

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ  
КИЇВСЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ  
ТЕХНОЛОГІЙ ТА ДИЗАЙНУ**

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**THE TOOLS OF COMMUNICATION ACTIVITY OF  
HIGHER EDUCATIONAL INSTITUTIONS OF  
UKRAINE****N. KRAKHMALYOVA<sup>1</sup>**<sup>1</sup>Kyiv National University of Technologies and Design**Keywords:**

European education cooperation, educational services market, higher education institutions of Ukraine, communication tools, consumers of educational services, international education exhibitions, university logo, public relations.

**ABSTRACT**

The article studies the nature of communication, which is a systemic phenomenon and possesses the element base. There has been analyzed their impact on the successful functioning of universities, studied university trend of communication activities in Ukraine. There has been defined the assignments of university communication activities, considered a rational set of higher education institution communications as a single functional direction where all the tools of communication are coordinated. That will most effectively bring the information to the target audience.

**Statement of the problem and its relevance.** Globalization processes in the world in various fields of human activities carried out by means of comprehensiveness of global communication systems, whose driving force is the information process, contribute to the dynamic development of the educational services market in most countries. Ukraine is not the exception in this process. In modern society higher education fulfills a complex economic function, namely influences the economy and the dynamics of its development through human potential. At the same time changes in economic conditions cause the need for new models of higher education development. Ukrainian economy moves to innovative investment level of development that requires the modernization of higher education, which content remains the urgent problem today. One of the ways to solve this problem is to apply the modern management technique, including the communications of higher education institutions.

From the economic point of view communications at the education market are considered as a necessary tool for effective management of universities. For improving activity and increasing competitiveness at the education market, universities effectively use various forms of communication that provide simultaneous distribution and obtaining a wide range of economic, technical and commercial information.

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**Analysis of scientific papers on solving problems.** Definition, importance and necessity of using the communication tools by organizations of different areas and higher education institutions are featured in the works of many foreign and national scientists, such as E. G. Becker, I.M. Gryshchenko, Em Griffin, I.M. Sinyayeva, T.N. Paramonova, E.M. Sheremetyeva, I.M. Krasiuk, O.I. Matthias, D. E. Schultz, W. Rudelius, S.I. Tannyenbaum, R.F. Lauterborn, F. Kottler, Karen F.A. Fox, L.E. Orban-Lembryk, A.A. Chichanovskyy, Jan W. Victor and others. However, the essence and influence of communications on the effective activity of a company are not studied sufficiently. To a less extent there has been studied the use and development of communication tools by higher education institutions taking into consideration the peculiarities of domestic and foreign consumers of educational services and other privies towards their target information, in order to gather knowledge about a higher education institution and its educational services, to achieve understanding and receiving return reaction in the form of actions which are featured in the content of transmitted information.

**The objective of the article** is to determine the role of communications in the context of successful functioning of higher education institutions at the Ukrainian educational services market and rationally choose the communication tools to provide clarity, consistency and influence maximization of communication programs on target audiences by means of undeniable integration of all individual appeals.

**The main results of research.** In contemporary complicated global and information environment, higher education institutions exist and develop in conditions of constant changes, too dynamic environment, tough competition. Therefore, the system of higher education Ukraine definitely needs further reform as required by the needs of the modern development of socially-oriented economy and to the integration of Ukraine into the European educational cooperation as the European vector of development in all spheres, particularly in higher education, is defined in the state.

These trends contribute to the necessary disclosure of the existing potential in education, its intellectualization. Taking into consideration the problem of increasing competition, universities are made to compete for potential consumers of educational services – entrants more actively, often involving non-traditional methods and approaches that have not been previously characterized by the education industry and belonged exclusively to the business area, namely tools of communication. Today at the Ukrainian education market supply prevails demand. By means of active and open communication one can influence even the innovative human behavior.

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The determinant of competencies specific to each activity is communication as a process of creating and interpreting information linked to relationship causing a certain reaction [2]. Thus, the communicative process is the basis of communication, the organization of which depends on understanding the system, process structure and the nature of communication, which is a systemic phenomenon and has the element base [14]. Nowadays the experts of almost all areas have communication problems. In addition, the problems of studying the communication processes belong to the global problems of civilization [13]. Today communication activity of universities is aimed at:

- ✓ formation, development and presentation of contemporary material and technical base of the university;
- ✓ organization of material basis for training reserve officers, carried out by the institution;
- ✓ creation and presentation of university intellectual property;
- ✓ design, development and improvement of university corporate style, meetings of graduates of different generations, creating its own corporate clothing and uniform style (for security guards, mantles for professors and students, etc.);
- ✓ improvement of material and moral encouragement of students, faculty and staff (bonuses, scholarships, prizes, diplomas, etc.);
- ✓ organization of leisure of students, sport, development of cultural preferences development, rehabilitation, etc. [7].

However, under conditions of competition at the educational services market traditional methods of communication activity (career guidance) used by higher education institutions during decades and which mainly were assigned to attract future students, become not effective enough because they are designed for other social and economic conditions. Under these conditions, there is a need for universities to cohere and coordinate all efforts in promoting their services, namely the use of elements of communication that allow to integrate individual messages to ensure consistent and purposeful impact on different groups of communication recipients. Communication tools such as developed electronic communications infrastructure play a crucial role in providing effective management at the level of higher education institutions and higher education system as a whole. A special role belongs to informatization of education, information and communication processes, because communicative literacy, culture and competence are obligatory conditions for success of an individual in modern professional life [9].

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Today the assortment of educational services at the Ukrainian market is very diversified. But under the conditions of market economy it can vary considerably, because higher education institutions have to take into account the requirements of the environment. In addition, basic education services are often complemented by related services, which owners or producers are universities receiving additional income. Significant role in activity of Ukrainian and foreign higher educational institutions belongs integrated communication activities. For this reason it is important for universities to use communications that must not only inform applicants and interested parties about its objectives, activities and suggestions, but also motivate them for choosing this university.

Within a higher education institution, communication should be considered as a multilevel process of information exchange for communication among its employees, departments, students, applicants, all interested people etc. It should be noted that exchanging information, the sender and receiver are equal participants in the communication process and pass several stages, where the main task is to make the message and use the channel for its transmission in such a way that both sides understand the original idea [6]. These stages include: the origin of idea; coding and choosing a channel; transmission; decoding; feedback. Consequently, communication of higher education institutions is the process of information transmission through the usage of communication principles, functions and forms to provide awareness and interaction of education market subjects. Communication - is more than information exchange, it is a process, activity in order to acquire new knowledge, points of view, changes of social values. Besides, communication presupposes a single communication space (as information brings together partners in single information area), and its members are active subjects of mutual informing [10]. In general, communication is a way of human existence as a whole, because it implements life reality of any person. In a broad sense of meaning, communication is considered as a process of interaction and communication means that allow to create, send and receive various information and is characterized by repeated nature of messages and complex, integrated impact on the target audience [13].

The process of organization of communication with the market is too complicated and uses a complex of different functions and different internal structure. Together they constitute a set of promotion-mix, which means a system of promoting goods [11]. The integrated system of communications of higher education institutions include: advertising, vocational work, exhibitions, public relations (PR), personal communications, the Internet, corporate identity, sponsorship, unplanned communication etc.

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Such communications have many forms, the contents of which should be planned to meet the needs of the target audience and achieve the goals of higher education. Thus, university should use only one logo in the mass media and other communications to increase recognition of the institution and to identify every communication with it. This allows to create and coordinate a clear, coherent and convincing picture of an educational institution and its services. Thus, communication tools serve as the main management tools of higher education institutions through which they can reach and maintain a high competitive position at the education market of Ukraine.

According to the results of studying the foreign experience, higher education as a sphere of social activity possesses incessant dynamism, flexibility and adaptability of the market, advanced research, innovations, business creativity, openness to all kinds of social transformations, etc. [5]. For our country the effective modernization of the national education system is the key to socio-economic and scientific-technical achievements and the main prerequisite for integration of Ukraine into the European education space. Some scientists consider that using communication tools by means of information space it is even possible to rule another country, creating a huge range of situations according to its own program if information flows are directed with given creativity [12]

For each organization it is strongly topical to create their own communication aimed at achieving mission taking to consideration the design of communication strategy model. While choosing the set of such communication tools it is necessary to consider basic components, criteria and sequence of development stages of communication activity. As the character of each organization is reflected in the transmission of information and communication with the environment. And an organization itself exists by means of transmitting information and communication. That means communication is the main tool of strategy and practical implementation of organization market objectives. The process of organization communication with target audiences uses a range of tools of various functions and its different structure.

Determinative assignment of the communication activity of higher education institutions is the choice of optimal set of communication elements that will the most effectively bring the information to the target audience [3]. If the choice is correct, the various elements of communication will mutually reinforce the impact on consumers. In particular, the sequence of applying the communication elements plays the important role in the process, as using one of them often opens opportunities to others.

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As an example, advertisements on providing educational services and activity of higher education institution may encourage applicants or interested people to address the university for more details via e-mail or call or even visit him. With the rapid development of information technologies, the Internet becomes more and more important communication channel of higher education institutions with future applicants, their parents, relatives and other interested parties that presupposes significant changes in their communication activity. Users of personal computers around the world spend more time in social networks, paying less attention to other means of communication. Modern universities realizing the importance of this communication channel present themselves in the network, creating web-sites that contain information about educational services, departments, specialties, qualification levels (at the Bachelor, Master, postgraduate, doctoral levels), tuition fee, employment opportunities for students. Equally important message is information about dormitories, sports stadium, swimming pool, culture center of the university, fashion festivals and its other events. In addition, it covers various events in the University life, meetings with famous people in our society, with both national and foreign representatives in different areas.

The important communication tool for most higher education institutions in Ukraine is developing the effective programs of public relations (PR) and the purposeful application of their methods in the area of education and awareness of their significance. Universities are constantly working with many circles of society, for needs of which students are taught. In these circles the public opinion about the university and the quality of its services is formed. In general, for any company, public relations is a management function of establishing and maintaining mutually beneficial relations between it and the public. In addition, the success or failure of the organization depends on its opinions [4]. Rationally organized PR work allows to establish effective cooperation with the community and build and strengthen a positive public opinion about a higher education establishment, the quality of its educational services. Developing the program of complex PR activities contributes to the prestige of the university in its environment and the creation of its positive image. The positive image of any organization, namely a higher education institution, increases its competitiveness at the market, attracts customers and partners, increases sales of goods or services and, consequently, profits of organizations and higher education institutions in particular.

As for universities, if the image is important to attract applicants for budgetary places, it is twice more important for paid tuition. Graduates play a special role in forming the university image [1].

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Work on building relationships with graduates can be started with monitoring their career, creating alumni clubs as a way of forming the horizontal network of mutual assistance, involving graduates into university life. Relationships with graduates fulfill two important functions:

- ✓ creating informal community of people whose life is connected with university, and the stronger advantage of each participant is, the stronger is the overall brand of the university;
- ✓ assistance to the university as a community center - only graduates who have retained relations with education institution, it will provide financial, information, lobbying and other support.

It is important that graduates represent different spheres of human activity, take the appropriate position that is they are not directly university representatives. That is unattainable for one graduate may be possible for another one. However, graduates are able to achieve much more together, because opportunities to realize powerful synergy effect is created.

One of the key means of promoting educational services and communication tools of higher education institutions is advertising, which consists of non-personal forms of communication made through paid media. Effective advertising campaign of universities provides:

- ✓ goal setting; forming the budget that totally depends on its financial capacity;
- ✓ developing effective advertising messages;
- ✓ selecting appropriate media channel;
- ✓ evaluating the effectiveness of advertising for offers, adjustments and changes of advertising in future.

However, at the beginning of developing the program of university advertising campaign it is necessary to determine target audience, the necessary coverage and frequency of advertising messages, to describe the needed reverse reaction, because the effectiveness of impact of advertising messages is defined by the presence of feedback. For efficient activity at the education market universities effectively use exhibitions as a communication tool, which provide simultaneous distribution and obtaining a wide range of economic, technical and commercial information [8]. After all, exhibitions facilitate the information exchange, enable the comparison of similar educational services, offered not only by national education institutions, but also the foreign ones, conditions of its sale, quality and price, provide direct communication with the target audience, create preconditions for contacts of professionals in education sphere etc. In addition, the international exhibition is an effective mechanism for implementing plans of Ukrainian integration into European educational space, forming the system of European education, training universities and staff to expand the scope and intensity of contacts with European countries and world culture.

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Besides, the international exhibition of educational services orients national education system to solve the priority assignments of sustainable development of our country. It is highly important for Ukrainian higher education institutions to attract foreign students, take part in international exhibitions abroad. The above-mentioned events give the opportunity to the participants and visitors to get acquainted with international experience of the educational process, modern scientific and methodical developments, innovation and information tuition technologies, author projects, new samples of teaching means.

While forming the complex of communication elements, universities should take into consideration the important point of communication activity - identify and meet the information needs of faculty, staff, current students and other members of the internal environment, as they are, in turn, the channels of transmitting information to target audiences [7].

Therefore, in order to achieve the aims universities effectively use different communication tools and combinations that provide simultaneous distribution and obtaining a wide range of various relevant information. And for effective communication activities universities should take into consideration current trends, namely:

- ✓ conscious communication activity of a higher education institution in a competitive environment that has its purposes and nature of the conviction, aimed at achieving tactical and strategic objectives of the institution;
- ✓ singling out not only purposes, but also forms, tools used simultaneously and sequentially in the communication process, but are intermutual;
- ✓ foreseeing ways of feedback and its availability, in which the information recipient response is simultaneously a signal for future university actions;
- ✓ multilevel nature of communication, implementation of which involves several successive stages (levels).
- ✓ opportunity of calculating the economic effect of communication activity that is the hallmark related to the economic nature of communication;
- ✓ reducing the communication budget by means of careful approach to selecting and coordinating the communications tools.

For this reason, it is expedient for higher education institutions of Ukraine to use only those combinations of communication tools that are mostly suitable for effective achieving its strategic goals. At the same time choice and intensity of using complex communication tools are important not only for the university, but also for other participants of the communication process.

**Conclusions.** At the present stage of the education market development in Ukraine and abroad successful functioning of higher education institutions requires total focus on specific customer of education services with long-term relationships, but not only on the individual market segments of consumers. Sustainable competitive university position at the market of higher education is provided by complex communications as a single functional direction where all the communication tools are coordinated, which base is in using a single university logo.

It should be noted that effective communication activity plays a crucial role in the successful management of higher education institutions and influences the importance of its competitive position at the national education market as well as in other countries.

Applying an integrated approach to communications enables higher education institutions to reduce the budget of communication activities, since such communications carefully coordinate the use of complex communication tools, avoiding duplication that is extremely important for public universities of Ukraine, where the funds have been always limited.

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JEL Classification: O320

УДК 330.341.1

**MANAGEMENT OF INNOVATION POTENTIAL OF THE COUNTRY****L. SELIVERSTOVA<sup>1</sup>**<sup>1</sup>Kyiv National University of Technologies and Design**Keywords:**

innovation policy, organizational, economic development, systematic approach, subsystem, innovation policy.

**ABSTRACT**

In the article, the system approach to the strategic development of the country in which the state, through direct or indirect participation can effectively implement innovation policy. Formation of the organizational–economic system of innovation systematically invited to consider, namely in terms of subsystems scientific potential, innovative entrepreneurship, innovation and financial infrastructure subsystem.

**Statement of a problem.** At the present stage of development of the national economy, achieving economic growth and sustainable development requires the use of innovative tools of transformation mechanisms of social and economic development, i.e. innovation. Improving economic competitiveness is an essential component that determines the priority directions of economic development. The need to solve the problems of innovative development is the need to develop an active innovation policy, developing effective mechanisms for its implementation, including organization and management.

**Analysis of research and publications.** The development and provision of innovative processes in Ukraine paid special attention to such scholars as A. Amosha [1], L. Antoniuk [2], M. Bilyk [3], A. Halchyns'kyi [5], O. Harafonova [6], V. Geyets [7], M. Denisenko [4], V. Savchenko [8], A. Cherep [10] and others.

**Unresolved earlier part of the overall problem.** Paying tribute to the scientists and experts engaged in research on the promotion of innovative development, many aspects remain controversial because of the complexity of providing innovative processes, including organizational and economic component.

Approach to the extensive economic development causes permanent increase in attention to the search for new factors that accelerate economic dynamics according to the current state of the global economy. Therefore, the introduction of innovative model of economic growth is an objective necessity in Ukraine.

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**The goal of the study** is a systematic approach to the strategic development of the country in which the state, through direct or indirect participation can effectively implement innovation policy.

**The main results of the study.** Organizational relations are closely interrelated with such concepts as “organization” and “management”. Their content is based on recent internal study of the dynamic characteristics of complex systems and structural hierarchy of divisions, as well as the functional sense of self on different levels. In this connection, the system of organizational relationships highlights the organizational control unit which, with its integrative quality, covers the totality of technological, economic, social and other ties, as well as a system of economic interests.

This makes content of the organization functions in the control system aimed at developing a sustainable relationship of various aspects of facilities management and sales process management (decision-making and their implementation in practice, evaluation of the results, monitoring of the implementation).

