryvyi Rih in the future will be the cleanest metallurgical center of the world, which introduces modern energy saving technologies;

- Kryvyi Rih in the future will be a powerful industrial center with a diversified economy, modernized mining and metallurgical complex, high-tech engineering, the regional center of scientific and technological developments, the leader in attracting investment and industrial tourism;

- Kryvyi Rih in the future will be a safe and comfortable city to live in (Oglyad pro stan zabrudnennya navkolishnogo prirodnogo seredovischa na teritoriyi Ukrayini za danimi sposterezhen gidrometeorologichnih organizatsiy u 2015 rotsi).

The structure of the strategic plan, in addition to the modernization of enterprises, introduction of new technologies, also includes the formation of an ecologically conscious population. Ecologically conscious population is the central element of the ecological system (fig.2).

Today, there is the problem of apathy among the population regarding the status of city pollution and environmental disasterThus, an important role in the formation of consciousness is to be played by environmental education Environmental education is a conscious and systematic development of knowledge about the environment, especially the human impact on the environment, the principles of harmonious development of man and the environment.Environmental behavior is formed as a result of such education. Environmental behavior is a system of actions that implement education about the laws of human functioning environmental protection, respect for it. The objectives will be achieved by:

- popularization and promotion of ecological, energy-saving behavior of city residents;

- raising public awareness about the methods of economical consumption of resources;

- creation of public information system on the environment;

- activation of the public in monitoring the activity of enterprises in the field of ecological safety and environmental protection;

- introduction of the institute of public condemnation for causing harm to the environment;

- - expansion of cooperation between local authorities and NGOs in the context of the formation of ecological consciousness.

As shows the experience of other countries, effective factors in the formation of ecological consciousness are:

    1. Legal regulation of activity of the population and enterprises of the city and its impact on nature by enhancing the knowledge of«environmental law" and the introduction of a system of responsibility for its violation (warnings, fines, etc.).

    2. The introduction of the monitoring system in the areas of green space from both the public and law enforcement officials.

    3. Public monitoring and control of the city's business activities on pollution.

DIRECTIONS

| A. environmentally safe city with effective use of resources | B. acity with diversified competitive economy and modern technology | C. Open effective city department with a high quality of life standards |

STRATEGIC

| A.1. Clean environment | B.1. The development of new sectors of city economy | C.1. Open effective city department |

| A.2. Effective waste management system | B.2. Innovative and high-tech industry | C.2. Convenient and user-friendly for people of city infrastructure |

| A.3. Energy-efficientcity economy | B.3. Developed enterprise | C.3. High quality life standards of inhabitants |

| A.4. Ecologically conscious population | B.4. Investment-attractive city | |

Fig. 2. The structure of strategic plan
(Proekt Strategichnogo planu rozvitku mista Krivogo Rogu na period do 2025 r., 2016)

Conclusions and suggestions

As a result of studying the problem, we have identified ways of creating environmental awareness with the assistance of the city and the public. The steps to be taken are the creation of the city's population information system on ecological status by highlighting itin the information resources of the city, television and holding actions, trade fairs and seminars. In our opinion, the formation of ecological consciousness of population of the polluted city is only possible on condition that each person treats pollution as an indicator of danger to their lives and the environment in general; NGOs as authorities of effective impact on institutions, businesses and residents, along with executive bodies of local self-government identify problems and seek ways to address them at the national level

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GLOBALISATION PROCESSES IMPACT ON LATVIAN INSURANCE MARKET DEVELOPMENT

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Abstract. In globalization circumstances the economy of each country is viewed and evaluated not only individually, but also in global and regional context. It allows determining the level of development of a definite country in comparison with global, regional and other countries' indices, its impact and contribution to the global economy, as well as it helps to detect global and regional impact on the economy of a definite country.

The authors identified factors affecting the insurance industry, have analized the possibility of business environment to adapt and determined development potential of the Latvian market in context of globalization.

Keywords: the globalization ,insurance market , development

Ievads

Apdrošināšanas nozare, tāpat kā citas finanšu nozares, nav izolēta no tendencēm pasaules ekonomikā, politiskajiem notikumiem un dažādām globālajām pārmaiņām, piemēram, klimata, IT jomā vai drošības situācijas pasaulē, un jebkuras izmaiņas var būtiski ietekmēt gan visu apdrošināšanas nozari kopumā, gan arī atsevišķus apdrošināšanas segmentus.

Pētījuma mērķis ir izpētīt Latvijas apdrošināšanas tirgus attīstību pasaules ekonomikas globalizācijas aktuālu procesu kontekstā, lai noteiktu faktorus, kas ietekmē Latvijas apdrošināšanas tirgus attīstību.Pētījuma hipoteze ir Globalizācijas procesi vairāk negatīvi nekā pozitīvi ietekme Latvijas apdrošināšanas tirgus attīstību.

Lai sasniegt izvirzītos mērķus un pierādīt hipotēzi ir jārealizē šādi uzdevumi: savākt un apkopot un sistematizēt faktorus, kas ietekme tirgus attīstību globalizācijas procesu ietvaros, veikt šo faktoru analīzi un noteikt tirgus attīstības potenciālu.

Pētījumā pielietotaekonomiskās analīzes metode un kontentanalīzes metode.

Latvijas apdrošināšanas tirgus attīstības tendences globalizācijas procesu aspektā

Ar jēdzienu „globalizācija" saprot valstu pieaugošo savstarpējo atkarību, kas rodas, palielinoties to ekonomiskajai integrācijai ārējās tirdzniecības, ārvalstu investīciju un cilvēku un ideju starptautiskās pārvietošanās iespaidā. Globalizācija ir process, kas saistīts ar ekonomiskām, sociālām, tehnoloģiskām, politiskām un citām izmaiņām, kuru rezultātā vairums pasaules valstu un ģeogrāfisko reģionu kļūst savstarpēji ciešāk saistīti un vienlaikus

arī vairāk atkarīgi viens no otra. Praksē globalizācija izpaužas pieaugošā preču un pakalpojumu, kā arī kapitāla, naudas un iedzīvotāju plūsmā starp valstīm.

"Lisabonas grupa", kuru veido 18 speciālisti no Eiropas, Ziemeļamerikas un Japānas, veikusi mūsdienu pasaules globalizācijas tendenču sociālo, ekonomisko un ekoloģisko aspektu analīzi, ir izstrādājusi pasaules attīstības scenāriju, kuru raksturo 10 galvenās tendences:

1. Pasaules ekonomikas koncentrēšanās trīs reģionos (Japāna, Ziemeļamerika, Rietumeiropa), jauno globalizācijas procesu kontekstā;

2. Nelīdzsvarota demogrāfiskā situācija – Āzijas iedzīvotāju skaitliskā dominante un Āfrikas iedzīvotāju nabadzība;

3. Attīstīto valstu intereses nosaka pasaules zinātnes un tehnikas attīstības virzību uz pilnīgu ekonomikas privatizāciju, decentralizāciju un liberalizāciju;

4. Palielinās plaisa starp sociāli integrēto un sociāli izstumto iedzīvotāju daļu;

5. Jauna tehno-organizatoriskā revolūcija noteiks visu rūpniecību kopumā;

6. Lielie uzņēmumi arvien aktīvāk kļūs par sadarbības tīklu dalībniekiem, bet vidējie un mazie – tiks pakļauti lielām organizatoriskām izmaiņām un tirgus izvirzītajām prasībām;

7. Patreizējām tendencēm turpinot attīstīties, sagaidāms pieaugošs bezdarba līmenis;

8. Pateicoties jaunā tipa konkurencei, arvien plašāk notiks rūpniecības "apzaļumošana";

9. Pilsētas un to priekšpilsētas kļūst par svarīgām globalizētās ekonomikas teritoriālām vienībām;

10. Sociālās stratēģijas nākotnē svārstīsies starp brīvu tirgus ekonomiku un ierobežotu sociālā tirgus ekonomiku ar mērena protekcionisma devu (Manfred B. Steger, 2012).