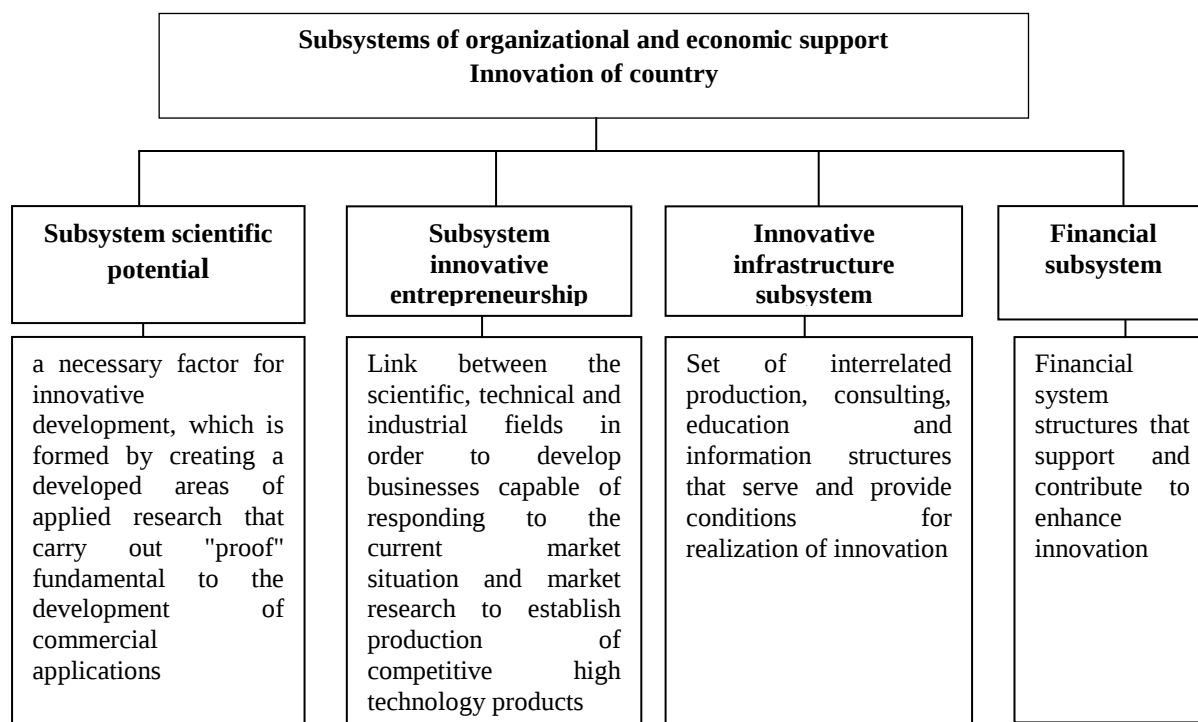
Economic relations in management system are presented as an organic set of planning of the economic regulation. While the essential content of the management mechanism, they associate the organization with the final result of the system of governance. In this sense, relationship management is the result of strictly defined ratios of internal and external organizational and economic components. Investigation of mechanisms to ensure internal order, a certain consistency and coherence of the elements to achieve optimal effective behaviors appropriate systems, include targets and effective action. In management, objectives take the form of strategy, program, project, task, plan, providing a proportional and balanced economic growth, distribution and efficient use of resources to achieve the objectives.

Relationships that established between subjects and objects in their activities make the purposeful impact on the innovation processes. The mechanism of such influence is linked to the performance of the content of the analyzed processes or phenomena, as well as specific forms of manifestation. As a category of deep meaning, expressing general and abstract economic processes, mechanism of action contains knowledge, setting development goals, as well as forms and methods of organization and use. However, effective influence determines the specific content of more mechanisms characterizing certain economic processes. As specific categories, these mechanisms characterize the impact of many factors that reflect on different levels, directions and stages of economic development, as well as their goals and objectives, natural or probabilistic in nature that causes a change in relations of system and often the system itself [2].

Multilevel processes of innovation characterize the effect of factors that are in different situations can have both negative and positive effects. The mechanism of influence of various factors on the economy is directly related to the regulatory process [9]. The latter, in turn, is closely related to the most significant parameters of the economic system for the conservation and use of which they exist. On this basis the strategy is formed and identifies ways of economic development. In terms of the operation of socio-economic systems, the various sectors and economic spheres concrete expression of purposes directly affect the nature and content of the various factors together with its functional nature – economic, institutional, social, environmental, political, etc., as well as the specifics of the regulated sectors of the economy[10]. Accordingly, the purpose of controlled objects in the economy may be economic, organizational, social, political and others, which determines the content of regulatory mechanisms. In other words, the objectives, specific, conditions and factors regulated objects economy determine the nature and content of the mechanisms of influence.

With the formation of organizational and economic system of innovation it is necessary to develop a systematic approach, within which to identify and analyze the main subsystem in which the state through direct or indirect participation can effectively implement innovation policy.

Subsystems organizational and economic support innovation countries invited to consider in terms of components, which are shown in Fig. 1.



**Fig. 1. Subsystems of organizational and economic support of country innovation (compiled by the author)**

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Innovative development is based on state innovation policy. In turn, the state innovation policy develops measures to improve organizational, financial and regulatory support of innovation and incentive mechanisms. To implement innovative mechanisms of development of the national economy instruments of state regulation should be involved. In such circumstances, the sector of social production can reduce risk, increase resilience and competitiveness, and promote national innovation systems [8].

Performance of some functions by public authorities depends on institutional approach to regulation of industrial innovation, and in turn, provides: state forecasting and planning determined functional approach; state incentives based on formal approach; government regulation, which is realized on the basis of a systematic approach to the regulation of innovation; state control is ensured by institutional approach; state monitoring provides institutional and informational approach; government regulation and coordination is based on institutional approach. Organizational and economic foundations of innovation include solving such problems of innovative development: ensuring extended reproduction of intellectual resources of the country; the development of innovation infrastructure; creating favorable conditions for innovation; staffing innovation process; development of university and scientific sectors of the country that is the most important prerequisite for improving innovation intellectual potential of the state [4].

An important place is given to innovation and infrastructure as a set of different businesses and organizations on the one hand, provide scientific and technical development of the country, on the other – practically implement innovative programs. Infrastructure innovation is a system that can consist of the following subsystems: scientific and innovative subsystem that provides scientific support management processes; investment and financial institutions, including enterprise venture industry; the economic enterprises and organizations; information network; specialized innovation infrastructure (business parks, business incubators, innovation centers, etc.).

When providing innovative development must adhere to the following principles: the principle of long-term goals priority – high uncertainty of the possible results of innovation identifies the need for long term vision of development based on territory and revitalization of existing innovative potential, which requires the development strategy of innovative development of the country; the principle of public participation – the state establishes rules for the operation and interaction of participants in the innovation process through the formation of legal field, as the most valuable are the types of public policies that seek to improve the interaction between the various actors of the innovation process and increase the capacity for innovation, including the introduction of new technologies; the principle of adaptation manifested in the adaptation of innovative development system to changing conditions.

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Thus, the phase of depression common market strategy related to profit maximization, changing strategy to minimize losses and reduce uncertainty; In addition, the emergence of new technologies, services and management practices leads to significant changes in the needs of society, social behavior, which in turn leads to the need to adapt the organizational system of the conditions prevailing; the principle of cross-industry interaction – the strongest competitive advantages of the country appear when combining companies of different sectors that mutually promote growth of competitiveness of each other in clusters.

An important distinguishing feature is its innovative cluster orientation, which manifests itself in the rapid development of new types of equipment and production technology, followed by the release of new markets; the principle of efficiency – innovation should be aimed at getting the economic, social, environmental, scientific, technical and other effects.

Awareness of the need for innovation development requires the implementation of organizational and economic measures to stimulate innovation on the basis of a certain level of management. Organizational and economic measures to support innovation development should occur at three levels: national, regional and entrepreneurial.

**Conclusions.** The study identified four approaches that reveal the essence of organizational and economic support innovation national economy: “Institutional” approach that provides a set of institutions that provide purposeful activity; “Functional” approach, in which defined the scope and type of regulatory functions of the state; “Formal” approach, which is defined as part of the general policy of the state and certain state of socio-economic and socio-political institutions; “Systemic” approach provides a set of measures for the management of functional systems in the innovation sphere.

Found that the system of organizational and economic support of innovation consists of four subsystems: scientific potential, innovative entrepreneurship, innovation and multi finance infrastructure.

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JEL Classification: O320

УДК 330.322+330.341.1]:65

**THE CONCEPT OF MANAGEMENT OF  
INNOVATION AND INVESTMENT ACTIVITY IN  
ENTERPRISES****I. HRASHCHENKO<sup>1</sup>**<sup>1</sup>Kyiv National University of Technologies and Design**S. KRASNIUK<sup>2</sup>**<sup>2</sup>Ukrainian State University of Finance and International Trade**Keywords:**

innovation, innovation and  
investment model of  
development, innovation and  
investment processes.

**ABSTRACT**

We propose a scientific approach and practical advices on the formation of the concept of management of innovation and investment activity of enterprises aimed at enhancing of innovation and investment processes, product updating, in order to increase its competitiveness.

**Statement of a problem.** In the system of regulation of the national economy one of the most important tasks of scientific and applied nature is the study of a number of measures for scientific and technological progress, the formation of an effective innovation and investment policy, which would ensure innovation-focused development of industrial and economic systems in the short and long term. The factor of intensification of innovation and investment activity is of paramount importance for the economic growth of Ukrainian enterprises especially considering the rapid increase in technological development of other countries. Results of changes in the global and domestic economy caused by the achievements of science and technology, the widespread introduction of advanced technologies and high-tech products, require continuous improvement of methods and models of innovation and investment processes in domestic enterprises.

In the system of economics and management of national economy one of the most important tasks of scientific and applied nature is the introduction of new theoretical and methodological bases of the various spheres of enterprises management and the formation of their innovation policy that enables to provide innovative directed development of industrial and economic systems in the short and the long term perspective. The factor of intensification of innovative activity has the main importance for economic growth of industrial enterprises, especially considering the rapid growth of the technological gap between Ukraine and EU leading countries. The unresolved problems of forming an effective system of innovation and investment processes in enterprises, the lack of a comprehensive assessment and prediction of their effectiveness as a whole determine the relevance of the research. Particular noteworthy are the searching and studying the ways of enhancing innovation and investment activity and accelerating the process of innovation with the definition of possible directions of industrial products renewal.

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**Literature overview.** Issues related to the development of theoretical bases and strategic directions of innovations management took attention of many researchers, such as: S. Winter, G. Hannt, G. Dos, R. Nelson, V. Prigogin, F. Taylor, J. Tymberhen, G. Ford and others. Innovation viewed in their works: Amosh A. Klaykneht, M. Kondratiev, Mensh G., B. Santo, R. Solow, J. Freeman, J. Schumpeter. To innovation in industry dedicated their works well-known domestic and foreign scientists - economists, including: Alymov A., I. Ansoff, X-K. Vahreyn, M. Denisenko.

However, some aspects in the formation of the concept of effective management in innovation processes of the processing industry in the modernization of Ukrainian industry require deep research, especially in the context of the transition of the national economy to innovation-investment model of development. This requires new approaches to the problem of activation of innovative processes in enterprises, and hence - the relevance of the topic and its research, the main goal and set specific objectives, which unsolving hampers the development of the economic science and its branches such as economics and business management.

**The purpose and objectives of the study.** The purpose of the study, the results of which are reflected in the article is the development of theoretical and methodological foundations and practical recommendations for formation of the concept of innovative and investment processes in the Ukrainian enterprises.

**The main results of research.** In the system of economic management in Ukraine today is a priority in the development of innovation and investment activity. Activation of innovation and investment activity has key importance for the economy development of our country, considering the rapid growth of the technological gap between Ukraine and EU leading countries. Results of changes in the global and domestic economy due to the achievements of science and technology and the widespread introduction of advanced technologies and high-tech products require rapid response, continuous improvement of methods and models of management of innovation and investment activity at different levels of directing. Unsolving problems of innovation and investment activity, the absence of comprehensive evaluation and prediction of the efficiency of the whole enterprise, resource-intensive nature of any businesses and their depreciation of fixed assets determine the relevance of the proposed extraordinary results and suggestions. We should note that in Ukraine has already recognized the importance of implementing the policy of intensification of the development of innovation and investment activity, approved a number of relevant laws, but tangible results are not achieved. The deterioration factors were:

- 1) a sharp decline in the production of socially oriented products;
- 2) violation of technological regimes in the processing industry;
- 3) significant deterioration of basic production equipment and facilities;

4) less-active innovation policy;

5) economic imperfect mechanism for implementing measures to enhance and development of innovation and investment activity in individual enterprises as well as in the domestic industry as a whole.

The problem of innovation and investment development of industrial enterprises of light industry is closely linked with the choice of strategy development of the country, and is its priority. Strategic innovative position of the organization is determined during the consideration of internal and external environment, which is innovative capacity and innovative climate. The assessment of an innovative position is held through various matrices. At all hierarchical levels and in all structural units of industrial and economic systems it is necessary to clearly define direct media interests to achieve certain goals, and if any hierarchical link will not be involved in the interaction, than the probability of achieving the ultimate goal reduced. That hierarchical scheme of objectives should reflect the interests of the individual-consumer.

The overall objective of innovative activity of industrial enterprises in Ukraine is the adaptation to the needs of consumers. We only note that there are also risks derived from the existence of non-equilibrium state of the strategy of innovative activity – that is, for example, possible actions and reactions to stimuluses in the environment, the understanding of which is based on continuous analysis of hazards and threats in the market area [1]. The current period can be characterized as a period of accumulation of threats that is why it is reasonable to define the features of the macro and micro environment, which influence innovative activity.

Operational management of innovation and investment activity is impossible without the use of uniform criteria for assessing final outcomes. Therefore, to assess the effectiveness of innovation and investment processes of an enterprise we must use a single indicator of the effectiveness of innovation and investment processes, which demonstrates the company's ability to effectively assimilate and apply ideas, knowledge, devices, equipment and technologies that are (tools) essence of innovation and investment activity in optimal time within existing resource constraints. The value of this index is proportional to the resistance level of implementation of innovations and hence is determined by factors of individual and systemic resistance. The index should consider the following factors: the level and likelihood of existing risks, the effectiveness of investment; the number of implemented innovations; the dynamics of products updating [2]; management effectiveness; number of advanced technologies; the relative length of innovative application in the enterprise. Thus, management of innovative investment process involves solving two major problems:

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1) increasing the impact of factors that contribute to a high level of readiness for the implementation of innovation and investment processes and enhance its efficiency;

2) reducing the impact of factors causing resistance in managing innovation and investment processes, and therefore reduce its effectiveness.

These objectives are based on keeping the most important organizational characteristics which directed to achieve a steady state of implementation of human needs and to avoid an imbalance that is based on the properties of the alignment mechanism. This method is based on a scientific hypothesis that any situation at any time, is not a static, but is in dynamic equilibrium under the influence of two interdependent groups of opposing factors and that can be both internal and external. That is, there is always in the enterprise dynamic equilibrium of forces that support and hinder implementation and adaptation of any innovation.

Thus, the situation related to the management of innovation and investment processes observed as a set of polar forces. Implementation of innovative investment process means changing balance and involves the use of at least one of the following methods (use several increases the probability of success): amplification of at least one of the supporting factors and / or the introduction of new supportive factors; weakening steps at least one inhibitory factors and / or removal of inhibitory factors; conversion inhibitory factor for supporting.

Using this approach causes the necessity of the assessment of the relative power favorable and restrictive factors to determine the intensity of their impact on innovation and investment process. Therefore there is a need to construct a system of management of innovation and investment processes in enterprises that attracts the best mechanisms for managing individual and systemic resistance, based on diagnostic analysis of complex factors of readiness of enterprises to innovative processes to identify potential sources of temporary and financial losses. According to the results of the diagnostic analysis of the factors of individual and systemic resistance carried out corrective action on the implementation of innovation and investment activity: planning the development and implementation of innovations, organization of the implementation process, staff motivation, monitoring the process of implementation [3].

Accomplished the analysis helped to determine the level of readiness of the enterprise to effectively managing innovation and investment activities, which is determined by many factors of individual and systemic resistance, which are different in nature and it is difficult to quantify them.

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This creates additional difficulties in determining the intensity of areas of influence of each individual factor, determines the need in separation in the management system of a particular type of enterprise-readiness diagnostics for effective innovation and investment activity, and the determination of mechanisms to control individual and systemic resistance. Thus, the more complex is a management object, the more elements it has, and there are more difficult links between these elements. Therefore, you should use as much as possible the individual and system factors of resistance and determination of their parameters. Number of factors as is determined by their ranking on the degree of influence on the readiness of the enterprise to innovation and investment activity.

Thus, the task of effective functioning of the concept of innovation and investment activity management indicates in the following: in the development of methods of assessing the readiness level; in obtaining reliable information; in development of control measures taking into account the results of the assessment. To solve these tasks we need to: identify the optimal performance of the factors of readiness of the enterprise to innovation and investment activity according to influence the effectiveness and efficiency of innovation and investment process "reference state" readiness; assess the actual level of readiness of the company to innovation and investment; determine the potential resource and raw material losses as a result of the resistance of organization as well as transition costs of the actual level of readiness for "reference state"; develop management measures to control individual and systemic resistance with a goal to switching of the "reference state" readiness for innovation and investment activity taking into account economic effectiveness of these actions.

Note also that total losses from resource resistance of innovation and investment activity is the sum of losses: reduction of labor productivity as a management and production staff; declining in the quality of products / services; losses of working time due to additional temporary expenses spent on development and implementation of individual stages of innovation; unproductive idles of equipment; increase in absenteeism, tardiness, sick leaves etc.; increasing rates of employee turnover, and therefore increasing the cost of recruitment, training and retraining of personnel; additional (unplanned) costs in the implementation of innovation or the introduction of advanced technology systems. Therefore, quantification of the amount of losses from the resistance to changes caused by these sources of resource losses is possible can mainly after the process of development and innovation. Thus, in the case of ignoring the problem of resistance, resource losses will increase, thus reducing the effectiveness of the design and implementation of next innovation.

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Thus the process of developing of control measures in the management of innovation and investment activities requires diagnostic procedures of readiness of the enterprise to its implementation, as well as mechanisms for managing individual and systemic resistance.

Let us define areas of introducing the concept of management of innovation and investment activity. On the basis of strategic management [4] in the study proposed the concept of management innovation in enterprises in order to achieve socio-economic results of appropriate definition of the nature of processing industry, which is to achieve their goals through learning and meet the needs of customers better than the competition. The author defined the concept argues the following activities that precede the formation of the enterprise system. Grounded following priority areas for implementation of the strategy of innovation and investment processes in enterprises:

- 1) monitoring capabilities of the enterprise;
- 2) formation of databases
- 3) study the competitive position of the company;
- 4) determination of the risks and threats;
- 5) development of pricing policies;
- 6) formation of strategic alternatives;
- 7) the choice of optimal organizational, technical and technological solutions;
- 8) the diversification of operations of the company;
- 9) forecasting demand for innovative products / services and choice of management methods;
- 10) adaptation forecast-operative system to the new economic conditions.

As a result of specific production innovation, industry efforts should target demand management innovations that will encourage cost-effective introduction of innovative technologies. Formed components of socio-economic consequences of effective and rational use of innovative resources.

Economists argue that functions of innovative enterprise policy is a complex construction, real space, and the more likely objectification, which applies to most categories of workers, including the bulk of their material and spiritual power, resources and opportunities. Therefore, to priority responsibilities of innovative policy of an enterprise it is appropriate to include:

- the formation of workers consistent understanding of the nature of innovation-directed development of industrial and economic systems in the current economic conditions in order to prevent threats to existence (worldview function);
- adequate understanding of the challenges to maintain and increasing the level of innovation and investment activity of the enterprise (methodological function);

- 
- ensure coordinated activities to achieve the set goals of all structural units (regulatory function);
  - creating economic conditions for the effective management of the capacity factor and system-universal operation of the business, ensuring effective management of innovation and investment processes (organizational and mobilization function);
  - forming and strengthening in the minds of workers spiritual values that define their commitment to the general interest of meeting action steps to eliminate threats and risks reducing innovation activity of the enterprise (educational function);
  - predictions prospects of development of innovative processes at the enterprise in their constructive and destructive aspects, forecasting of enterprise development, ways to optimize the use of innovations, developments in the real implementation of an enterprise (predictive function).

The functions can be considered as the basis of the strategic potential of the country as a whole and individual enterprise in particular.

The updated views on the nature and content of the strategic potential [1, 4, 5] allow to structure it on the basis of multiline and multi-level analysis, which greatly enhances the possibilities for the objective awareness of the processes associated with changes in the economic sphere of Ukraine.

Multiline and multi-level approach to thinking about the nature of strategic potential isolates much more complex set of potentials divided into groups by independent basis [4]. Differentiation of potentials into separate groups does not mean their independent functioning and the isolated impact on relations between departments. In the author's view, in the formation of innovative management processes the special attention deserve the group of potentials which includes organizational, managerial, academic, labor and intellectual potentials. These potentials provide revitalization of investment and innovation processes in the enterprise and efficiency in managing them. Therefore, minimizing risks and economic losses even with the likelihood of significant changes in external conditions of the enterprise can be achieved through the implementation of a rapid transition to adaptive management and capabilities of providing optimum level of the efficiency of management decisions.

Thus the aim of the concept of innovation and investment management in enterprises is to meet universal and interdependent goals: survival of the enterprise, to ensure the integrity, stability, development, preserve its economic system based on the dominance of innovative processes; implementation of security aspects of national development, the intensification of innovation as an important component of national security. However, the objective awareness of a content of the author's conception is impossible without explaining significant factors of influence on its intrinsic properties, which must include:

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- Economic interests in the production of its own innovation policy - an axiom of business, which has not lost relevance in the current situation;
  - The potential and the present opportunities (economic, resource, scientific, technological, demographic) that can actually provide these interests;
  - Internal and external conditions in which it is expedient to include character of the country development, global and regional processes.

Significant changes in these factors able to stimulate revision of economic interests of the enterprise, the possibilities of ensuring, purpose and means of innovation strategy, methods of formation.

Based on the above reasons, we note that the structure of the concept - is a complex combination of at least three groups of constitutively key elements:

- Firstly, set of basic ideas, principles and guidelines, which are designed for the long term;
- Secondly, current plans and decisions with which help there is a realization of the theoretical study of this type of strategy;
- Thirdly, direct action of the structural elements of entrepreneurship that allows achieving innovation economic targets in enterprise according to the formula «here and immediately."

Therefore, to the structure of the concept it is necessary to add the following:

- 1) from predication and determination of the criteria and generalized indicators of efficiency of enterprise innovation processes, indicators of their level;
- 2) from evaluation of offer and demand of innovation to 5-30 years for the different versions of the forecasts;
- 3) rationale for the choice of the basic version as the most appropriate for the enterprise;
- 4) from determination the stages realization of the concept;
- 5) from operational detailing of directions to reach efficiency of innovative processes in enterprises (development and implementation of programs to accelerate the implementation of innovation, implementation of programs of increasing of the technical standards and modernization of the equipment and so on.

Improvement of the efficiency of innovative activity should be provided through increasing the number of innovative development; reducing the time required for implementation and realization of innovations; increase the number of implementations of innovations in production; increase the number of innovative products and services of total production; increase production using innovative technologies; mandatory introduction of innovative management mechanisms.

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To summing up and developing the author's theories mentioned in this article, we suggest the following: the concept of management of innovation and investment activity in enterprises is ordered interaction of its components; it is needed structural and functional optimization of the system to look at which it is possible satisfactorily solve urgent problems of implementing innovative model of economic growth of enterprises.

**Conclusions.** Conducted by the author research of the problems of effective application of innovation in enterprises based on the experience of industrial policy leading countries of the world allow to reveal the internal reserves of efficiency increasing of investment and innovation processes and to identify ways to enhance, accelerate innovations. The main reserves of enterprises in a market economy is to develop systems to ensure the effectiveness of innovation and investment processes based on a systematic approach to evaluating and forecasting efficiency innovative application.

As it is known, the deficit of shunting capacity, a significant proportion of obsolete and outdated equipment, inadequate supply of industrial enterprises own raw materials in Ukraine, difficulties in developing and introducing innovations, their possible negative impact on the environment, limited financial resources for the development of innovation activity in enterprises create unfavorable conditions for innovation and investment processes in the processing industry. Great influence on production and economic activity of industrial enterprises has the state innovation policy. Under these conditions, businesses appropriate to use modern innovation management system, based primarily on the principles of strategic management.

Therefore, the system of intensification of innovation and investment activity is forming by adaptive system of management of innovation and investment activities of the company in the process of transformation of resources and raw materials, as well as interaction of industrial enterprises, development and assimilation of their own innovation and investment potential. Improving information and methodological base becomes complex, which necessitates the definition and evaluation of a large number of different indicators that provide initial information base.

All mentioned makes it possible to offer adapted to modern requirements and real social and economic processes taking place in Ukraine's industry, the model of the concept of management of innovation and investment activity in the enterprise and the logic circuit operation and the relationship of its target subsystems: maintenance, monitoring, updating products, justification of technical and organizational level of production, forecast and control. Solving of actual problems of industry development in Ukraine in view of the limited available resources requires their concentration on the most pressing areas of implementation and enhance of innovation and investment activity.

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JEL Classification: I250

УДК 330.341.1

**THE MAIN ASPECTS OF PREPARATION THE  
COMPETENT SPECIALISTS IN THE CONTEXT OF  
SUSTAINABLE DEVELOPMENT****T. HAVRYLENKO<sup>1</sup>, N. SHABATYN<sup>1</sup>**<sup>1</sup>Kyiv National University of Technologies and Design**Keywords:**

high education, master's degree program, European integration, implementation, competitive.

**ABSTRACT**

The article deals with the process of formation of masters' research competence in universities. Researched the current state of national institute of master's training means of achieving high quality training of competitive experts, ways of integrating Ukrainian higher education into the European educational space. The article defines the issue of the effective use of innovative and communication technologies while training masters in the modern university. Based on the analysis of legal documents relating to the functioning of the higher education of Ukraine were analyzed courses of forming national institute of Master Degree.

Ukraine once again confirmed its European development vector by signing an agreement on European integration. This applies not only to support of democratic values, ethical and social norms, but also to the aspirations of our country to create and develop a model of European society. Reform must be carried out in the economic, political and other social spheres, as well as in the education system, which takes a leading role in the professional and educational preparation of modern specialists.

The processes of European integration continue to spread onto more and more spheres of our life, of which education is of no least importance. The problem of quality of education in Ukraine in the conditions of implementation of European standards of higher education occupies central place in the world's educational discourse. The world's education development trends are necessitated by practical implementation of innovative trends taking place in almost all spheres of economy, while augmentation of accumulated knowledge represents the main factor behind the growth of social wealth. Consequently, people interact among each other in the sphere of education for the purposes of augmenting and developing fundamentally different knowledge and determining the ways of its optimal use. As a result, education may be characterized as the main sphere of preparing competitive specialists to achieve higher results in national economic development.

The educational system of any country, despite its uniqueness, is made up of the same elements. In its composition the following main components are pointed out: generation of knowledge (scientific work and education); practical application of knowledge (production sector of goods and services); management component (organization of training and educational environment).

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The connection between the elements is provided by a special environment, formed by moral, social and cultural environment of society, government policy and regulatory framework. Ukrainian higher education systems are based on the above components, but their implementation and content are somewhat different.

Formation of knowledge of future specialists in a particular subject area is the first and the main component of the whole educational process. But due to the high velocity of propagation, change of information and new information technologies there is a need in the formation of the basis of knowledge that enables the specialist to have the professional competence. In addition, they must be prepared to develop and learn throughout their lives, thereby improving their professional and personal qualities.

Integration of the system of higher education into European and world organizations with simultaneous preservation and development of national achievements and traditions of higher school is one of the principles of development of Ukraine's educational policy. Ukraine as a member of the Bologna Process faces a number of key priority tasks envisaging implementation of standards, recommendations and main instruments of the European Higher Education Area: implementation of three-level education system (Bachelor, Master, Philosophy Doctor); innovative European Credit Transfer and Accumulation System; Annex to the European-standard diploma; National Qualifications Framework. It became possible thanks to creation of a legislative framework in higher education sphere, revision of existing and passage of new laws and regulatory documents, and implementation of measures aimed at determining the status of higher education institutions of all levels of accreditation and changing the areas and forms of teaching.

Contemporary Ukrainian Education is in the process of formation and development, due to a difficult task: to preserve all the positive position and experience of Ukrainian education, enrich its innovative achievements and harmoniously reconcile them. This situation requires a comprehensive, systematic and coordinated action in higher education, namely:

- Creating conditions to achieve a new level of mobility and practical vocational training;
- Creating conditions for the development of highly cultured personality and creative self-realization of every citizen of Ukraine;
- Renewal of educational content and organization of educational process in accordance with European and international standards;
- Ensuring cohesion between the education system and labor market needs.

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Participation of Ukrainian universities system in the Bologna process requires it to take part in the modernization of scientific, academic and educational work. For these purposes, two-tier system of education, universal graduation diplomas, degrees and qualifications, which is recognized throughout Europe were implemented [1, 2, 3, 5]. A universal system of evaluation ECTS (European Community Course Credit Transfer System) was adopted. This will enable the Ukrainian educational system to be close to the European system and will enable future graduates to be competitive on the European labor market.

But with the majority of positive factors of transformation of the national training system in Ukraine, there are significant differences, which are due to national and cultural features. The European system of education is based on the values of science, culture and education of the leading countries like France, Germany, Italy, which have always been centers of science and art. But at the same time, higher educational institutions in Europe are trying to preserve national characteristics and values of their countries.

Considering the foregoing, the Law of Ukraine *On Higher Education* (a legislative basis for higher education in Ukraine) was developed and passed in July 2014. In the conditions of implementation of the Law of Ukraine *On Higher Education* which sets out the main legal, organizational and financial principles of functioning of the higher education system, preparation of competitive specialists (in particular, holders of Master's degree) becomes an extremely important matter. It is worth noting that the problem of legal framework regulating Master's programs in Ukraine remains scarcely studied, whereas legal regulation of professional preparation of Masters and its scientific substantiation plays an important role in creation of the European Higher Education Area in Ukraine.

When analyzing the process of professional preparation of Master degree holders in the conditions of European integration, one has to understand a certain set of requirements which society has to the system of education in the age of intellectual work and information technologies, of which the following are especially important: inventive and critical thinking ability; universal, systemic knowledge, high degree of adaptation and self-development; key competences in the relevant industry; ability to make decisions, social responsibility; ability to control dynamic processes and work with projects; ability to work in a team, high productivity.

Fulfillment of requirements to preparation of future specialists, in particular, Masters, is ensured by innovative type of education, because contemporary education must, on the one hand, remain the basic phase of the person's erudition and adaptation, and on the other hand, predictably meet today's requirements. That's exactly what the graduates of Kyiv National University of Technology and Design are.

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According to the Law of Ukraine *On Higher Education*, Master is an academic degree attained at the second level of higher education and awarded by a higher education institution upon successful completion of an academic program by a seeker of higher education. A Master's degree is awarded under a professional education or scientific education program which includes advanced fundamental, humanitarian, socioeconomic, psychological and pedagogical, special and practical components.

The essence of Master's education is determined by qualification characteristics and professional education program of preparation which provided the basis for academic curriculums. Master's programs at Kyiv National University of Technology and Design are classified as:

- **professional** programs envisaging development of professional and managerial competences in a certain sphere of professional activity;
- **scientific** programs envisaging in-depth study and research in a particular field of science.

To be eligible to enroll to **professional specialization programs** on the basis of admission tests, an applicant has to have education and be desirous of continuing education in the selected area of preparation to attain in-depth specialization in a selected field. These programs are required to provide manufacturing industries with highly-skilled specialists possessing innovative knowledge and able to implement it in advanced, highly-efficient technologies. The volume of professional education program for a Master's degree is 90-120 ECTS credits.

Kyiv National University of Technology and Design prepares **Masters in scientific fields of specialization** solely at departments licensed to prepare postgraduates and which have sufficient financing of research projects and achieved substantial progress in research and development sphere. Enrollees to these Master's programs are required to be fluent in at least one foreign language. Preparation of Masters in scientific disciplines envisages continuation of research work in a selected field of specialization at a postgraduate school or R&D institute and at knowledge-intensive enterprises. Scientific education programs for a Master's degree are available for full-time students only. The volume of scientific education program for a Master's degree is 120 ECTS credits. The number of persons studying under a scientific education program must be limited to three.

Studies under Master's scientific education programs offered by Kyiv National University of Technology and Design are based on individual schedules. Individual academic schedule of the attendee of a Master's scientific education program is prepared by his academic advisor, adopted at department's meeting and requires approval by the University Rector's order.

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The Master's degree paper represents the result of original comprehensive research of a problem in the field of degree seeker's specialization. The paper must be written individually during the period of study under a Master's program simultaneously with the study of disciplines required by an individual curriculum. Requirements to the Master's degree papers are set out in the Regulation on Preparation of Master's Degree Papers at Kyiv National University of Technology and Design.

Master's papers of all types must meet the following requirements which represent high status of and requirements to Master's degree holders:

- posting paper's subject on Kyiv National University of Technology and Design website;
- a research work must be published in a scientific magazine, collection and/or electronic publication;
- examination of paper for the signs of plagiarism;
- participation in a scientific conference with subsequent publication of an article dealing with the subject of Master's paper.

Master's degree papers under scientific education programs are recognized as a separate type of graduation qualification papers which are accorded the status of Master's thesis and subjected to the following additional requirements:

- introduction of the institute of opponent when defending a Master's degree paper (experienced academic and research fellows are designated as opponents for Master's papers);
- individual speech with a report on a subject of Master's thesis at minimum two scientific conferences, of which at least one must be held outside Kyiv National University of Technology and Design;
- publication of summaries of foreign-language reports at an international conference;
- preparation and publication of a research work in a specialized magazine.