Globalizācijas procesu mijiedarbība ar apdrošināšanas kompāniju darbību un biznesa aktivitātēm ir arī viens no vairākapspriestiem jautājumiem visā pasaulē pēdējos 20 gadus. Rādītāju dinamikas analīze, pasaules ekonomikas globalizācijas kontekstāun biznesa vides pielāgošana jaunajiem apstākļiem, it īpaši kļuva aktuāla Austurmeiropā pēc apdrošināšanas tirgus liberalizācijas, noteikumu unifikācijas un protekcionisma politikas ietekmes mazināšanās Eiropāun tirgus atvēršanas Austrumeiropā.

Šos jautājumus pasaules zinātnieki pētīja no dažādiem skatu punktiem. Tā zinātnieks Patriks Lidtke savā rakstā 'What's Insurance to a Modern Economy?" izpētīja jaunus trendus finanšu nozarē caur prizmu kā apdrošinātāji spēj pielāgoties tendencēm globalizācijas procesa ietvaros. Vairāki zinātnieki, tai skaitā Lee, CC. & Chang, CH. (2012); M. Mrak (2000); O. Zhabynets (2013) un A. Theis, M. Wolgasts (2010) un citi pētīja globalizācijas procesus apdrošināšanas nozares attīstības kontekstā dažādās valstīs. Bet svarīgi atzīmēt,ka Latvijā līdz šim šāda veida pētījumi netika veikti.

Savas attīstības gaitā Latvijas apdrošināšanas tirgus ir attīstījies nevienmērīgi, piedzīvojot vairākus kritumus un salīdzinoši nelielas izaugsmes periodus, un tikai 2004. gadā, līdz ar iestāšanos Eiropas Savienībā, aizsākās tā straujāka attīstība, kas turpinājās līdz 2008. gadam, kad globālās ekonomiskās krīzes iespaidā, Latvijas apdrošināšanas tirgū sākās recesijas periods.

Iestāšanās Eiropas Savienībā deva stimulu valsts ekonomikas izaugsmei, kas pozitīvi ietekmēja apdrošināšanas nozari un veicināja tās dinamisku izaugsmi. Šajā laikā ievērojami pieauga parakstīto prēmiju un izmaksāto atlīdzību apmēri, tirgus dalībnieku skaits u.c. apdrošināšanas attīstību raksturojošie rādītāji, tomēr globālā finanšu krīze, kura Latvijas ekonomiku sasniedza 2008. gada rudenī, tajā pašā gadā lika samazināties dzīvības apdrošināšanas segmentā parakstīto apdrošināšanas prēmiju apmēriem, lai gan kopumā

apdrošināšanas tirgū vēl bija novērojami pieauguma tempi. Savukārt 2009. gadā aizsākās strauja lejupslīde, ko izraisīja hipotekārās kreditēšanas apstāšanās, kas ietekmēja īpašuma apdrošināšanas apjomus, pārdošanas apjomu kritums auto tirgū un auto līzinga darījumu samazināšanās, kas izraisīja samazinājumu obligātajā transportlīdzekļu īpašnieku civiltiesiskās atbildības apdrošināšanā un sauszemes transportlīdzekļu KASKO apdrošināšanā – apdrošināšanas veidos, kuri veidoja lielāko daļu no nedzīvības apdrošināšanas tirgus, iedzīvotāju pirktspējas samazināšanās, kā arī citas ekonomiskās krīzes sekas. 2012.gadā , kopā ar Latvijas ekonomikas atveseļošanos, arī apdrošināšanas tirgū ir vērojama pieauguma tendences, bet jau 2013. gadā pārstrukturētais tirgus sasniedza pirms krīzes apjomus.

Autori izpētot globalizācijas procesu ietekmi uz Latvijas apdrošināšanas tirgus attīstību,nonāca pie secinājuma, ka šo tēmu ir jāskatās vismaz trijās plāksnes :
  – ietekmējošie faktori,
  – biznesa vides pielāgošana,
  – attīstības potenciāls.

Veicot globalizācijas procesu analīzi, autore noteica un sistimatizēja faktorus, kas var pozitīvi un negatīvi ietekmēt Latvijas apdrošināšanas tirgus attīstību.

Pozitīvi ietekmējoši faktori	Negatīvi ietekmējoši faktori
Kapitālizācijas pieaugums, saistībā ar ārvalstu investīciju pieplūdumu nozarei	Tirgus kļūst jūtīgāks pret svārstībām globālajā tirgū un ekonomikā kopumā
Konkurences pieaugums	Vietējo apdrošinātāju izstumšana no tirgus
Tarifu samazinājums	Notiek investīciju samazinājums, ko veic paši apdrošinātāji valsts ekonomikā
Izdevumus, kas saistīti ar pārapdrošināšanu samazināšanās	Samazinās iespējas veikt pakalpojumu eksportu
Likumdošanas harmonizācija un unifikācija vismaz ES līmenī	Mazāk tiek ievērota nacionālātirgus specifika un intereses
Jauno teholoģiju izmantošana	Grūtāk kontrolēt un prognozēt uzņēmumu darbību
Jaunu un inovatīvu produktu rašanās Sadarbības paaugstināšanās starpvalstu līmenī	

Attēls1. Faktori, kas ietekmē Latvijas apdrošināšanas tirgus attīstību.

Globalizācijas process pats par sevi ir ļoti pretrunīgs process, kuram ir gan atbalstītāji gan pretinieki. Šī procesa ietvaros valsts intereses tiek mazinātas, priekšplānā liekot tirgus mehānismus : pieprasījumu un piedāvājumu. No vienas puses tas ir atbalstāms, jo konkurences apstākļos vairāk tiek ekonomēti resursi un klientiem tiek piedāvāts kvalitatīvāks serviss pie mazākām izmaksām. No otras puses, klients paliek mazāk aizsargāts un var justies mazāk drošs, bet tā kā apdrošināšana ir uzticības bizness, klienta uzticībai ir liela nozīme.

Mūsu interesēspēc iespējas maksimāli izmantot faktorus, kas sekmē tirgus attīstību gobalizācijas procesā un mazināt to faktoru ietekmi, kas bremzē kopējo attīstību.

Autori, veicot pētījumu, nonāca pie secinājuma, ka pašlaik Latvijā nekas netiek darīts lai mazinātu globalizācijas negatīvo ietekmi uz tirgu.Piemēram, apskatīsim dažus no augstāk minētajiem faktoriem.

1. Globalizācijas procesa iespaidā tirgus kļūst jūtīgāks pret svārstībām globālajā tirgū un ekonomikā kopumā.

Lai mazinātu šī faktora ietekmi, ir jāprognozē pasaules ekonomikas attīstību un laicīgi jāreaģē, mainot apdrošināšanas portfeļa veidošanas politiku.Tā 2008.gada globālās finanšu krīzes ietekme uz pasaules apdrošināšanas tirgus attīstību raksturo parakstīto prēmiju kritums vidēji par 5% (Skatīt attēlu 2.)
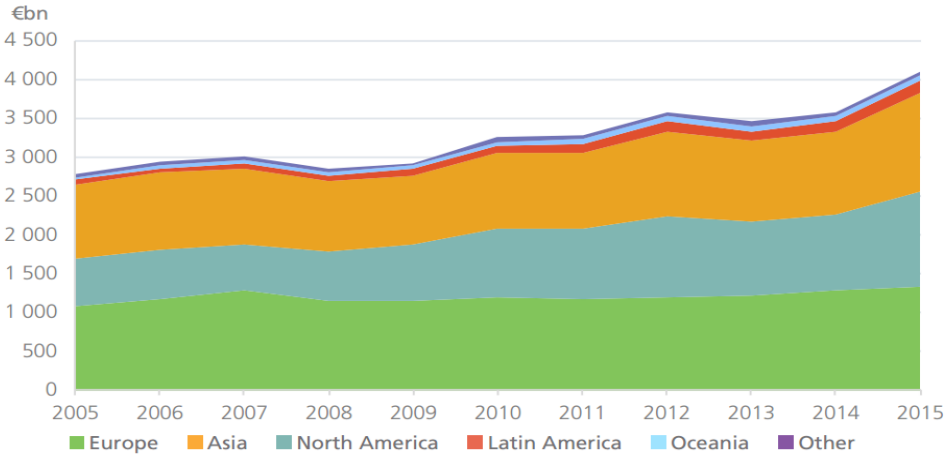
Attēls 2. Parakstīto apdrošināšanas prēmiju dinamika pasaulē 2005-2015.g.
(€bn) *Swiss Reinsurance Company (2016)*

Latvijā šī faktora ietekme bija dramatiska, kad divu gadu laikā tirgus kritās aptuveni par 34%.(Skatīt attēlu 3.)Šo kritumu varēja mazināt laicīgi, restrukturizējot un diversificējot portfeli.
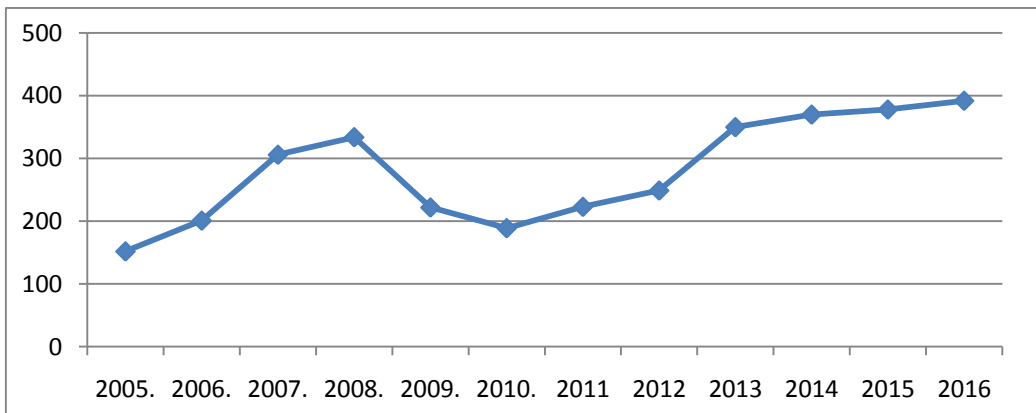
Attēls 3. Parakstīto apdrošināšanas prēmiju dinamika Latvijā 2005-2015.g.(€bn)
FKTK (2017)

Kā vēl vienu būtisku faktoru, kas negatīvi ietekmē apdrošināšanas tirgus attīstību, autori grib minēt *vietējo apdrošinātāju izstumšana no tirgus globalizācijas procesa ietvaros.* 4. attēlā ir atspoguļota apdrošinātāju, ar vietējo kapitālu, samazināšanās dinamika.

Attēls.4. Apdrošinātāju kapitāla stuktūras dinamika Latvijā 2001.-2016.g.
FKTK (2017)

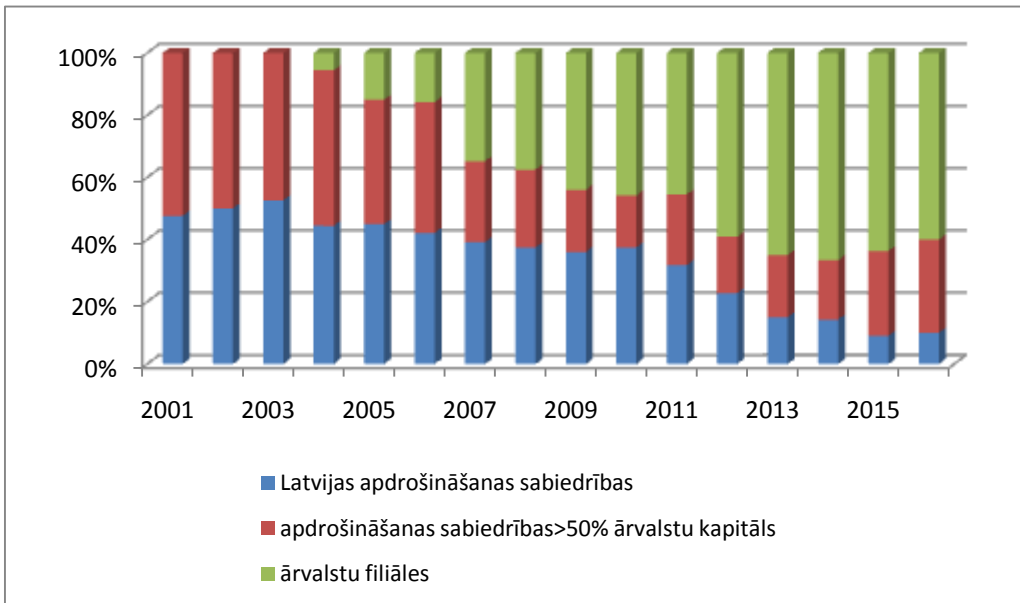Kopš 1991. gada, kad Latvijā tika atcelts valsts monopols apdrošināšanas nozarē, un tirgū tika atļauts nodarboties ar komercapdrošināšanu, tirgus dalībnieku struktūra būtiski mainījās, īpaši strauji tā sāka mainīties pēc 2004.gada, kad Latvija iestājās ES un pakāpeniski tirgus tika iekļauts kopējā Eiropas tirgū.2016.gadā no 20 apdrošinātājiem, kas sniedz apdrošināšanas pakalpojumus Latvijas teritorijā, tikai 2 ārvalstu kapitāls ir mazāks nekā 10% .

Analizējot pēdējās tirgus aktualitātes, autori var secināt, ka apdošinātāju darbība vairāk neaprobežojas tikai nacionālajā līmenī, tā iziet ārpus robežām un nereti apdrošinātāji pašlaik izpētot tirgu analizē Baltijas tirgu kā vienu veselu reģionu. Lieli tirgus spēlētāji(korporācijas) vērtējot iespēju uzsākt darbību Latvijā, analizē to vienmēr Baltijas kontekstā.Gandrīz visiem apdrošinātājiem ir mātes uzņēmums un divas filiāles Baltijā. Lielo darbaspēka nodokļu sloga dēļ pēdējo divu gadu laikā ir vērojama tendence, ka Latvija zaudē savas pozīcijas, un apdrošinātāji pieņemot lēmumu biežāk izvēlas Lietuvu vai Igauniju Mātes uzņēmumu reģistrācijai, Latvijā paturot tikai filiāles.Tā notika gan ar Gjensidige , gan ar If Baltija gan arī ar ERGO dzīvība Baltia.

Analizējot globalizācijas ietekmi uz apdrošināšanas tirgus attīstību Latvijā, nedrīkst aizmirst arī par riska pārapdrošināšanu. Pārapdrošināšana ir ekonomisko attiecību sistēma, kuras procesā apdrošinātājs daļu no klienta uzņemtā riska nodod specializētiem apdrošinātājiem uz savstarpēji noslēgta līguma pamata.

Pārapdrošināšanas ekonomiskā būtība ir sākotnējā apdrošināšanas fonda sadale starp apdrošināšanas organizācijām. Pārapdrošināšana ļauj samazināt zaudējumu lielumu atsevišķiem riskiem vai viena atgadījuma rezultātā radušos zaudējumu summu, sadalot

zaudējumus starp apdrošināšanas un pārapdrošināšanas sabiedrību.Pārapdrošināšanas procesā notiek riska diversifikācija netikai starp vairākiem apdrošinātājiem, bet arī risks ir izkliedēts pēc teritoriālā principa. Globalizācijas ietvaros Latvijas klientu risks bieži ir izvietots pāri okeānam pārapdrošināšanas ietvaros. Tas palīdz mazināt nacionālās ekonomikas ietekmi uz apdrošināšanas sabiedrību maksātspēju un finanšu drošību. Lai atvieglotu pārapdrošinātājiem riska parakstīšanas procesu un samazinātu izdevumus pašiem apdrošinātājiem, tika pieņemts lēmums ieviest kopējo maksātspējas rādītāju aprēķināšanas sistēmu Solvency II.