An additional requirement to professional Master's programs includes availability of an opinion from a company, institution or organization where the results of research were used.

Graduates of a joint program offered by Kyiv National University of Technology and Design and another Ukrainian university with a specialization accredited at the Master's level may be issued a dual state-recognized diploma from the two universities. Licensed scope of these universities will be used at the 50/50 ratio in this case. In the case of a joint program with a foreign university, diplomas of either of or both these universities may be issued.

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Preparation of competitive specialists requires the following key knowledge and skills from the seekers of higher education: proficiency in native language; proficiency in foreign languages; ability to learn; interpersonal and intercultural skills; businesslike qualities; cultural expression. For that purpose, it is necessary to develop methodology of continuous professional education below and at the higher education level according to the needs and abilities of population.

In the conditions of sustained development, economic system will be able to function efficiently thanks to specialists capable of continuously gaining and employing scientific knowledge and mastering technologies of searching for new information. Under these conditions, the problematic parameter of efficiency of Ukraine's higher education system will be overcome: once receiving a job, a graduate will be able to use his knowledge and skills in practice right away. While in the rest of the world intellectual activity became a very important factor of economic development and social achievements, Ukrainian realities meant that a quite substantial intellect of the nation became alienated from economy and at the same time from the entire social system.

In the course of integration into the European Higher Education Area, Ukrainian system of education faces a number of problems:

1. Transition to the European Credit Transfer and Accumulation System of organization of academic process, which requires determination of academic workload on the seeker of higher education necessary to achieve required results
2. Contact between the higher school and labor market
3. Students' internship in realities of market economy
4. Separation of academic and professional areas of higher education in Ukraine
5. Bringing Ukraine's academic qualification degrees to EU standards

Therefore, this study allows to formulate a number of important points and suggestions regarding development prospects of Ukraine's education system:

- integration of science and education must facilitate development of university sector of science, preservation of scientific schools and increase of scientific potential of Ukrainian universities;
- close interaction between science and technology must be combined with preparation of modern-generation specialists and highly-skilled research cadres;
- universities must be given greater autonomy and academic freedom and their rights to manage financial resources must be broadened, which is an indispensable condition of their further development.

Therefore, while the reconstruction of the education system of Ukraine and introduction of educational technologies, methods and tools that suggest its introduction in the framework of the Bologna process, we should not forget about the peculiarities of the national education system and cultural features. Moreover, the Bologna process involves variability of pedagogical techniques and approaches. Therefore, in collaboration with institutions of higher education of the European countries, the Ukrainian higher education system should strengthen the links between the existing systems of education, retaining the strengths of its own traditional high school.

Realization of the aforementioned areas in Ukraine's higher education system will help: improve its effectiveness and quality; resolve the problem with recognition of Ukrainian diplomas abroad; increase mobility of students, academic and research staff; strengthen positions and achieve equal partner's status of Ukrainian universities and citizens on European and world markets and on educational services market.

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JEL Classification: M410

УДК 338.45:658.8:631.3

**PRICING BASED ON PERCEPTION OF THE  
PRODUCT VALUE BY AGRICULTURAL  
MACHINERY CONSUMERS****V. SHCHERBAK<sup>1</sup>, S. MARCHENKO<sup>2</sup>**<sup>1</sup>Kyiv National University of Technologies and Design<sup>2</sup>Interregional Academy of Personnel Management**Keywords:**

logistics marketing pricing  
system, agricultural  
machinery manufacturer,  
market conditions, and  
customer service.

**ABSTRACT**

The paper deals with the authors' research into substantiation of theoretical, methodological and practical principles of formation and implementation of a marketing logistics system of pricing of agricultural machinery manufacturers based on perception of the product value by agricultural machinery consumers. It substantiates the advisability of implementing a system of logistics support for marketing customer service policy in agricultural machinery industry produce markets, which helps manufacturers to gain sustainable competitive edges.

**Problem statement and its connection with important scientific and practical tasks.** Amid furtherance of market-oriented reforms in domestic economy, the nature and effectiveness of marketing activities of the agricultural machinery manufacturers depend significantly on improvement of the current market logistics pricing mechanism as regards sales of industrial goods to the agro-industrial sector. This is particularly significant today, when, due to financial instability within the country and an existing considerable disparity between agricultural product prices and prices of manufactured goods consumed in the agrarian sector of economy, most agricultural enterprises have lost their buying power. As a result, the market for agricultural machinery considerably contracted, which had an extremely negative impact on the situation in the agricultural machinery industry.

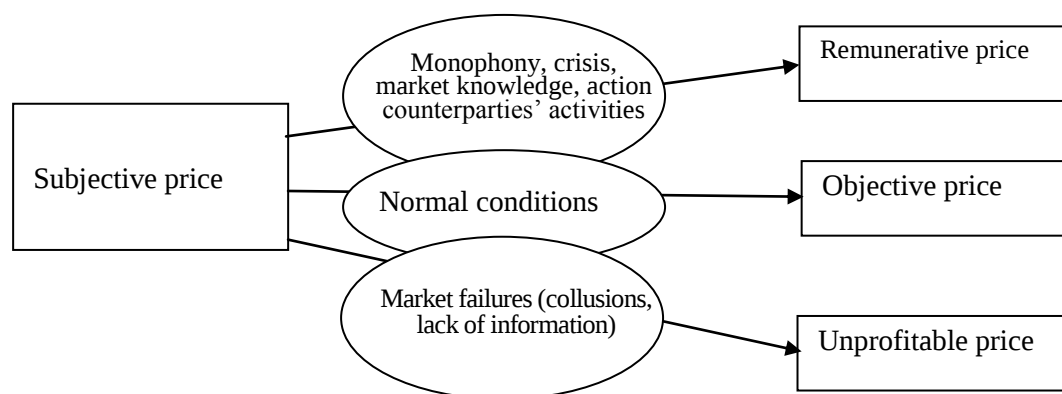
**Review of recent papers on the problem.** The problems of the marketing pricing process were studied in works by A. Alekseev [2]; V. Herasymchuk [4]; O. Zhehus [5]; F. Kotler [13]; S. Pogodayev[11] and others. Works by Y. Voskobiy[3]; E. Lukin [7]; N. Ovcharenko[10]; O. Ulianchenko [12] and others are devoted to issues of setting prices of agricultural machinery industry products.

**Unresolved parts of the problem.** Overall, the above-mentioned authors clearly outline the problem in question but do not determine the lines of its solution with due regard to the specifics of the agricultural machinery industry produce based on perception of the product value by agricultural machinery consumers.

There is no concept of setting prices for these products, which would take into account requirements of the consumers-agricultural producers with due consideration of their low solvency margin.

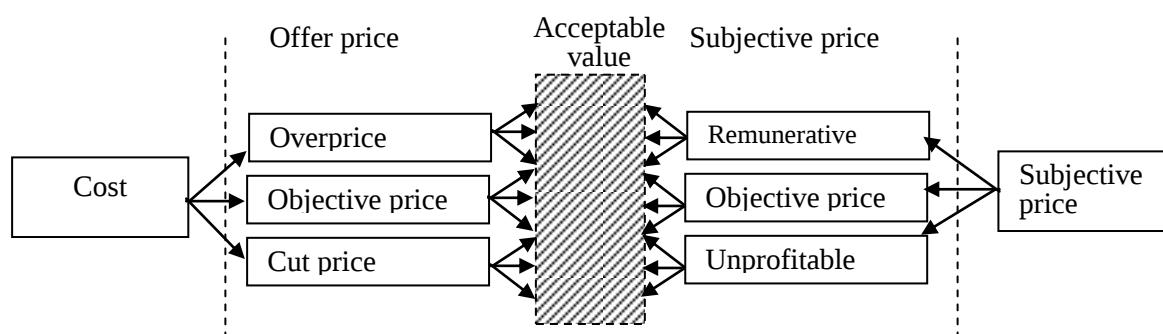
**The goal of research** is to improve the theoretical framework for and develop scientific and practical recommendations on assessment of the factors governing formation and implementation of an adaptive system of marketing formation of prices for agricultural machinery manufacturers based on the product value perceived by consumers.

**Key findings.** Customer focus is the basic prerequisite for effective pricing policy of any enterprise in a market economy. Pricing on the ground of perception of the product value by agricultural machinery consumers is based on the so-called commodity subjective price – dependence on subjective (consumer's preferences, machinery technological utilization conditions) and objective (overall price level, consumer's financial capacities to purchase a commodity) factors of assessment of an acceptable value in terms of money. The economic form of expression and method of determining a value to customer depend on the system of economic relations, on specific economic and technical conditions of purchasing and using a commodity. A diagram illustrating formation of a commodity subjective price is given in Fig.1:



*Fig. 1. The subjective price and acceptable value ratio, original development*

The technique for selection and practical use of customer value as a component of the pricing process is explained as part of the marketing mix, including the logistics approach, the constituents of which, taken together, constitute the net result of an enterprise performance. The general diagram of the mechanism of the cost and acceptable value impact (indirectly, in the form of a subjective price) on a commodity pricing is given in Fig. 2.



**Fig. 2. The mechanism of the cost and acceptable value impact on a commodity price, original development**

The suggested mechanism accommodates the economic categories of value and utility in the course of forming a commodity market price. The commodity price is composed of a sum of the offer price and subjective price taken as a proportion determined by the market-determined coefficients  $\alpha$  and  $\beta$ :

$$\text{Commodity price} = \alpha \times \text{Offer price} + \beta \times \text{Subjective price}, \quad (1)$$

where  $\alpha$  – a coefficient determined by a ratio of the commodity quality and cost;  
 $\beta$  – a coefficient determined by a supply-demand ratio;

$$\text{Offer price} = \alpha \times \text{Cost}. \quad (2)$$

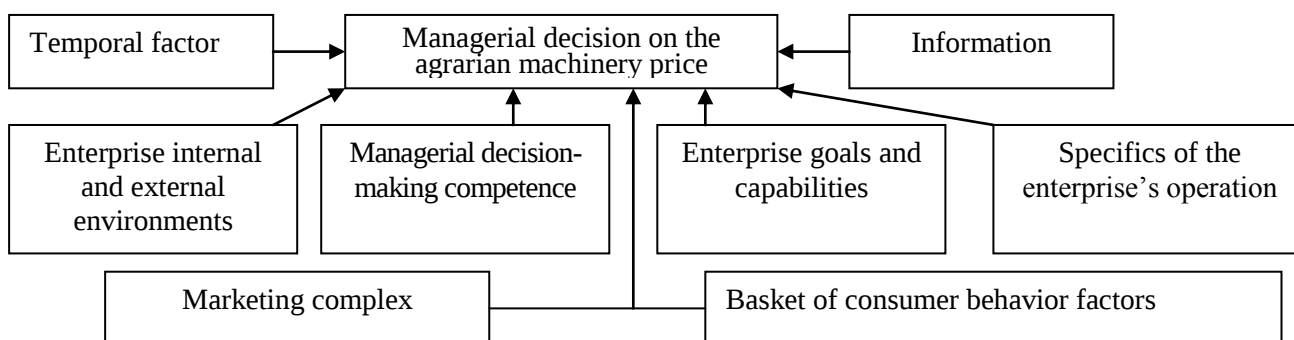
Due to the specifics of agricultural machinery as a commodity (seasonal use, substantial utility, mainly high cost, difficult to operate and maintain and the like), as well as consistent high demand for this commodity on the part of agricultural producers and lack or an extremely limited quantity of substitutes that accompany the process of its promotion, coefficient  $\alpha$  takes on a value at the level of 1 or more than 1, while coefficient  $\beta$  ranges within 0 and 1. Therefore, the agricultural machinery price formula appears as follows:

$$\text{Agricultural machinery price} = (\alpha \geq 1) \times O_p + (\beta \geq 0) \times S_p \quad (3)$$

Since agricultural machinery utility is, as a general rule, extremely high, then the commodity value formed as a ratio of utility to cost also has high values. The acceptable value, accordingly, is calculated using the following formula:

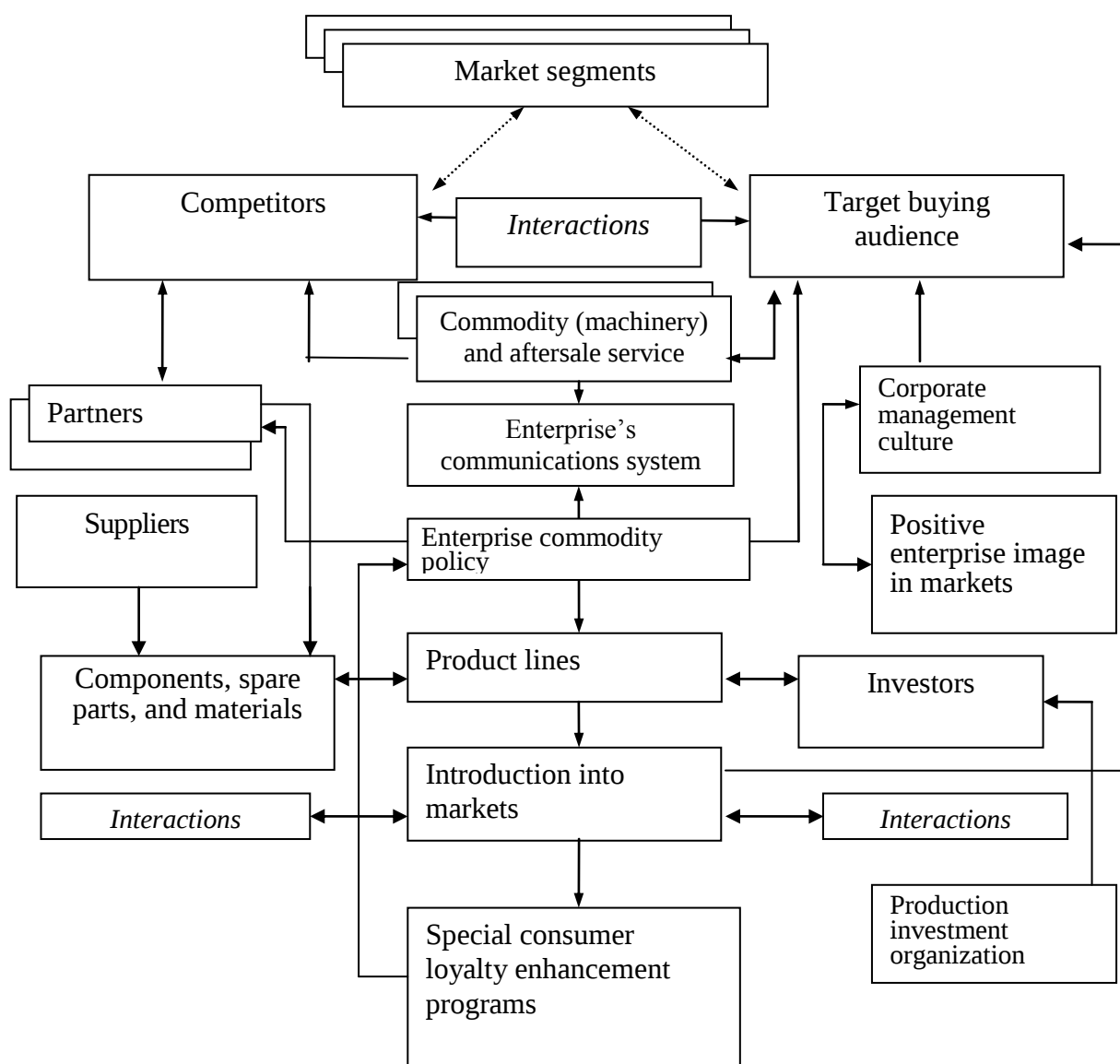
$$\text{Acceptable value} = \text{Consumer benefit} / \text{Offer price} \quad (4)$$

The magnitude of the commodity market price results, therefore, from interaction of the commodity cost and consumer utility (subjective price and offer price), the ratio of which is determined by the state of the market and economy as a whole. The formula developed as a consequence confirms the tentative assumptions of a synthetic mechanism of cost and utility interaction. Such an approach enables to distinguish the primary factors that have an impact on managerial decision-making at enterprises as to logistics pricing based on consumers' perception of product utility (Fig. 3).



**Fig. 3. The factors having an impact on managerial decision-making,**  
original development

The managerial decision-making model, which takes into consideration consumer behavior factors (The module “A managerial decision on the agrarian machinery price” – Fig. 3), stages of pricing substantiation based on perception of product utility by consumers rests on employment of the function-oriented structured analysis and design technique – SADT. The SADT technique (Structured Analysis and Design Technique), developed by Douglas T. Ross in 1969-1973, was created to design more general-purpose systems as compared with other structured methods (Fig. 4). The diagram given below represents a set of some already known models and new ones developed by the author in terms of their content in an attempt to build among them cause-and-effect relations that tell and impact on effective managerial decisions concerning pricing and introduction of agrarian machinery into market outlets. Substantiation of the pricing system based on perception of product utility by consumers of equipment and implements manufactured by appropriate enterprises through comprehensive combination of Ishikawa diagram and ABC analysis [1].