Apdrošinātāju kontroles sistēmas organizācija tiek veidota līdzīgi banku sektoram. Tā balstās uz 3 pīlāriem. Pirmais pīlārs ir kvantitatīvās prasības un ietver prasības finanšu resursiem – apdrošināšanas rezervēm, aktīviem maksātspējas normai; otrais pīlārs ir uzraudzības prasības, ietver iekšējās kontroles sistēmas novērtēšanas noteikumus, risku vadības metodes un to kontroli, ko veic apdrošināšanu uzraugošās institūcijas; trešais pīlārs ir informācijas publiskošana un uzraudzības pārskati. Solvency II koncepcijas attiecībā uz risku vadību mērķis ir popularizēt risku vadības kultūru sekojošā veidā:

- sapratnes veidošana, ka riskam ir sava cena;
- tirgus stiprināšana, stimulējot konkurenci;
- sabiedrībām, kurām ir analoģisks risku apjoms, ir jābūt arī analoģiskam normatīvā kapitāla lielumam;
- investīcijam jāatbilsts minimālajam drošība sprasībam;
- risku apjomam, ko uzņemas sabiedrība, jāatbilst riska kapitāla lielumam (Kuzmina, Voronova, 2011).

Apdrošinātāju kontroles sistēma Solvency II ļauj Latvijas valsts uzraugošām institūcijām kontrolēt apdrošinātāju darbības radītājus pat ja tie sniedz savus pakalpojumus izmantojot ES priekšrocības arī ārpus Latvijas robežas. Tas pozitīvi ietekmē tirgus situāciju kopumā un nodrošina vietējiem klientiem papildus aizsardzību.

Apdrošināšanas procesu vadība globalizācijas kontekstā

Globalizācija ir likumsakarīgs un objektīvs pasaules ekonomisko, tiesisko, sociālo, politisko, etnisko, reliģisko, psiholoģisko u. c. procesu mijiedarbības galarezultāts, kad notiek visu pasaulē noritošo procesu nacionālo mērogu pāraugšana globālajos mērogos un veidojas visaptveroša starptautiska sistēma. Brīvām kapitāla, preču un darbaspēka plūsmām ir postoša iedarbība uz nacionālu valstu pastāvēšanu.

Patriotiski noskaņotiem cilvēkiem grūti pielāgoties šīm tendencēm, kad valsts nozīme un identitāte zūd ar katrunākošo migrācijas vilni. Bieži, aizstāvot savas un savas nācijas intereses, rodas konflikti, kas būtiski ietekmē kopējo politisku, etnisku un sociālo vidi.

Apdrošinātājiem arī ir jāpielāgojas šīm izmaiņām. Tā Latvijā līdz 2014. gadam visiem apdrošinātājiem visos apdrošināšanas veidos - karš,masu nemieri un terorisma risks bija kā izņēmums, un tā bija vispasaules vispārēja prakse. Tagad gandrīz visi apdrošinātāji tādos veidos kā nelaimes gadījumu, ceļojumu un kravas apdrošināšanā, šos riskus akceptē un nevis kā individuālos gadījumus, bet tas jau ir ierasta prakse.

20. gadsimtā cilvēce pārdzīvoja milzīgas pārmaiņas. Cilvēces attīstībā šajā gadsimtā bija daudz jaunumu nekā iepriekšējā gadu tūkstotī. Rādās lietas, kuras bija ļoti svarīgas jaunas kultūras un pasaules veidošanā. Informācijas tehnoloģijas un mobilitāte kā globalizācijas virzītājspēki veicina piekļūšanu jaunajām zināšanām, kas ir ilgtspējīgas attīstības balsts. Tomēr nevienlīdzīgā pieeja tehnoloģijām polarizē sabiedrību : dod impulsu iespēju attīstībai

vienai grupai un atstumj pārējās, kam jaunās tehnoloģijas nav pieejamas. No reģionālās attīstības viedokļa ir svarīga komunikācijas tīklu attīstība starp reģioniem, pilsētām un laukiem, kas daudzējādā ziņā notiek, pateicoties informācijas tehnoloģijām.

Cilvēka dzīve strauji mainījās, īpaši strauji pieauga uzņemamās informācijas apjoms. Viens no galvenajiem globalizācijas stūrakmeņiem ir jaunu sakaru līdzekļu attīstība: internets, mobilais telefons, televizors palīdz cilvēkiem saņemt informāciju. Tas radīja arī atkarību no informācijas un informācijas nesējiem, kā arī cilvēciskās saskarsmes izmaiņas. Ņemot to vēra,apdrošinātāji maina arī savu pieeju klientu apkalpošanā.

Distancēti noslēgti apdrošināšanas līgumi un noformētas atlīdzības tagad ir Latvijas ikdiena. Pašapkalpošanas portāli un mobilās aplikācijas palīdz klientiem nodot rūpes par risku apdrošinātājiem nojebkuras pasaules malas, kur ir internets.Interneta priekšrocības vidēji ļauj apdrošinātājiem ekonomēt ap 10%, neizmantojot starpnieka pakalpojumus. Līdz ar to nodarbīnātība apdrošināšanas sektorā pēdējo divu gadu laikā Latvijā samazinājās par 7%.

Tehnoloģiju attīstības dēļ mainās netikai apdrošinātāju komunikācija ar klientiem, bet arī mainās pieeja riska vadībai kā tādai. Jaunākās tehnoloģijas palīdz ātri apstrādāt lielu datu apjomu, meklējot korelācijas un sistēmas. Līdz ar to statistikas datu vākšanas, apstrādes un modelēšanas process atvieglo jauno produktu ieviešanu tirgū..

Sekojot līdzi tehnoloģiju attīstībai, apdrošinātājiem laicīgi jāreaģē uz riska izmaiņām, uzlabojot un modernizējot savus produktus. Tā piemēram, attīstoties transportbūves industrijai, padarot transportlīdzekļus ar katru gadu drošākus un drošākus, drīz var būt situācija, kad KASKO apdrošināšana vairāk nebūs nepieciešama, jo visu atbildību uzņemsies paši transporta ražotāji. Un otrādi, tehnoloģiju attīstība stimulē apdrosinātājus piedāvāt tādus pakalpojumus, kā apdrošināšana pret kiberuzbrukumiem vai datu drošības riska apdrošināšana.

Apdrošinātāji ar pieaugošām investīcijām mēģina ietekmēt riska varbūtību. Kā piemēru, var minēt apdrošinātāju ieguldījumu zinātniskajos pētījumos, kas saistīti ar nedegošo būvmateriālu izgudrošanu vai apdrošinātāju iesaistē klientu drošības sistēmu uzlabošanā (piemēram, ugunsdrošības sensoru vai pretaizdzīšanas sistēmu uzstādīšana, pārbaude un modernizācija). Samazinot risku, apdrošinātāji samazina izdevumus atlīdzību noformēšanai, tas savukārt palielina potenciālās investīcijas risku vadībai un mazināšanai un tā veidojas nepartraukta mijiedarbība.

Globalizācijas procesi ekonomikā ir cieši saistīti ar vides un klimata izmaiņām, tās savukārt negatīvi ietekmē apdrošināšanas nozari kopumā. Pirmkārt pieaug negadījumu skaits, kas saistīti ne tikai ar cilvēku radītiem bojājumiem, bet arī dabas katastrofām. Otrkārt, vides piesārņojums negatīvi ietekmē cilvēka dzīves ilgumu un kvalitāti, tas savukārt atkal palielina atlīdzību apjomu dzīvības apdrošināšanā. Latvijas apdrošinātāji, reaģējot uz dzīves un veselības kvalitātes izmaiņām, sāk piedāvāt jaunus apdrošināšanas riskus, tādus kā, piemēram, kritiskās saslimšanas vai bīstamo slimību riski.

Izmaksāto atlīdzību apjoma palielinājums globalizācijas procesu dēļ ir saistīts arī ar krāpniecisku gadījumu pieaugumu, it īpaši tas skar transporta apdrošināšanu. Eiropas mēroga krāpnieku un noziedzīgu grupējumu darbība Latvijā rada papildus problēmas apdrošinātāju drošības dienestu darbībā. Izmēklēt tāda veida zādzības ir grūti, jo šajā procesā jāiesaistās vairāku valstu drošības dienestiem un institūcijām. Lielas birokrātijas un likumu atšķirības dēļ, process nereti tiek bremzēts, tas savukārt nes zaudējumus apdrošinātājiem. Un tā kā Latvija atrodas pie Eiropas Savienības ārējās robežas, neretiizmeklēšanā jāiesaistāsnetikai Eiropas Savienības institūcijām, bet arī Krievijas un Baltkrievijas. Robežu neesamība starp Eiropas savienības dalībvalstīm un sankcijas ieviešana pret Krieviju, pēdējo gadu laikā

trīskāršoja auto zādzību skaitu. Periodiski tiek atklāti gadījumi, kur tika iesaistīti netikai Latvijas, Lietuvas vai Igaunijas pilsoņi, bet arī Polijas, Itālijas un Francijas iedzīvotāji. Tas liecina par noziedzības restrukturizāciju, ar kuru jācīnās tikai ar kopējiem spēkiem, kad sadarbojas ne tikai vietējie apdrošinātāji, bet cīņa notiek globāli pasaules līmenī.

Globalizācija ir ieviesusi izmaiņas starptautiskajā tirdzniecībā, investīciju politikā un starptautiskajās attiecībās. Šodien, kad globalizācijas rezultātā starptautiskais tirgus kļūst aizvien integrētāks, jo īpaši nepieciešams attīstīt jaunas daudzpusējas sadarbības formas. Tas dos papildu iespējas samazināt biznesa izmaksas, tādējādi panākot lielāku efektivitāti un palielinot vispārējo labklājību.Latvijai pašai jāatrod sava vieta jaunajās globālās dzīves dimensijās. Tādēļ jau pirms dažiem gadiem mēs esam sākuši izmēģināt līdz šim nebijušas starptautiskās sadarbības formas un lietot jaunus terminus: pārrobežu sadarbība, partnerattiecības u.tml. Turpmākās globālās sabiedrības attīstības formas prasīs no mūsu valdības un apdrošinātājiem vēl lielāku elastību un dinamiku.

Secinājumi un priekšlikumi

Globalizācija, tehnoloģiskās un demogrāfiskās pārmaiņas ir radījušas ievērojamas izmaiņas ražošanā un pakalpojumos, tai skaitā arī apdrošināšanas pakalpojumos.Pētījuma hipotēze apstiprinājās daļēi. Vērtējot globalizācijas ietekmi, nevar viennozīmīgi raksturot tās sekas. Nacionālo interešu mazināšana un investīciju aizplūšana no Latvijas ekonomikas no vienas puses un apdrošinātāju finanšu stabilitātes palielināšana un jauno tehnoloģiju ieplūšana no otras puses būtiski ietekmēja tirgus attīstību. Ar globalizācijas procesiem nav jācīnās.Apdrošinātājiem Latvijā labāk pielāgoties esošai situācijai un maksimāli censties gūt peļņu un ieguvumus visai sabiedrībai no globalizācijas procesiem, to var panākt analizējot globālas ekonomikas attīstības tendences.

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INSTRUMENTS FOR PROVIDING ECONOMIC SAFETY OF NATIONAL ECONOMY AT MESO LEVEL

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Abstract. Instruments of economic safety at sector level have been generalized. The relationship between the level of industry economic safety and the level of state economic safety has beenanalysed with application of a synergetic approach.

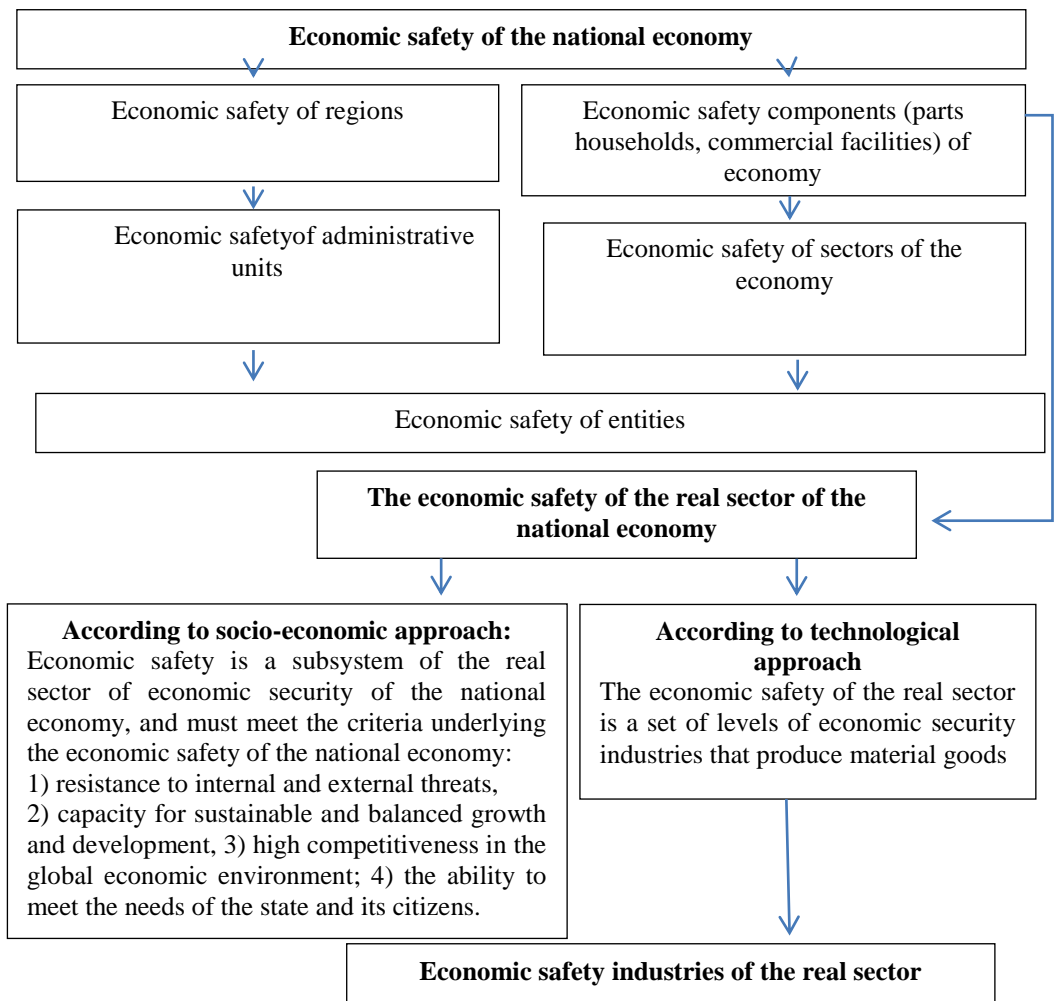**Keywords:** economic safety, hierarchical level of safety, instruments for providing economic safety.

Introduction

Key transformations are taking place at global level and influencing the domestic economy, including such as strengthening of regional integration and deregulation, deterioration of the situation on the world food market due to increasing global demand for food (especially sugar, oils, fats etc.) and changing of the paradigm of economic thinking. The above mentioned transformations lead to the weakening of economic instruments and increasing of importance of specialized institutions in the mechanism of integrated management system of economic safety of the national economy.

Results of the Research

The increase in risks and threats to economic safety determine the security actions to protect national interests, which we believe to be effective only if there are synergistic effects of interaction between integral parts of the economic system. Determining the structure of economic safety at different hierarchical levels of management both in general theoretical terms and in applied aspect is one of the stages of investigation of economic safety. Scientific understanding of economic safety as a system involves the formation of structural and hierarchical levels of components and finding vertical and horizontal interdependencies between them. Considering the economic safety to be a separate line item of economics from the point of view of classical taxonomy methods of economic analysis, scientists distinguish micro- and macro-levels. Thus, the hierarchy of entities involves different criteria of achieving economic safety because of differences in interests, objectives and instruments of economic safety. In particular, macro-economic safety provides progressive economic

development, social satisfaction and maintaining a single economic space for the state industries and regions. In its turn, micro-economic safety provides positive dynamics of financial and economic activity, full implementation of the agreements with creditor for business entities. Summarizing the scientific achievements of Ukrainian scientists concerning problems of economic safety based on this approach one can find researches where transformation of economic system of Ukraine is an instrument for providing economic safety at the macro level (Zhalilo, 2001; Muntiian, 1999). Sincerely appreciating the contribution of these researchers (Zhalilo, 2001; Muntiian, 1999) in solving problems of economic safety in general, it is still worth noting that national interests and economic safety threats aremostly formed at the meso level. Retrospective analysis allows us to claim that the negative trends in the spheres of real economy inevitably lead to destabilization of the national economy in general.