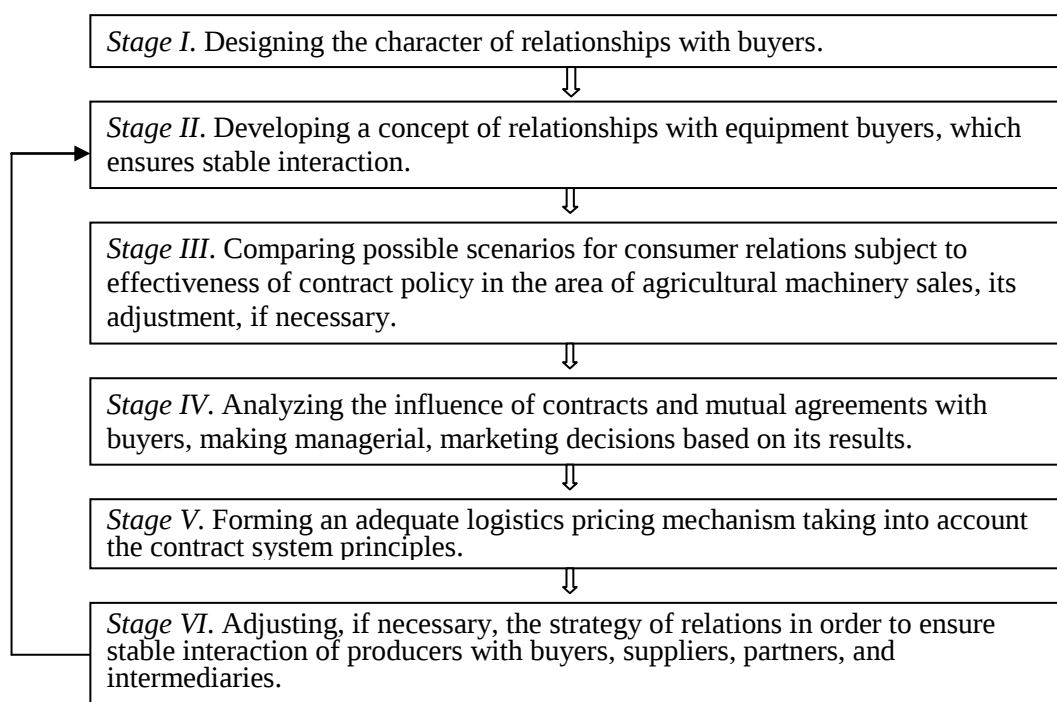


**Fig. 4. Diagram of interaction of market elements in the marketing context, original development**

The Ishikawa diagram is applied when developing and continuously improving products, as a tool ensuring a system approach to identification of factual root causes of problems (Alekseev [2]; Zhehus [5]). The Ishikawa diagram affords an opportunity to substantiate pricing based on perception of product utility by agricultural machinery consumers. The Ishikawa diagram is practically used in building dendrograms via the cluster analysis method through the “STATISTIKA 6” package.

Upon identification of a problem by building an Ishikawa diagram, it is important to determine areas for performance quality improvement and causes. The ABC analysis is the most common method in such case. The essence of the ABC analysis method is that it enables to classify a firm's resources in order of their importance. This analysis is one of the streamlining methods and can be applied in the area of activities of any enterprise. It rests upon the Pareto principle – 20% of all commodities generate 80% of turnover. With respect to the ABC analysis, the Pareto's law can run as follows: safe control of 20% of items enables to control the system by 80%, be it raw material and component stocks or the product line of an enterprise and so on [6; 8; 9].

Implementation of the approach developed as regards pricing based on perception of product utility by agricultural machinery consumers ensures stable and sustained interaction with buyers in line with general marketing policy and its specific modules: product, price, sales, communications (Ovcharenko, [10, p.188-193]) (Fig. 5).



**Fig. 5. Interaction of a producer with partners based on perception of product utility by agricultural machinery consumers, original development**

Operation of the systems in question, their control, adaptation, with account taken of changes in the external environment and development of the producer's internal capabilities, enables to build an effective marketing pricing system based on perception of product utility by agricultural machinery consumers.

Consequently, the suggested organizational-methodological approach in the context of marketing systems and communications interaction theory proves that communication strategies in relationship marketing coordinates come down to creation of a company's positive image resource, which ensures a synergistic effect due to establishment of integrated communication and logistics pricing networks. The special feature of marketing logistics pricing communication strategies that are "built in" the general interaction system in their differentiation by elements consists in: producer – buyers; producer – suppliers (equipment, components, and materials); producer – dealers; producer – competitors.

**Conclusions.** The specifics of forming marketing logistics pricing policy of agricultural machinery builders in the domestic market are as follows: the large majority of agricultural machinery consumers experience problems when purchasing necessary machines for a number of reasons, among which poor solvency takes center stage; agricultural producers see solution of this problem in raising prices for their products and in an appropriate incentive function of the state and society; more than half of customers point out to existing seasonality in machinery acquisition; the vast majority of customers use the price, quality and productivity criterion when acquiring machinery; only less than half of customers think the used agricultural machinery market competitive; foreign-manufactured products somewhat prevail in agricultural machinery acquired by domestic agricultural producers, while prices, as well as technical and quality parameters basically ensure the competitive ability of domestic products; there is no predominant sources of information on agricultural machinery offers.

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JEL Classification: D830

УДК 338:004

**ANALYSIS OF INFORMATION SECURITY  
MANAGEMENT PROVISIONS IN MODERN  
CONDITIONS****O. DIBROVA<sup>1</sup>**<sup>1</sup>Kyiv National University of Technologies and Design**Keywords:**

information security,  
management, knowledge-  
based economy, dynamic of  
scientific researches.

**ABSTRACT**

The article analyzes conditions of information security of knowledge-based economy and dynamics of scientific and technical work. Explored the concept of information security of knowledge-based economy and reviewed recommendations for improving of information security management. The rational management of information security of knowledge-based economy contributes to competitiveness of the state on the world level and the growth of the economy.

**Statement of a problem.** Quick and permanent development of information and communication technologies facilitates international cooperation, but at the same time there is a need for information security at different levels.

The relevance of this theme is the fact that in the near future especially the development of the information sphere, information security level will determine: political and economic roles of states at the international level; division of countries for informational sign. Also, with the increasing dependence of all spheres of modern society from information systems, information exchange, which is associated with the implementation of new technologies.

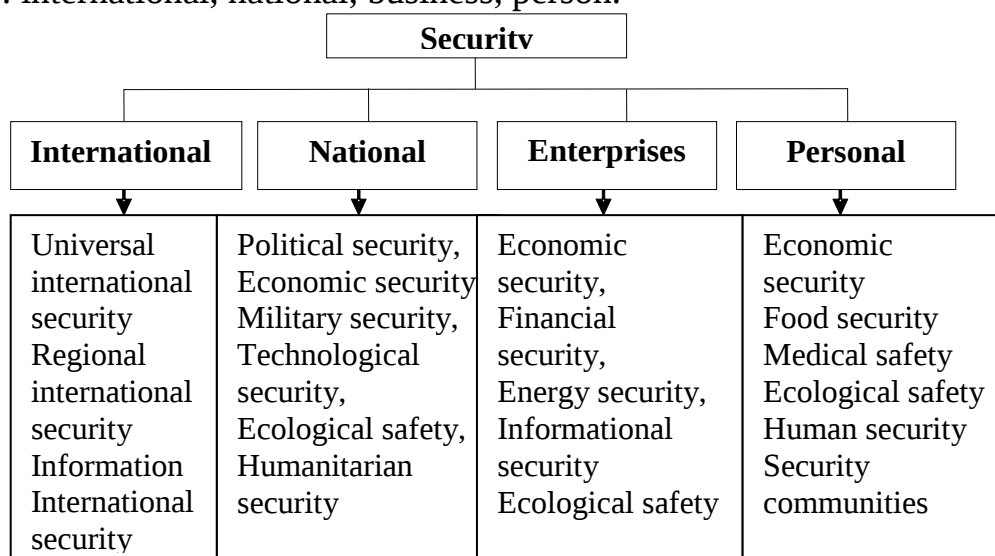
**Literature overview.** The problems of ensuring information security as a component of national security and security of companies and individuals consider many scholars, native and foreign. These are the scientists: Hurkovskyy V. I., Litvinenko O. V., Danilyan A. G., Dzoban A. P., Panov M. I., Harchenko L. S., Ross Anderson, Bruce Schneier, Tyler Moore and others.

Most of scientists focus their attention on:

- security of computer and information systems (Mel'nyk V. [1]);
- ensuring international information security (Kashpruk N. [2]);
- ensuring information security of state, industries, enterprises (Saschuk H. [3], Borysenko P. [4], Koshevoi M. [5]).

**Setting objectives.** In our time of globalization of society fundamentally increases importance of information security for the country as a whole and separately for the economic sectors, for enterprises and individuals. And in terms of industrialization to the era of knowledge-based economy on priority position come out high technology production, which constitute a priority sector of the economy, which in the future could bring the state to a qualitatively new level.

**Research results.** In the current conditions information is no longer purely technical category and becomes economic category, as more and more economic relations take the form of exchange of knowledge / information, not a commodity. Nowadays the main factor is access to information resources, knowledge, which leads to the fact that more wars are conducted in cyberspace with the help of information weapons. The globalization of information resources is the determining factor of life in modern civilization. Thereby takes the need ensuring information security at different levels. Management of information security, as indicated in Figure 1, is carried out at the following levels: international, national, business, person.



**Figure 1.** Types of security

The objects of information security are information resources, channels of information exchange and telecommunications, mechanisms which ensure the functioning of telecommunications systems and networks and other elements of infrastructure.

International information security is defined as the interaction of participants in international relations for support sustainable peace based on international protection of ionosphere (cyberspace with the media), global infrastructure of social consciousness of the international community from the real threats to information [2].

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Information security as a part of national security - Protectability of Vital Interests of man, society and the state in which the damage is prevented through: incompleteness, untimely and unreliability information which is used; negative information influence; negative consequences of using information technologies; unauthorized distribution, use and infringement of integrity, confidentiality and information accessibility [3].

Information security as a component of enterprise security - purposeful activity of bodies and officials using permissible forces and means to achieve the protection of status of information environment of the organization to ensure its normal functioning and dynamic development [3].

Information security as a part of the personal security of the person (human and citizens) - characterized as a condition of security of the person, various social groups and associations of people from influence capable against their will and desire to change the mental states and psychological characteristics of human behavior and modify it restrict freedom to choose [3]. But among set definitions of information security little attention is paid to information security exactly knowledge based sector, which is most exposed to the newest technologies and developments. First of all it is necessary to determine what a knowledge based sector is.

Knowledge based sector – the sector of the economy that lets out production, performs works and services using the latest, cutting-edge science and engineering achievements [4]. Activities of sector are regulated by the Law of Ukraine about state support for knowledge-intensive industries in Ukraine. Activity of sector includes conducting scientific research and developments, which leads to additional spending and the need to attract scientific staff to work.

The main characteristic features of the knowledge-intensive industries are:

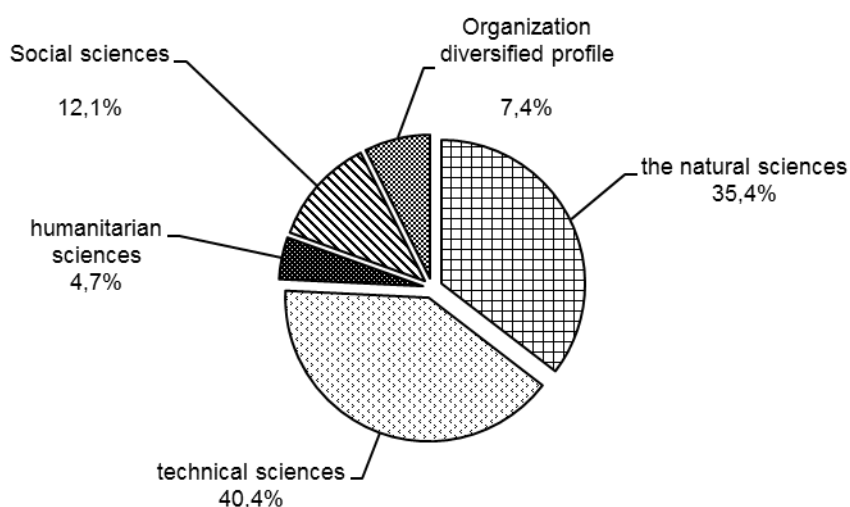
- presence of scientific schools, teams of designers and engineers, which are able to create unique and competitive products in the global market;
- predominance of highly qualified engineers and technicians and production staff in the total number of employees;
- publicly available and effective system of training of highly qualified personnel;
- an effective system of intellectual property protection;
- efficient implementation of creations, providing increased competitiveness;
- high dynamics of production;
- state stimulate and support legislative and financial levels;
- active and effective investment and innovation;
- using in production of leading technologies;
- long life cycle of many types of products;
- high specific costs for research and development, etc. [5].

Table 1

**Number of performed scientific and technical work in directions**

| Indexes                            | Total number of | From it introduced |
|------------------------------------|-----------------|--------------------|
| Total                              | 42953           | 30662              |
| including the creation             |                 |                    |
| new products                       | 4652            | 3250               |
| including new types of equipment   | 1806            | 1146               |
| new types of technologies          | 3220            | 2088               |
| including resource                 | 1435            | 910                |
| new materials                      | 1070            | 577                |
| new plant varieties, animal breeds | 2165            | 1848               |
| new methods, theories              | 7462            | 4208               |
| other                              | 24384           | 18691              |

Table 1 shows the number of performed scientific and technical work in directions in 2014, and Figure 2 shown the number of distribution of organizations that perform research and scientific and technical work on a branch of science in 2014.

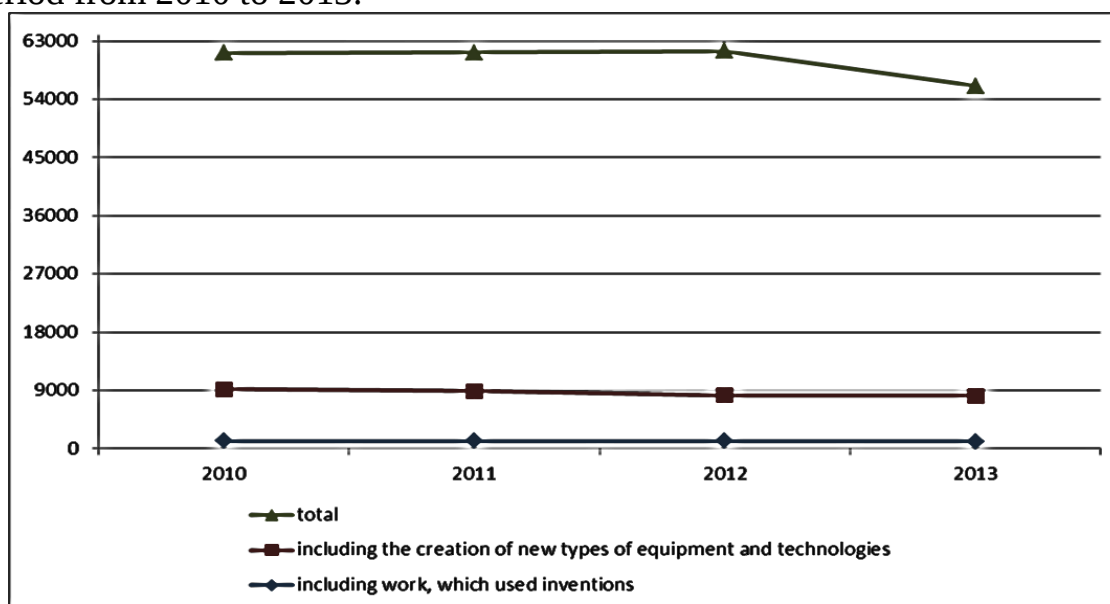


**Figure 2.** Distribution of organizations that perform research, scientific and technical work on a branch of science, in %.

The current state of scientific and technical potential of Ukraine is characterized by the falling of level the level of knowledge intensity and knowledge-intensive production work, which consequently reduces the competitiveness of domestic equipment, processes and increasing dependence on imports of scientific achievements.

It should be mentioned that the economy of leading countries in the world trend of there is a steady growing role of knowledge-intensive, resource-saving technologies and industries.

The evidence of domination of such direction of economic development is that the most expensive companies in the world, listed on the stock market is not the most resource mining and processing enterprises, but those specializing in intellectual, knowledge-intensive, high-tech products, and, more recently - steadily declining specific energy consumption per unit of production and their prices [3]. Figure 3 shows the number of completed R & D works in Ukraine for the period from 2010 to 2013.



**Figure 3.** The number of completed R & D works

As you can see from the graph, the period from 2012 to 2013 there is a decrease the number of performed scientific and technical work while in the leading countries, these figures are increasing.

Dimensions of knowledge based sector and the extent of using of high technologies describing the scientific, technical and economic potential of the country. The value of knowledge based industries sector for economic growth varied: in these sectors companies performed particularly intense innovational activity that contributes to the expansion and development of new sales markets and more effective use of resources.

Thus these problems, being always topically, acquired special significance at present rapid development of information technologies and require special attention to information security of knowledge based sector.

It's worth noting if there is no unified position on information security as a single legislation governing these provisions.