Economic safety of the national economy

| Economic safety of regions | Economic safety components (parts households, commercial facilities) of economy |

| Economic safetyof administrative units | Economic safety of sectors of the economy |

Economic safety of entities

The economic safety of the real sector of the national economy

According to socio-economic approach:
Economic safety is a subsystem of the real sector of economic security of the national economy, and must meet the criteria underlying the economic safety of the national economy:
1) resistance to internal and external threats,
2) capacity for sustainable and balanced growth and development, 3) high competitiveness in the global economic environment; 4) the ability to meet the needs of the state and its citizens.

According to technological approach
The economic safety of the real sector is a set of levels of economic security industries that produce material goods

Economic safety industries of the real sector

Fig. 1. The structural and hierarchical level of national economic safety
(*suggested by authors*)

Thus, in 2010, the problems in the steel sector were a key factor in the proliferation of domestic economic crisis. Negative phenomena in the energy sector are one of the key threats for both economic and national safety. Similarly, problems in the sugar, alcohol and other food industriesare destabilizing factors for the stateeconomic and food safety. Taking into account the fact that there was a further decline in all the basic branches of real sector of the national economy in 2015 we find it necessary to study the economic safety of the national economy based on an industry orientation and development of instrumentsof economic safety at the meso level. Thus,the abovementioned research is actual and has essential scientific and practical importance. It gives opportunity to consider economic safety through the necessity of the mechanism formation where the government, industry or company are not subjects to economic safety, but they form the level of economic safety (Fig.1.).

The results of authors' research based on the use of fuzzy sets method are the proof of direct relationship between sectoral economic safety and economic safety of the national economy. Thus, for example, in the Ukrainian economy the increase of the level of safety in the sugar sector is a prerequisite for growth of competitiveness index of national economy in whole and strengthening of national safety level (Figure 2.).
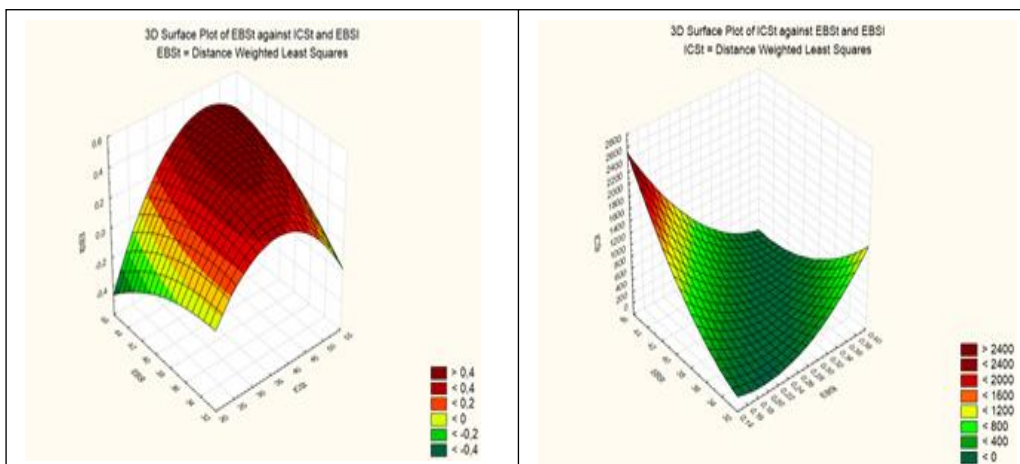

Fig. 2. The relationship between the level of economic safety of the sugar industry (EBSI), level of economic safety (EBSt) and the index of competitiveness of the national economy (ICSt) in Ukraine in2000-2014 pp. (method of fuzzy sets)
(Calculated according to Assotiation "Ukrtsukor"; State Statistics Service of Ukraine, the EU statistical service Eurostat, World Bank).

Fuzzy definitions of the level of economic safety such as comparing estimation indicator with the value of reference (which is taken into account regarding the EU average) were taken into account in our study. Calculations have shown that one of the factors of strengthening of the national economic safety is to ensure its competitiveness and increase the level of economic safety component. That suggests that the growth of economic safety level will have a synergistic effect in the economy for traditional Ukrainian economic sectors.

The results of Feldman Competitiveness Index calculation for food industry in terms of the development of the sugar industry in 2015, where it is the least efficient in use in Ukraine are (Figure 3.) the argument of dependence of economic safety on the development of real sector industries.
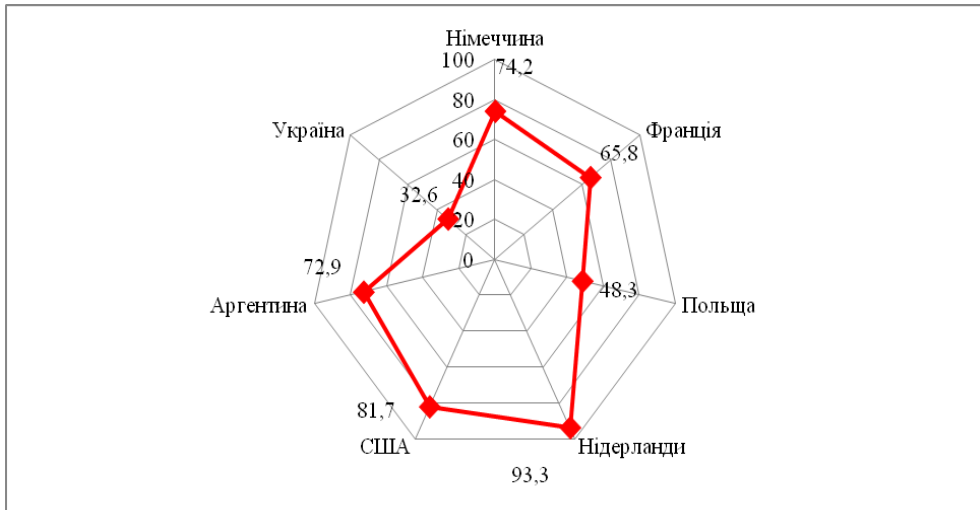
Fig. 3.Feldman Competitiveness Index for food industry in terms of the development of the sugar industry in 2015. (Calculated according toAssotiation"Ukrtsukor"; State Statistics Service of Ukraine, the EU statistical service, World Bank).

Ensuring economic security industry involves the formation of a system of actions that would prevent the emergence of crises or allow to minimize the negative effects of their influence. The theory of state regulation of the economy determines the necessity of a systematic approach for the selection of instruments to ensure economic safety. A set of industry leverage for economic safety of a national industry is the instrument for providing the economically safe industry.

Difficult processes of industry functioning which are not influenced by any leverages or misbalance of their combinations should be regulated. Economic safety entities will use different instruments depending on the level of management. Special regulatory law area which can provide the basis for the functioning of the sector is formed on the global and macro levels. State and supranational regulations aim at creating conditions to prevent (overcome) the negative impact and develop measures to ensure stable operation of the sector. Division of importance of global and macro-level is rather essential as the goals of supranational regulation are not always in the interests of the state.

Measures to ensure economic safety, which are formed by inner leverages and regulated by outer leverages (state (through law), consumers (through demand for products), suppliers (through contractual conditions on quality and raw supply)) are taken at the meso economic level. Functional approach to organizational and economic mechanism of industry economic safety is carried out at this level enabling to fulfil the tasks defined at macro-level.

Micro-level involves the implementation of measures to ensure economic safety of businesses. Instruments for modernization, diversification and restructuring of production are

used at this level and reasons for the existence of a business internal threats, which have the possibility to transform into the whole sector inner threats are formed at this level.

Regulatory and legal instruments that provide state influence as a subject for providing economic safety include laws and decrees of the Verkhovna Rada of Ukraine, presidential decrees, decisions of the Cabinet of Ministers of Ukraine as well as the guidelines, instructions, etc., which directly or indirectly affect the functioning of the sector. The laws have long-term legal regulation function whereas decrees and regulations have short-term or operational function (Kirzhetska, Alkema, Babets, Zhyvko, 2015). State targeted programs of industries' development are essential in the system of normative legal instruments and they enable the Government to make decisions to improve their effectiveness using the program targeted approach.

Administrative instruments are the most important group of tools used by the state to ensure economic safety at industry level. Experience of regulation of administrative methods of economic safety of the real economy is present in all post-Soviet countries including Ukraine. We agree with I. Mikhasyuk, who states that the use of administrative methods is effective when aimed at protecting national interests and under the conditions of destabilization of the economic system (Mykhasiuk, 1999). A significant change in external conditions adversely affects the industry market, which at this stage is not self-contained and self-regulating and requires protection with administrative state regulation instruments. Neoclassical theory assumes violation of trade freedom: large open economy with high demand may introduce customs tariff for improving terms of trade in order to increase the price of foreign goods (Metsler paradox). The above-mentioned means that usage of protection measures on temporary basis to restore the broken equilibrium within the domestic market is justified.

Economic instruments for providing economic sectors safety are divided into instruments of direct and indirect action. Direct methods include various forms of non-repayable financial targeted assistance to industries such as grants or direct subsidies, which include various kinds of donations, allowances, bonuses from special budgetary and extra-budgetary funds of different levels (national, regional, local) and concessional crediting. Indirect methods include regulation in financial, fiscal and tax areas (Chechel, 2013).

The complex system of economic safety at sector level involves using various instruments depending on the hierarchy of threats (Fig. 4).

Formation of state and private programs of priority sectors development is optimal to exclude operational threats that affect intra-industry resources. Creation and implementation of a complex system of intra-planning goals due to aims, activity results andcompetitive allocation of resources between programs and projects for providing economic safety at this levelgrants a conceptual peculiarity as well as monitoring of the achievement of the results of their work,determining thoseones which are responsible for failure of problems. The implementation of sectorial programs aims to adapt the functional components of economic industry safety to the objectives defined in the program. Thus, the basis of a system is qualitative and quantitative indicators of the level of economic industry safety. It is important that the formation of programs be carried out in a decentralized way and be not restricted to one program for the industry. Formation of the organizational, economic, organizational-economic, technological, investment etc. programs will help to bring out the threats that accompany the functioning of the industry more efficiently and get the desired result or achieve its objective function.
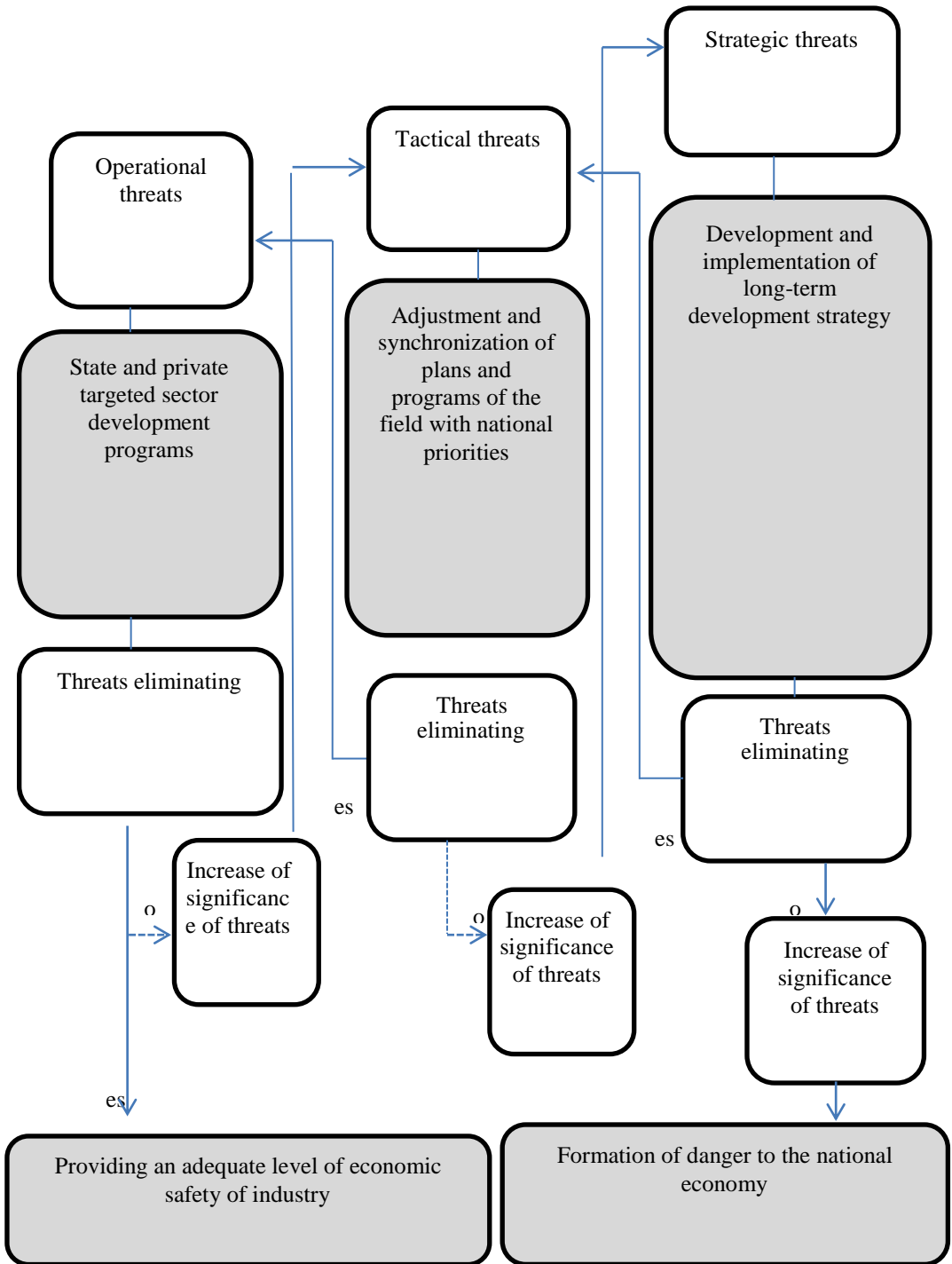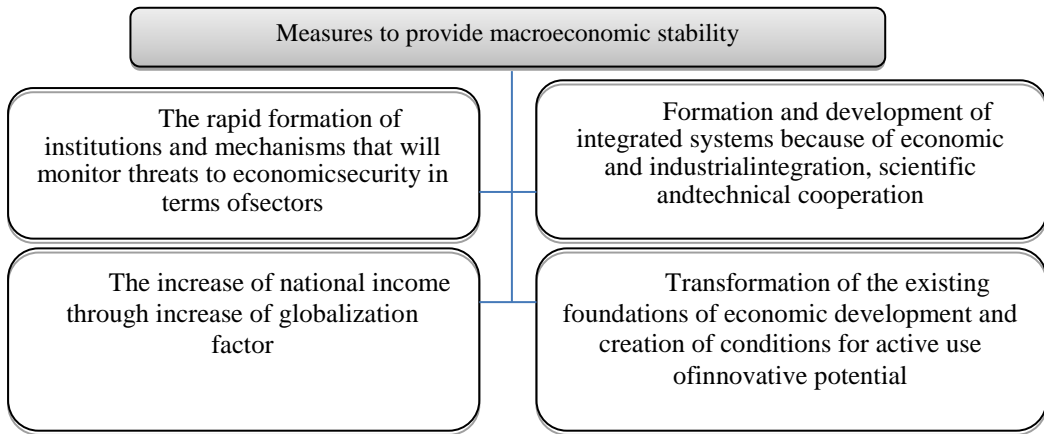
Fig. 4. A complex system of measures to provide the economic safety of the industry (suggested by the authors)

Providing economic industry safety by revealing tactical threats (such as reducing the quality of organizational support for the industry) involves the formation of a system that consists of choosing a model of industry regulation and creating such an environment of interaction between the state / industry and the sources of their arising in which the transformation of danger into safety through legal cooperation, aimed at the sector environment changingtakes place. Providing of economic safety can be achieved through the use of (1) normative legal instruments: the development of economic legislation to provide a legal framework and social climate and support the preservation of competition and market approaches that contribute to the effective functioning of the economic sector; (2) a selected model of state involvement in the regulation of the industry.