**Conclusion.** In the conditions of globalization and the highly rapid development of science and technology key question in all areas of the state, enterprises and individuals is the management of information security. Unsuitable its level efforts spent on creating, obtaining information will be brought to naught because it could easily become known for attackers, and this in turn may cause conflict, loss, and danger to people or the state.

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JEL Classification: R230

УДК 330.341.1

**DIVERSIFICATION OF BUSINESS ACTIVITIES IN RURAL AREAS****L. ZABURANNA<sup>1</sup>**<sup>1</sup> National University of Life and Environmental Sciences of Ukraine**Keywords:**

sustainable development, rural areas, diversification, rural economy, organic farming, rural tourism, cluster analysis.

**ABSTRACT**

The article deals with the importance of sustainable development on rural areas. The main criterion for sustainable development of the agricultural sector is improvement of the quality of life of farmers, rural population, and the nation that would base on preservation of life supporting systems. It was identified that agricultural production and agricultural employment are able not only to provide the appropriate level of income as a basis for quality living conditions of farmers, therefore, there exists an objective need for diversification of the rural economy. Identified several promising fields for diversification of business activities in rural areas that would ensure sustainable development of the agrarian sector, namely the development of organic farming and rural tourism.

**Introduction.** In the history of Ukrainian society, Ukrainian village always played a crucial role, because historically Ukrainians had sedentary lifestyle which involved tillage and farming. Yearly several dozen of villages disappear from the map of Ukraine and rural population is decreasing rapidly. Ukrainian village is generally characterized by the phenomenon of “aging nation” because young rural dwellers often leave their homes in search of better life in the cities. Overall, according to the State Statistics Committee, Ukraine lost 475 villages during the years of its independence and only 71 villages were founded (State Statistics Service of Ukraine, 2014). The reasons for disappearance of villages and decreasing number of rural population are demographic crisis, urbanization and ageing nation. Prospective villagers move to the cities because of the hopelessness of the rural hinterland: the lack of work and collapsed social infrastructure (non-functioning hospitals, schools, cultural institutions) do not allow to create proper living conditions for young people. For this reason, the principles of environmental and sustainable development are quintessential. The foundation for the establishment of the basic principles of sustainable development of the agricultural sphere should be appropriate infrastructure for land use based on innovations [1]. A significant criterion for sustainable development of the agricultural field should also be improvement of the quality of life of farmers, rural population, and the nation based on the preservation of life supporting systems.

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This criterion can be interpreted as a criterion for protection of life support, security of an individual as a biosocial being and natural means for agricultural labor, such as land and water used in agricultural production of services of ecosystems and nature in general.

Summarizing the characteristics of the socio-economic condition of villages and the processes typical for agriculture and rural areas in general, it is possible to conclude that there are not only necessary conditions for diversification of rural economy, but also sound reasons for that, among which is low level of employment and financial well-being of rural dwellers.

**Latest research and publications analysis.** The importance of sustainable development on rural areas and different aspects of diversification of rural economy was investigated by A. Balmann [7], V. Bill [8], O. Bulavka [6], M. Burian, L. Dixey [15], A. Gannon [11], L. Hamzaoui [13, 14], O. Hohulia [3], J. Holland [15], M. Kropyvko [6], K. Larsen [19], M. Malik [6], V. Pulim [4], V. Valentinov [19], L. Zaburanna [2; 3; 20], M. Zahaf [13; 14]. However, despite the presence of substantial research insufficiently substantiated strategic importance and conditions of diversification of rural economy based on the experience of countries - members of the European Union.

**The research objective** is to determine promising fields for diversification of business activities in rural areas that would ensure sustainable development of the agrarian sphere and competitiveness of Ukrainian agrarian sector.

**Key research findings.** Agricultural production and agricultural employment only are not able to provide the appropriate level of income as a basis for quality living conditions of farmers, therefore, there exists an objective need for diversification of rural economy through a new strategic direction – diversification of activities, which does not require significant investment (in particular from the state), but guarantees positive results for both the private sector of the economy and for the society, represented by the state. Basing on thorough research of scientific papers on diversification process, we identified some differences in the definitions of “diversification”. In our view, *diversification* is an innovative strategy aimed at mitigating business risks and increasing revenue by expanding business activities of an entity through reallocating existing resources to other areas that are significantly different from the previous ones.

Diversification of activities through innovative fields refers to small forms of agricultural production as well. They can help expand the scope of employment in rural areas [10; 16; 17; 18].

According to researchers M.J. Malik and V.A. Pulim, de-agrarization of rural economy (decrease of the share of agricultural production) is a significant step to effective rural development; it serves as a prerequisite for formation of private initiative and entrepreneurship in rural areas (M. Malik and V. Pulim, [4]).

A classic example of this can be agricultural tourism, which uses human, material, and land resources of farms or private households, as well as produced goods for providing accommodation, board and other forms of services to tourists. It is not necessary for farms to provide the entire range of these services; they can specialize in one or several ones.

Western part of Ukraine is at the forefront of the rural tourism development. The most popular is the Carpathian zone: Ivano-Frankivsk region, Zakarpattia region, Lviv region and Chernivtsi region. Main attractions include skiing and the opportunity to celebrate New Year and Christmas holidays in winter and beautiful landscapes, fresh air, and mountain rivers in summer.

The hypothesis of our study is that there are three types of rural tourism enterprises according to their income structure (sources of funds), including:

1. Enterprises with mixed structure of income for which tourism revenues were less important or even unimportant.
2. Enterprises with mixed structure of income for which tourism has become an important source of income.
3. Active, sustainable and dynamic rural agricultural tourism enterprises that raise revenues primarily from tourism.

Quantitative variables that describe the examined companies by their size, number of permanent members and employees, sources of income, amount of agricultural production and services provided in the field of tourism were used for creating typological classification based on clustering using k-averages.

There is no classification of small and medium-sized enterprises of rural tourism according to their sources of income (share of income from agricultural and tourist activities). As a result of the study, we defined 17 key indicators (variables) for the classification of SMEs of rural tourism according to their sources of income and, therefore, divided them into three groups (Table 1):

- indicators that determine the level of income from both agricultural and tourist activities (ICP, ILP, RT, SIT);
- indicators that determine the level of income only from tourism (CL, CB, AL, NT, DTS, SI);
- other indicators that influence the level of income from both tourist and agricultural activities (TA, SAL, AAO, PA, PT, TLC, ET).

Table 1

**Description of variables used for typological classification of enterprises of rural agricultural tourism**

| No. | Code of the indicator | Name of the indicator                                             | Characteristics of the indicator                                               |
|-----|-----------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------|
| 1   | TA                    | Total area                                                        | Hectares                                                                       |
| 2   | SAL                   | Share of agricultural land in the total area                      | Percentage of the total area, %                                                |
| 3   | AAO                   | Average age of company owners                                     | Years                                                                          |
| 4   | PA                    | Number of people engaged in agriculture (agricultural production) | Number of individuals                                                          |
| 5   | PT                    | Number of people engaged in tourism                               | Number of individuals                                                          |
| 6   | TLC                   | Total labor costs of the enterprise                               | Including labor costs both in agriculture and tourism for all employees, hours |
| 7   | SI                    | Sources of income                                                 | Total amount, units                                                            |
| 8   | AB                    | Amount of beds                                                    | Total number of beds at the enterprise, units                                  |
| 9   | NT                    | Number of tourists                                                | Total number of tourists per year, individuals                                 |
| 10  | DTS                   | Duration of the average tourist season                            | Number of days with tourists per year                                          |
| 11  | ET                    | Experience in the field of rural agricultural tourism             | Number of years                                                                |
| 12  | CL                    | Cost of living                                                    | Average price of accommodation for 1 person per day, UAH                       |
| 13  | CB                    | Cost of board *                                                   | Average price of board for 1 person per day, UAH                               |
| 14  | IT                    | Income from tourist activities                                    | Total income from tourism, UAH                                                 |
| 15  | ICP                   | Income from crop production                                       | Total income, UAH                                                              |
| 16  | ILP                   | Income from livestock production                                  | Total income, UAH                                                              |
| 17  | SIT                   | Share of income from tourism in the total income                  | Percentage in the total income, %                                              |

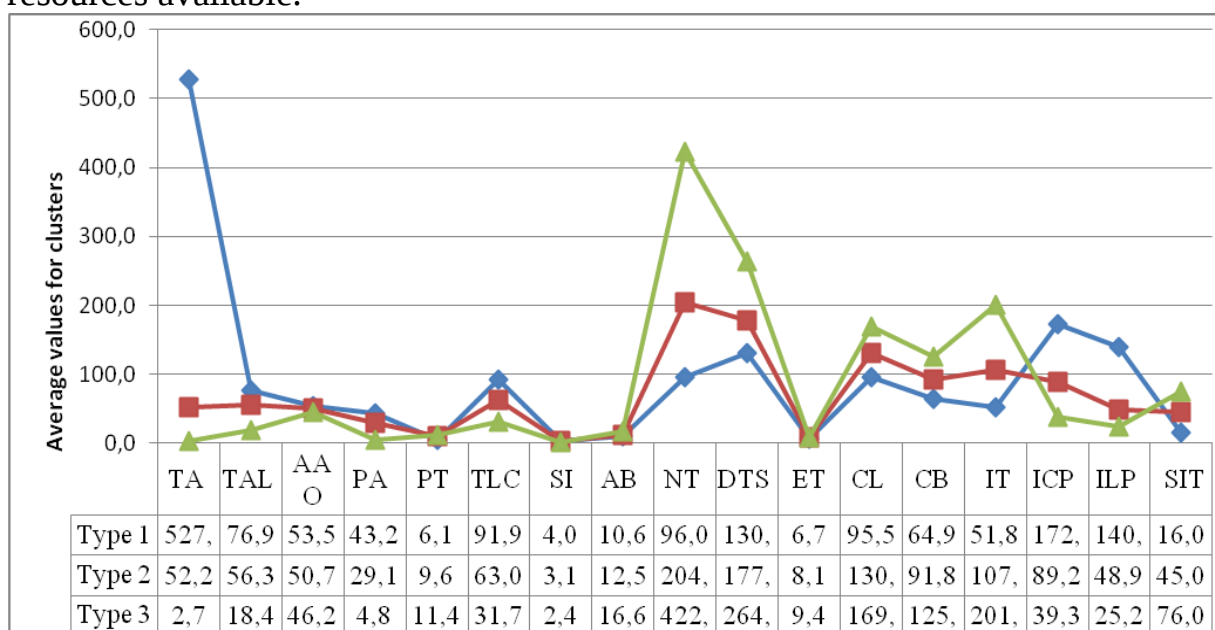
\* The examined enterprises usually offered breakfast and dinner.

Author's development

One of the most suitable methods of study of empirical data is the algorithm of fuzzy *K-averages*. It is important to analyze not only the absolute values of economic parameters of rural tourism enterprises, but also relative ones, such as the coefficients of economic efficiency of use of resource potential of the investigated business field.

According to the research methodology, the above mentioned parameters were identified as of January 01, 2015 for 87 rural tourism enterprises in Western Ukraine, the level of diversification of sources of income of which has substantial differences.

The results of the cluster analysis performed with the help of Statistics 8.0 package can be represented in the graphical form (Fig. 1), which reflects average values of the formed cluster groups. The diagram in Figure 1 shows typical profiles of rural tourism enterprises, and, thus, makes it possible to identify major differences in mechanisms of obtaining economic benefits from the resources available.



**Figure 1. Diagram of average values of the clusters formed for the sample of enterprises of rural agricultural tourism**

*Calculated by the author.*

To determine the contribution of a certain classification feature in the distribution of observations we will summarize the results of the analysis of variance generated in Statistical 8.0 (Table 1). It was established that for all of the suggested 17 indicators intragroup variance is lower than intergroup one, as the values in the last column of Table 3 are positive.

Table 2

**Analysis of variance of cluster distribution of the enterprises of rural agricultural tourism**

| Variables<br>(classification<br>criteria)                                          | Inter-group<br>variance<br>(Between –<br>SS) | Number<br>of degrees<br>of freedom<br>df | Intra-group<br>variance<br>(Within –<br>SS) | Number<br>of degrees<br>of freedom<br>df | Fisher<br>criterion<br>value<br>(F) | Level of<br>significance<br>of F-<br>criterion<br>(signif. –<br>p) | Excess of inter-<br>group variance<br>compared to<br>intra-group one |
|------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------|---------------------------------------------|------------------------------------------|-------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------|
| Total area (TA)                                                                    | 2670249.0                                    | 2.0                                      | 1357686.0                                   | 84.0                                     | 82.6                                | 0.0                                                                | 1312563.0                                                            |
| Share of<br>agricultural land<br>in the total area<br>(SAL)                        | 44916.3                                      | 2.0                                      | 10939.9                                     | 84.0                                     | 172.4                               | 0.0                                                                | 33976.3                                                              |
| Average age of<br>company owners<br>(AAO)                                          | 672.4                                        | 2.0                                      | 402.8                                       | 84.0                                     | 70.1                                | 0.0                                                                | 269.5                                                                |
| Number of<br>people engaged<br>in agriculture<br>(agricultural<br>production) (PA) | 19038.5                                      | 2.0                                      | 3314.5                                      | 84.0                                     | 241.2                               | 0.0                                                                | 15724.0                                                              |
| Number of<br>people engaged<br>in tourism (PT)                                     | 284.1                                        | 2.0                                      | 204.7                                       | 84.0                                     | 58.3                                | 0.0                                                                | 79.5                                                                 |
| Total labor costs<br>of the enterprise<br>(TLC)                                    | 40617.05                                     | 2.0                                      | 4859.91                                     | 84.0                                     | 351.0                               | 0.0                                                                | 35757.14                                                             |
| Sources of<br>income (SI)                                                          | 28.0                                         | 2.0                                      | 19.7                                        | 84.0                                     | 59.8                                | 0.0                                                                | 8.3                                                                  |
| Amount of beds<br>(AB)                                                             | 499.3                                        | 2.0                                      | 167.1                                       | 84.0                                     | 125.5                               | 0.0                                                                | 332.2                                                                |
| Number of<br>tourists (NT)                                                         | 1440186.0                                    | 2.0                                      | 206402.2                                    | 84.0                                     | 293.1                               | 0.0                                                                | 1233783.8                                                            |
| Duration of the<br>average tourist<br>season (DTS)                                 | 230785.0                                     | 2.0                                      | 104807.0                                    | 84.0                                     | 92.5                                | 0.0                                                                | 125978.0                                                             |
| Experience in<br>the field of rural<br>agricultural<br>tourism (ET)                | 74.9                                         | 2.0                                      | 36.5                                        | 84.0                                     | 86.2                                | 0.0                                                                | 38.4                                                                 |
| Cost of living<br>(CL)                                                             | 61065.6                                      | 2.0                                      | 21367.8                                     | 84.0                                     | 120.0                               | 0.0                                                                | 39697.9                                                              |
| Cost of board<br>(CB)                                                              | 43066.9                                      | 2.0                                      | 12272.0                                     | 84.0                                     | 147.4                               | 0.0                                                                | 30794.9                                                              |
| Income from<br>tourist activities<br>(IT)                                          | 286406.8                                     | 2.0                                      | 78276.4                                     | 84.0                                     | 153.7                               | 0.0                                                                | 208130.4                                                             |
| Income from<br>crop production<br>(ICP)                                            | 174163.5                                     | 2.0                                      | 68301.0                                     | 84.0                                     | 107.1                               | 0.0                                                                | 105862.5                                                             |

Continuation of Table 2

|                                                        |          |     |         |      |       |     |         |
|--------------------------------------------------------|----------|-----|---------|------|-------|-----|---------|
| Income from livestock production (ILP)                 | 124197.7 | 2.0 | 75209.7 | 84.0 | 69.4  | 0.0 | 48988.0 |
| Share of income from tourism in the total income (SIT) | 4.0      | 2.0 | 0.8     | 84.0 | 221.1 | 0.0 | 3.2     |

*Calculated by the author.*

The results of the sample of rural tourism enterprises in accordance with the structure of their income are presented in Table 3. Almost the half of the surveyed enterprises provide only tourist services, but a big share of companies – 36.8% – has diversified revenue sources, combining agricultural production with tourist services. For a small number of surveyed enterprises agricultural production is of primary importance and tourist services are a secondary source of income.

Table 3

**Results of typological classification of the enterprises of rural agricultural tourism in Western economic region\*, 2014**

| No. | Type of an enterprise | General characteristics of the type of an enterprise                                                              | Number of enterprises, units | Share, % |
|-----|-----------------------|-------------------------------------------------------------------------------------------------------------------|------------------------------|----------|
| 1.  | Type I                | Enterprises with mixed structure of income for which tourism revenues were less important or even unimportant     | 12                           | 13.8     |
| 2.  | Type II               | Enterprises with mixed structure of income for which tourism activity has become an important source of income    | 32                           | 36.8     |
| 3.  | Type III              | Active, sustainable and dynamic rural agricultural tourism enterprises that raise revenues primarily from tourism | 43                           | 49.4     |
| 4.  | Total:                | X                                                                                                                 | 87                           | 100      |

\* Zakarpattia region, Lviv region, Chernivtsi region and Ivano-Frankivsk region.

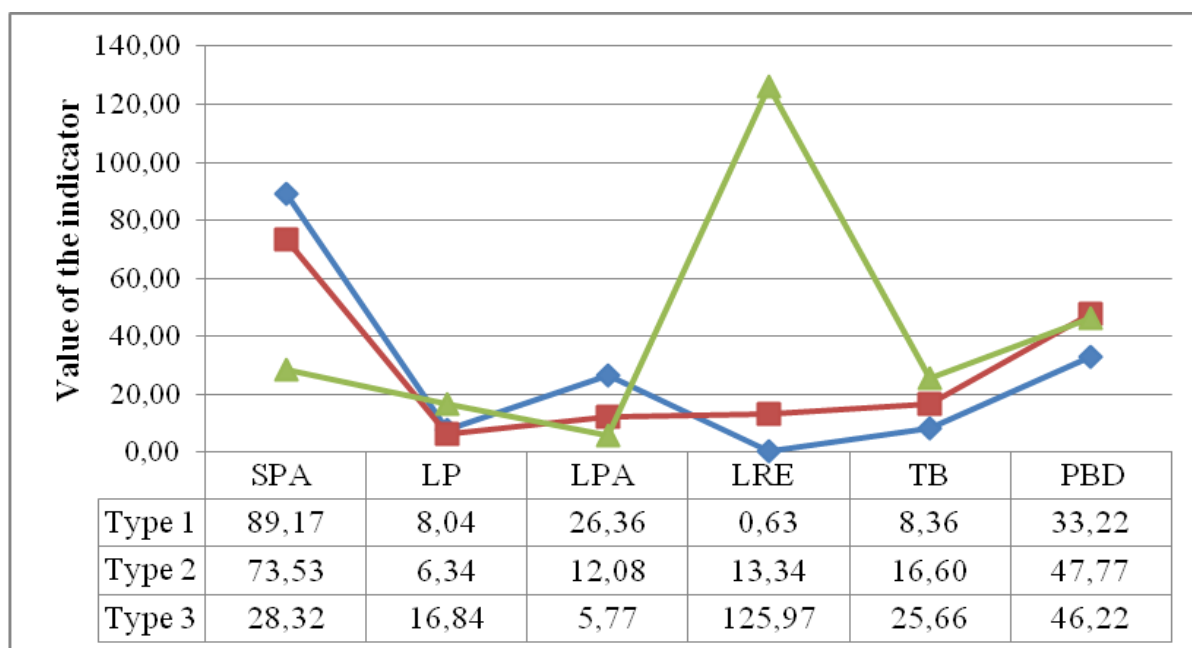
*Calculated by the author.*

The next step of the study based on typological classification of rural tourism enterprises is to analyze the most important factors influencing the efficient use of limited resources.

The foundation for the study of efficiency of rural tourism enterprises should consist of indicators that without any complications and conventions can be compared for entities different in size, structure, and location. These indicators include the share of agricultural land in the total area (SAL), the share of income from tourism in the total income (SIT), as well as:

- ✿ share of personnel involved in agricultural production in the total number of employees (SPA);
- ✿ labor productivity at the agricultural tourism enterprise that is defined as the total income of the company per employee (LP);
- ✿ labor productivity in agricultural production that is defined as the income from crop and livestock production per employee in agricultural production (LPA);
- ✿ land resources efficiency, which is determined by dividing total income by total area of the enterprise (LRE);
- ✿ turnover of beds, defined as the ratio between the number of tourists, who have visited the analyzed enterprise during the year, and the number of beds created (TB);
- ✿ average profitability of a bed per day – we believe that this indicator fully covers the level of fulfillment of tourism potential of an enterprise, the desired level of fulfillment of tourism potential, that is, PBD indicator.

The graph (Fig. 2) shows the average values of efficiency of rural tourism enterprises defined using typological classification of cluster groups.



**Figure 2. Performance profile formed in accordance with standard diversification strategies of rural tourism enterprises**

*Calculated by the author.*

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According to Figure 2, enterprises whose income is dominated by revenues from agriculture, have the lowest efficiency both in terms of productivity of land resources – only 630 UAH per 1 hectare of total area – and fulfillment of tourism potential: a potential bed eventually brings income of 33.22 UAH per day. They also have low labor productivity level, especially when compared to the enterprises that receive most of the income from tourist services: 8.040 UAH per person per year compared to 1.684 UAH per person per year. Latest enterprises are leaders in workforce productivity and efficiency of land resources – almost 126.000 UAH per hectare of the total area. Although labor productivity of workers engaged in agricultural production is the lowest at these enterprises: only 5.770 UAH per person per year. In addition, companies specializing exclusively in tourism do not reach maximum fulfillment of their tourist potential, because every potential bed allows obtaining an average income of 46.22 UAH per day. Turnover of beds at the enterprises of the third type is the highest, as they have almost 26 guests per bed per year. Enterprises of the second type occupy medium position by all performance indicators except two. They show the lowest labor productivity of only 6,340 UAH per person per year and the highest level of fulfillment of tourism potential – every potential bed in 2014 brought an average income of 47.77 UAH per day. Efficiency indicators, averaged within each type of diversified enterprises (see Fig. 2) are recommended to be viewed as “control” numbers. This means that management of enterprises should lead to exceeding of at least average values; in this case, it can be recognized as satisfactory. Taking all indicators into consideration, we can state that the cluster of rural tourism enterprises with mixed income structure for which tourism activity has become an important source of income is more cost effective compared to others, which proves our hypothesis about economic justification of diversification in agriculture on innovative basis, especially in the regions with difficult conditions for agricultural production.

An important area of diversification of rural economy on innovative basis aimed at achievement of its sustainable development is the use of organic farming that can adapt agricultural production to climate change and positively influence the socio-economic development of rural areas. Due to the fact that organic farming uses only organic materials (fertilizers, pesticides, etc.), the amount of organic matter in the soil increases. As a result, soil contains much more moisture than when using traditional farming systems.

Thus, the use of organic farming systems may to some extent neutralize the effect of environmental factors, most importantly in terms of global climate change. One more positive aspect of the system of organic farming is that the prices for certified products are almost twice as high as those for conventional agricultural products. This, in turn, allows farmers to receive higher income and cover the cost of production even at low yields.

Priority of the development of organic production is declared in the State target program of the development of Ukrainian village until 2015, which substantiates the necessity of “reproduction of soil fertility and environmental conservation, rural development, improvement of agricultural production, providing consumer market with healthy quality products, strengthening export potential of the state, ensuring food security and improving the welfare of citizens” (State Target Program development of Ukrainian village until 2015, 2007). The trend of market growth is presented in all countries. And it should also be mentioned that the demand far exceeds the supply even at high prices (Table 4). Analysis of the development trends of the market of organic products in European countries indicates significant positive results. The largest share of the market belongs to Germany, the UK and Italy. The data also show the growth of organic agriculture market in Ukraine, but in comparison to other European countries it is only at the beginning of its development and, therefore, small business entities in rural areas may play an essential role in the development of this area of innovative agriculture.

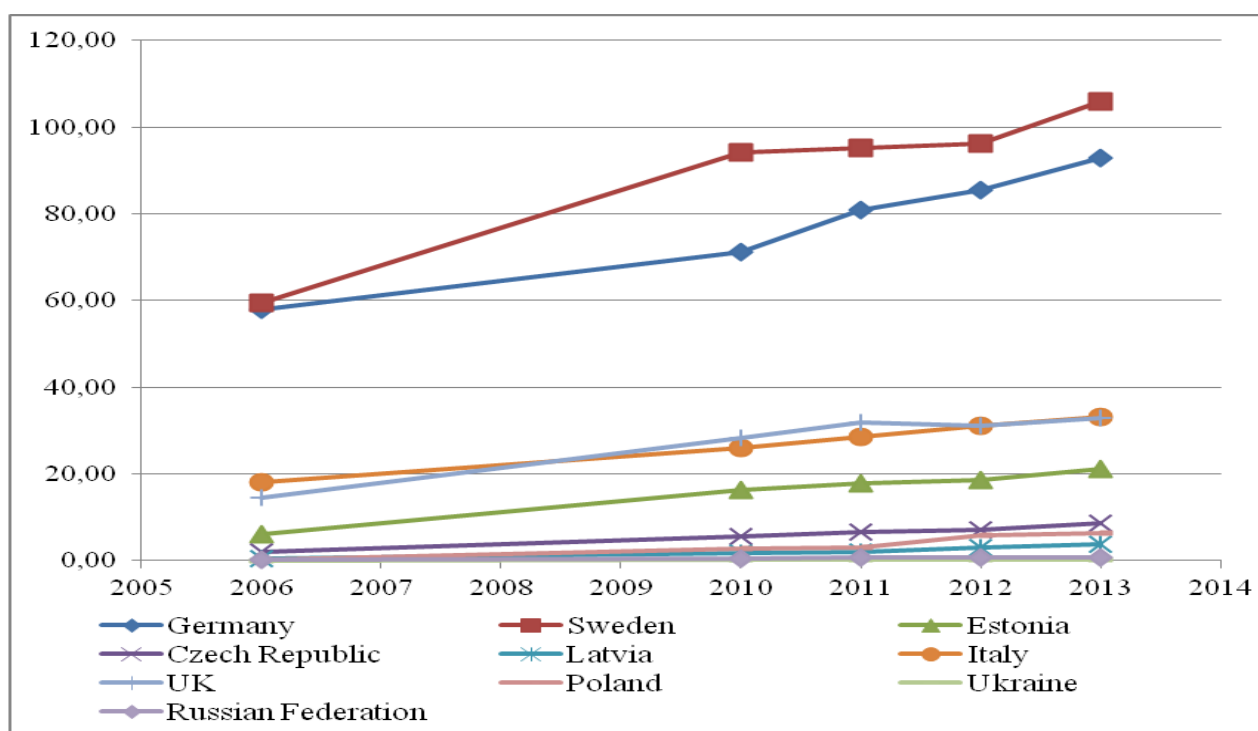
Table 4

**Development of the market of organic products in European countries.** Source: *Organic-World.net*

| Countries          | Market volume, million euros |      |      |      |      |                                 |
|--------------------|------------------------------|------|------|------|------|---------------------------------|
|                    | 2006                         | 2010 | 2011 | 2012 | 2013 | Change between 2013 and 2006, % |
| Germany            | 4600                         | 6050 | 6590 | 7040 | 7550 | 164.13                          |
| Sweden             | 605                          | 860  | 885  | 905  | 1018 | 168.26                          |
| Estonia            | 3.2                          | 12.1 | 18.7 | 20   | 22   | 687.50                          |
| Czech Republic     | 28.7                         | 59   | 66,2 | 70   | 71.3 | 248.43                          |
| Latvia             | 1.1                          | 3.6  | 4    | 4.7  | 5,3  | 481.82                          |
| Italy              | 970                          | 1580 | 1720 | 1885 | 2020 | 208.25                          |
| UK                 | 1240                         | 1680 | 1882 | 1950 | 2065 | 166.53                          |
| Poland             | 58                           | 111  | 120  | 127  | 138  | 237.93                          |
| Ukraine            | 0.5                          | 2.5  | 5.1  | 9.3  | 12.0 | 2400.00                         |
| Russian Federation | 56                           | 109  | 115  | 120  | 123  | 219.64                          |

Leaders in organic food consumption per capita are Germany and Sweden, where the average resident buys these products in the amount of 93 and 106 Euros per year respectively. In Ukraine, the figure is only 3 cents per capita per year (Fig. 3).

Despite the rapid increase of the EU sales of organic products, there exist certain obstacles for their production [12], such as poor soil and massive intensification of agricultural production (C. Dimitri and L. Oberholtzer [9]). Further growth of the markets of organic products offers opportunities for new producers from the developing countries, including Ukraine [5].



**Figure 3. Consumption of organic products per capita, euro**

*Source: Organic-World.net*

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In addition, the feasibility of implementation of organic farming in Ukraine is conditioned by the following factors:

- the need for reproduction of soil fertility and environmental protection;
- the need for rural development and raising the level of life of rural population;
- the need to improve the efficiency and profitability of agricultural production;
- the need to provide consumer market with healthy quality products;
- the need to strengthen export potential;
- the need to improve the image of Ukraine as a manufacturer and exporter of healthy high quality organic products;
- ensuring food security in Ukraine;
- improving the welfare of the citizens of the state.

**Conclusions.** A specific approach to the typology of the rural tourism entrepreneurship based on different types of activity within a company, which is based on the use of cluster analysis. Proved that there are three types of rural tourism enterprises according to the similarity of their income structure, including: enterprises with mixed structure of income for which tourism revenues were less important or even unimportant; enterprises with mixed structure of income for which tourism has become an important source of income; active, sustainable and dynamic rural agricultural tourism enterprises that raise revenues primarily from tourism.

As a result of the typology of enterprises in the rural tourism we found the most important factors of efficient use of limited resources and leverage increased business activity of companies in this field of work. It is proved that for the sum of generalized cluster of rural tourism enterprises, incorporating mixed-income structure for which tourism activity has become an important source of income is more cost effective compared to others, which proves our hypothesis about the economic justification Diversification in agriculture, especially in the complex for agricultural production regions.

Also, we researched the importance of organic production in rural areas. Organic farming can adapt agricultural production to climate change and positively influence the socio-economic development of rural areas. One more positive aspect of the system of organic farming is that the prices for certified products are almost twice as high as those for conventional agricultural products. This, in turn, allows farmers to receive higher income and cover the cost of production even at low yields.

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JEL Classification: I220

УДК338.24.01: 330.322

**MANAGEMENT CONCEPT OF HIGHER EDUCATION  
ESTABLISHMENTS INVESTMENT POTENTIAL****M. VERGUN.<sup>1</sup>**<sup>1</sup>Kyiv National University of Technologies and Design**Keywords:**

higher education  
establishments, social-  
economic conditions, market  
economy, investment  
potential, factors of  
development, investment  
potential level increase,  
evaluation, optimization.

**ABSTRACT**

The paper dwells on the issues of the investment potential structure of higher education institutions determining and analyzing in terms of modern social and economic situation in Ukraine. The management concept of higher education institutions investment potential has been offered.

**Problem definition and its relationship with important scientific and practical tasks.** The modernization of higher education system in Ukraine aiming at adoption of European standards and integration in accordance with the Bologna process requires appropriate investment security. Education plays and will continue to play a crucial role in the process of the economy modernization and comprehensive development of the state because only the countries with a powerful educational potential ensure the mankind's progress. Therefore, the education sector should be considered as the starting point of the progress in Ukraine. The development of science and education as well as the investment in human capital are the key conditions for the progress of all the sectors of the economy. The decisive role in this process belongs to the state. The key to sustainable economic development of Ukraine is investments in education, science, health, mobility, motivation, i.e. in those priority spheres of society where human capital is formed [10, 11].

However, the analysis of annual foreign investment dynamics in the Ukrainian education sector over the past 4 years has shown almost a fourfold decrease, from 41 mln USD in 2010 to 14.4 mln USD in 2013. The share of investment in education and science in 2013 was 0.4% of the total and this trend has no positive improvement forecast [2, 3].

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Statistics of total government investments in education in Ukraine has a negative trend. In 2007 the figure was 53.47 billion UAH, in 2008 - 70.39 billion UAH, in 2009 - 77.41 billion UAH, in 2010 - 91.07 billion UAH, in 2011 - 97.60 billion UAH, in 2012 - 111.18 billion UAH. However, comparing these indicators with the performance of the national economy in 2007 and 2008, we can conclude that Ukraine has spent 7.4% of gross domestic product (GDP) on education, in 2009 - 8.5% in 2010 - 8.4% in 2011 - 7.5% and in 2012 the figure was 7.9% [4].

Against the background of the given indicators the part of state investments in education that comes from the state budget is reducing too. So in 2013, investments in implementation of the state order were slightly less than 5% of all government spending, while in 2007 the figure was almost 5.5%. The biggest share was in 2010 - 6.4% [5, 6].

Described issues with investment in the higher education sector results in extremely low activity of domestic universities in groping after new sources of investment for research, scientific and technical activities. A vivid example is low participation of Ukrainian researchers in international scientific investigations. The funding share of scientific institutions of higher education sector in total R & D funding at the expense of foreign countries is insignificant (2000 - 1.1%; 2005 - 0.7%; 2009 - 1.3%; 2010 - 0.8% ; 2011 - 1.5%; 2013 - 1.2% of total funding of Ukrainian science at the expense of foreign countries) [7, 8].

The situation with investments and investment attractiveness of Ukrainian universities reduces the number of scientific achievements; minimizes their research and innovation, deteriorates the integration of the national system of education and science with production, reduces the number of regional, national and international investment projects and programs in which national Universities are involved [11].

**Analysis of recent research and publications.** The study of investment potential of the universities and the development of effective mechanisms for its improvement are considered to be the tools for investment climate improvement in education and science sector of Ukraine.

The fact that the sector of education and science has a considerable inexhaustible economic potential makes the topic of the given research important.