International practice identifies three models of state involvement in the regulation of industries: the first model means industry functioning on the principles of market self-maximum power decentralization and liberalization of the market; the second model is found in the presence of a strong and authoritative central body such as the Ministry, which controls the activity of all industries in the country; the third model gives the opportunity to regulate industry functioning through various ministries at the relevant branch level (Zhukova, 2003). Thus, the use of the first model of public participation in providing economic safety is described in works (Williams, Turnbull, Cheit, 1982; Wrzaszcz, Szajner, Wieliczko, 2016). and is appropriated in cases of non-priority of industry in the national economy, or when private sector entities are able to defend the interests of the industry without state participation. The second model implies the existence of a public authority with some discretionary powers to ensure the appropriate management of critical values of the indicators of the industry economic safety. These subjects form the main organizational and economic leverage on the level of industry economic safety and the prospects for its development. The disadvantage of this model is its slow adaptation to the changes and the formation of additional bureaucratic obstacles (Kirzhetskyy, 2012). The third model envisages a limited role of government in ensuring the industry economic safety. It requires that an executive body (responsible for the development of the industry) should not take a direct part in providing economic safety, but regulate general issues of industry development (development of the legal framework for the collection and processing of statistical information etc.) and give indirect protection to industry interests against the threats (Zhukova, 2003). Selection of one of the state involvement models in the regulation of industries provides the transition from episodic economic safety measures to systematic identification and solution of the totality of issues related to the protection of branch interests; implementing long-term policies and integrated programs into it (as well as legal and regulatory ones and methodological framework for their implementation), enabling to use organizational and economic levers as well as informational, organizational and methodological resources in a complex way; determination of stakeholders to strengthen economic security area and evaluate their impact on the functioning of the industry and protection of industry interests; formation of changes and recommendations to overcome the negative impact of tactical threats to industry environment.

The measures of providing macro-economic stability play an important role in countering strategic threats (those, which have a direct impact on the interests of the industry and bring irreparable losses, expressed in the destruction of the industry space). Thus, the strategic threats have significant synergistic effect and their rise increases the likelihood of industry degradation or suspension of its operationasthe mechanisms of direct strategic threats come into existence and possible threats at the tactical and operational levels are launched.

Thus, measures to provide macroeconomic stability is one of the instruments of economic safety (Fig. 5). They are based upon he following factors as: rapid formation of the state institutions and mechanisms that will monitor macro-threats to economic safety in terms of sectors; exchangewith other forms of cooperation like economic integration, scientific and technical cooperation, industrial integration based on a new paradigm of relations; increasing national income due to specified scale of domestic production international traffic growth and resource efficiency increase; enhancing of domestic producers international competitiveness and strengthening of the role of international exchange as a factor in economic growth balancing.

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            ┌─────────────────────────────────────────────────┐
            │  Measures to provide macroeconomic stability    │
            └─────────────────────────────────────────────────┘
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The rapid formation of institutions and mechanisms that will monitor threats to economicsecurity in terms ofsectors	Formation and development of integrated systems because of economic and industrialintegration, scientific andtechnical cooperation
The increase of national income through increase of globalization factor	Transformation of the existing foundations of economic development and creation of conditions for active use ofinnovative potential

Fig. 5. Measures to provide macro-economic stability of Ukraine
(suggested by the authors)

Conclusions and suggestions

It is important to form instruments to provide economic safety of the national economy taking into account the hierarchical levels of the economy. Considering that the development priorities and threats are formed just at the sectorial level, measures to provide economic safety are formed by inner industry instrumentsbut governed by outer instruments that are state (by law), consumers (demand for products), suppliers (by contractual conditions for the quality and supply of raw materials). Key transformations, taking place at the global level and openness of national economies hide a threat, which enhances the disparity of development and increases volatility of industrial markets. That is why such preventive measures to combat the crisis manifestation in the economic environment as the anti-crisis government policies aimed at specific control and monitoring of key sectors and companies which areof great priority for the economy, are one of the prevailing models of threats to national security management.

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<u>THE EXAMPLE OF THE DESIGN OF MATERIALS</u>

NEW ECONOMIC SYSTEM OF SOCIETY DEVELOPMENT

John Sitdson
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Abstract. The article deals with the information economy as a new economic system wherein information and knowledge are the main products. It is proved that a central component of an economic system is work with information and use of information systems in the process of management. The author substantiates the requirement for the search of new approaches to the solution of problems of development of institutional structures of information economy.

Keyword: knowledge, information, system, information economy, management.

Introduction

Global growth of information and telecommunication technologies, on the one hand, and also the necessity of development of scientific knowledge in the area of theory, methodology and practice of informative approach of study of information economy and society, on the other hand, determines topicality of consideration of the process of formationof information economy. Information turns into a strategic resource and factor of acceleration of scientific, technical and technological development and becomes a part of the real economy.

Subtitle of the body

It presupposes the conceptual comprehension of the process of establishment of an informative and technological method of production and related to it forming of an information paradigm in a modern economic science.

The evolutionary process of the establishment of information society is represented in researches of P. Drucker, who used a notion "information revolutions" (Drucker, 1989). He worked out the theory of the stages of development, which allows deeper understanding of the logic of establishment of information economy.

The term "information economy" was first used in 1976 in works of Mark Porat, an employee of the Stanford Centre and designated by him as a cluster of industries, engaged in the production of modern databases and facilities which provide their application and functioning (Porat, 1978). He is given the credit for introducing a distinction between the primary and secondary information sector of economy. A primary sector, according to his opinion, can be estimated quantitatively, while everything is much more difficult with the secondary one.

The Revolution in the development of information technologies allowed to talk about a global network, which materialized the globalization of economy. New information technologies, in fact, are not simply becoming the instruments of application, but also the processes of development. The system-oriented analysis of the information economy with due

regard to the forming informative paradigm of the economic theory requires additional consideration.

Figure. 1. A national software system (Information Economy Report, 2012)
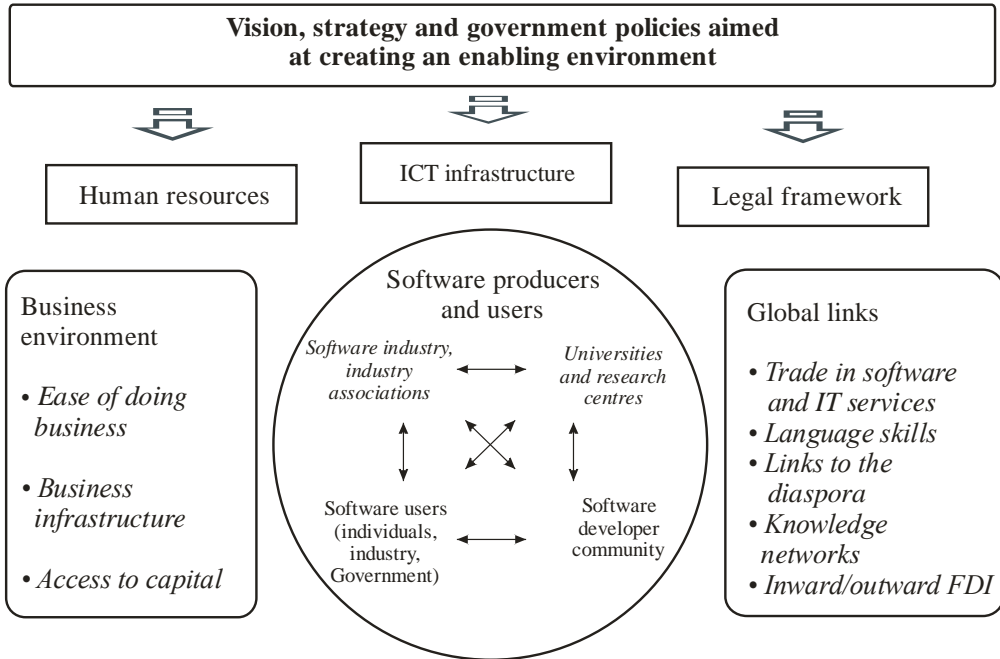
Conclusions and suggestions

Conception of information economy includes fundamental definition of information society. It's defined as a system of connections and relations between individuals, which appear in the process of interchange of information concerning social and economic activity. Information economy is simultaneously defined as a system of public relations, wherein the information is a basic productive resource.

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