International and Ukrainian scientists dedicated particular attention to substantiation of the content and investment potential evaluation at the country level. Among them are Bandura A.V., Berezhna I.Yu., Gryshchenko I.M., Drygo M.F., Kadyrova G.V., Miroshnichenko P.I., Nechytailo U.P., Oleksandrenko I.V., Pismachenko L.M., Stechenko D.M. and other scientists who study macroeconomic and regional aspects of investment processes.

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The economic category of "investment potential of the enterprise" has been considered by the following economists: Vorsovskyi O.P., Ivanov S.V., Krasnokutskaya N.S., Kucheruk T.Y., Revutsky L.D., Shevchenko S. Yu., and others.

The method of calculation and a set of indicators that make up the foundation of investment potential evaluation at the enterprise level were proposed in the researches of Arapov O.S., Vorsovskyi O.P., Dun I.V., Kucheruk T.Y. and others.

Aspects of formation and efficiency of investment potential have been investigated by Efimenko N.A., Krioni N.K., Kuzhel V.M. Lytyuha Yu.V.

**Formulation of the article purposes.** However the adaptation of the "investment potential" category to universities has not been investigated yet. In order to solve this problem it is necessary to implement an integrated approach to the study of "investment potential of the university" concept and develop the concept of the investment potential management based on effective mechanisms to bring it in ordered system of relationships.

It is also expedient to research the effect it has on the competitiveness and demand in the field of higher education in Ukraine. All mentioned above have determined the objectives, tasks, object and subject of the current study.

**Summary of main results with full justification of scientific results.** The functioning of the modern university in Ukraine's market economy is associated with diversification, which leads to complicacy of its organizational system, and management processes accordingly. This need is dictated by the significant reduction in budget funding allocated by the state to train specialists in different qualification levels [9].

In such circumstances, universities receive the status of a full-fledged economic entity and the ability to do business to provide various types of services (education, research, design, etc.), to determine its species, and, eventually make a profit [3, 5, 6].

A dramatic increase of a number of higher educational institutions was resulted from the democratization of the economy on the one hand, and the unreasoned state policy in education, on the other, and led to high competition between higher education establishments in Ukraine. Demographic problems reinforce the abovementioned factor of the market economy [5].

In this situation, the achievement of strategic competitive advantage of higher educational institutions is provided by innovations in education and research process that has become a common truth in the market economy, and selecting specific development strategies for each of them focused primarily on available financial resources and attracted investments [1].

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Within the study scope the investment potential will be considered as investments volume that can be held in its fixed capital due to all (internal and external) sources of funding, based on presence of various economic, social resources, characteristics of its location and other objective preconditions for the formation of significant investment activity in it [5, 7].

Analysis of the existing approaches to the interpretation of "investment potential" and specific investment processes in education of Ukraine has made it possible to develop the concept of management investment potential, which implements effective mechanisms for managing the investment potential (Fig.1). The suggested concept is based on the following principles:

- universal structure of economic entity investment potential as related components;
- relevant management mechanisms of the investment potential considering specific functions of a HEI and education in general;
- adequate mechanisms of necessary resources justification required to implement measures to improve the investment potential at a particular university.

The main components of the suggested conception of the University investment potential management are as follows:

The university management, represented by the key management departments: administration, dean offices, heads of Centers and others;

- the system of cross-functional business processes;
- the automated information system of business processes management and its Web-resources;
- mechanisms for the University investment potential management;
- functional units of a University that directly implement the system of cross-functional business processes;
- investment in education;
- potential investors in education sector;
- units that form the university management system;
- the concept of the "investment potential of universities", which is formed by external market factors of education in Ukraine.

These components make up a closed management circuit.

The input information in this circuit is the strategy of Universities created by the university leadership, by external market factors of education and based on the concept of the University investment potential.

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The strategy is detailed at the level of the university and departments activities. Established strategy is implemented through the set of such actions as orders, regulations, and investment projects during the year.

The input information is the specific resources (financial, human, material and technical) that should be involved by universities to implement measures (innovative programs and projects, institutional and infrastructural transformations) to improve the investment potential, which will lead to the effective investments implementation in this organization.

This management system allows defining a comprehensive description of the state of HEI investment attractiveness.

The significance of this information is that its basic principles and findings can be used to form and raise the resources of a University in the implementation of measures to improve the HEI investment potential.

Managerial impacts within the proposed circuit of the management system are implemented through the system of mechanisms (blocks 4-6 Fig.1). These mechanisms are applied by the University services (economic planning administration, training division, HR department, research department, accountants), which provide transformation of allocated resources in accordance with the overall goals of the HEI development strategy taking into account the notion of the investment potential. To implement this concept, the following mechanisms have been developed:

**Mechanism 1.** Synthesis of an effective infrastructure to support the investment potential of a University;

**Mechanism 2.** Formation of the balanced scorecard of the University investment potential assessment;

**Mechanism 3.** Optimization of University investment resources structure in market economy.

Mechanisms 1-3 support the operation of management system of the University investment potential and efficiently display the relevant information on the state of the process of its implementing within the University development strategy for the University leadership to make effective management decisions.

Let us consider the effect each mechanism has on the effectiveness of the University investment potential management.

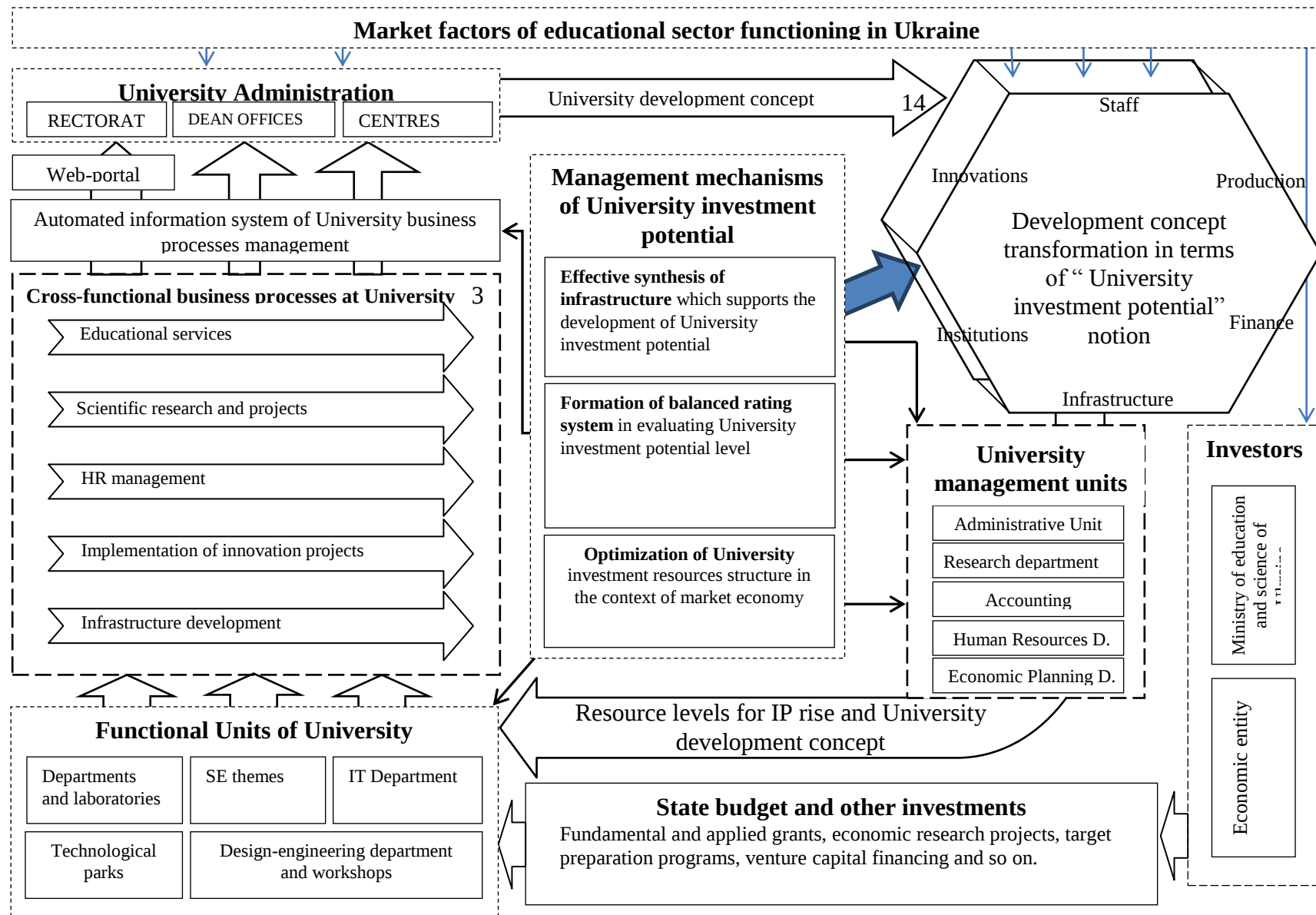


Figure 1. Management concept of University investment potential

Mechanism of formation of the balanced scorecard of the University investment potential assessment involves the formation of the major groups of factors of the University investment potential used for its monitoring.

Currently, effective management system is possible only on the basis of reliable information that quickly comes to the people who make decisions. Today, University management uses computerized information systems of major business processes management. Monitoring systems constructed on the basis of information technologies include the collection and storage of data on the University investment potential factors. They include numerous indicators, characterizing:

- qualitative and quantitative composition and dynamics of professional growth of the staff;
- level and dynamics of investment attracting in the context of sources;
- dynamics of investment projects creation and implementation;
- level of internal resources (assets, logistics) and others.

These data are the most important in the process of the University investment potential management. One should recognize that this information is used inappropriately by the bodies which allocate University resources. Weak attraction of modern technologies for evaluation and reporting is considered to be the main reason for it. Therefore, the main task within the mentioned mechanism is to provide the decision makers with results of solutions in understandable content and form and to promote the process of management actions development as objectively as possible. According to the research, the most suitable information presentation ways for a person are the ranking lists (graphs, cartograms) of problems on the investment potential factors.

Thus, this mechanism is based on methods of analysis of the information contained, methods related to grouping, ranking as well as more sophisticated methods of mathematical modeling and prognosis that can detect non-trivial facts and dependencies related to the state and dynamics of the University investment potential. These methods are used to assess the degree of investment potential, obtaining various projections, and, ultimately, developing the system of adequate indicator of University budget for implementation of measures to improve their investment potential.

The mechanism of the synthesis of infrastructure to support the development of University investment activities, which is based on institutional and systemic approach, improves the University investment infrastructure forming a set of interrelated and complementary elements of various kinds and various legal forms, that provide the services on free movement of investment resources in all phases of investment processes in a University.

Resulted from the determination of the principles of investment activity infrastructure formation and development one may suppose that the structuring of investment support institutions can be carried out in four subsystems: development, government guarantees, market, information and communication.

The first subsystem is created by financial institutions and institutions involved in building the knowledge economy.

Market subsystem includes institutions of the University investment activity marketing support that ensure implementation of investment processes within the process on provision of educational research services in domestic and foreign markets and institutions affecting the technological competitiveness of a local University.

Subsystem of state guarantees form the institutions of direct state involvement in University investment processes at all state management levels (sectorial, regional, national). The subsystem of information and communications includes institutions of information and information support for innovation processes. Each of these infrastructure subsystems of the University investment activity development support carries out certain functions in accordance with the challenges they face.

When developing the form of effective interaction between institutions of the University investment activity development support, one assumes a clear coordination and cooperation of all subsystems and components of their institutions, compliance of their efforts and tasks with both specific features of each stage of the investment process and with the overall performance of complex measures on construction of the University investment potential as part of the knowledge economy. The mechanism of the proposed approach to the interaction is focused on the centralization of management of elements of the University investment activity development in the organization of subsystems of management. The interaction is proposed to be implemented within the new infrastructure element - investment complex of a HEI, which contributes to uniting and coordinating the activities of all the subsystems of the University investment activity development.

The HEI investment resources structure optimizing mechanism in market economy is based on methods of economic analysis, statistical models and decision making. Implementation of this mechanism allows the University management to make managerial decisions concerning the choice of funding sources to introduce social and economic development programs of a University by implementing investment projects.

The mechanisms 1-3 are the basis of management concept of the HEI investment potential at the strategic, tactical and operational levels. They provide prompt and relevant information on the effectiveness of existing investment processes and recommendations for changes in investment infrastructure which allow University managers to make effective decisions to implement investment projects.

Within the proposed concept the importance of modern information technologies for improving the effectiveness of the investment management processes in universities has been proved. The described concept component is presented with automated information system of business process management (Fig.1) and information service parameters of the investment potential of universities.

**Conclusions of the research and recommendations for further research in this area.** The suggested concept of the university investment potential managing allows achieving the following results: improving the effectiveness of investment processes and projects; (selection of investment projects, establishing funding sources, evaluation of investment projects results and their impact on the University investment potential; improving the efficiency of management decisions on operation of the university investment infrastructure in general.

Information technologies increase the efficiency of planning and evaluation of alternative management decisions. The decision-making support tools which can improve the speed, accuracy and completeness of logistics solutions are used for this purpose as well as the increase of the University efficiency level. Improvement of investment communications between the university centers of investment infrastructure makes it possible to develop timely and effective management decisions. The developed concept of the HEI investment potential management provides the opportunity to effectively use the system approach for investment infrastructure transformation that results not only in the increase of HEI operational quality, but helps to improve their system and organization as a whole.

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JEL Classification: O410

УДК 339.9

**INTEGRATED BUSINESS STRUCTURES'  
OPTIMIZATION PRINCIPLES****Z. IVANOVA<sup>1</sup>**<sup>1</sup>National University business "Kyiv-Mohyla Academy"**Keywords:**controlling, management  
functions and tasks, the  
development of enterprises.**ABSTRACT**In the article the essence and place in the system of controlling  
the development of tourism enterprises and proved its place  
and role in the travel business.

**Formulation of the problem.** Tendency of modern economic development, as well as necessity in constant company's upgrades with respect to changing environment and the need of the company to have a competitive advantage on both national and international markets, requires improvement in company's structure formation principles. An organization of modern integrated business structures (IBS) is designed to provide adequate control, support creativity and company's optimality given the accelerating circulation of information flow.

Analysis of recent research study of problems of conditions and ways of controlling devoted to the works of foreign and domestic scientists, including J. Weber, A. Dayl, H. Kupper, E. Mayera, R. Manna, T. Reyhmana, D.Hana, P.Horvata A. Schmidt, D. Schneider, H.-Y. Folmuta, N. Danylochkinoi, V. Ivashkevicha A. Karmynskoho, S. Falko, M. Pushkarya, S. Petrenko.

**Unsolved parts of the problem.** At present stage in the leading economies of the world and in the world's economy in general integrated business structures play the main role (not a single company as a part of an integrated business structure). "The era of integrated structures" is marked by integrative tendencies of the global and national economies, globalization and information improvement in society based on the formation of the knowledge economy. Tight integration methods (consolidation and acquisition) along with soft forms of integration based on the principles of partnership require the establishment of an appropriate mechanism to regulate their activity.

**Analysis of recent studies.** The organizational structure of a business coalition (BC) is a form of distribution and business cooperation, in which activities are aimed at solving problems and achieving goals.

The organizational structure of integrated business structures varies and depends on several factors:

- the territorial proximity of companies that make up its membership;
- the degree of productive communication between them;
- common product range and others.

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One should distinguish general organizational structure of integrated business structure with financial, scientific and research institutions from industrial organization structure that consists of multiple small companies which work together as a single unit with respect to a specific production scheme.

**The main results of research.** One should understand organization of an integrated business structure as a set of firmly interrelated elements that support the functioning and development of the business unit as a whole. Both employees and company's departments, which consist of a certain number of employees, can act as a separate element of organizational structure. The communication between the elements of an organizational structure can be supported by horizontal and vertical relations. The first are of the same level and maintain coordination processes, while the second maintain the function of commands. Due to the fact that integrated business structure is usually a complicated hierarchical system, there is a necessity in construction of another type of connections especially if there are some other levels of government within the business unit.

With this type of bonds, a three-tier structure is formed: top management (usually a direction board of an integrated business structure) and lower level (employees directly managing the work of the others). The middle layer is also formed (usually top managers of a separate company within a business unit) and may also have several levels.

Different linear and functional relationships can be noticed in the structure of integrated business unit. The first reflects the ratio of the adoption and implementation of management decisions, the movement of information between the so-called line managers who are fully responsible for the activities of integrated business structure as a whole or its individual members. Functional relationships connect with other functions of management. Accordingly, using a notion of competence of linear staff, headquarters staff and functional. Powers line managers are entitled to make decisions in all questions and issues of their organizations and departments, as well as give orders, binding other members of integrated business structure (units). Authority staff personnel has a limited right to plan, recommend, advise or assist, but not to give orders to other members of the integrated business structure [1; 2].

For the application of optimization theory to solve specific problems, including optimization of the organizational structure of integrated business structure, one must perform a sequence of actions, called the statement of the optimization problem. It comprises the steps of:

- setting boundaries to optimize the system;
- the choice of a quantitative criterion, which allows to identify the best option (characteristic criterion);
- the definition of inner variables, which are expressed through

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characteristic criterion;

- building a model that describes the relationship of inner variables.

In modern management theory there are the following principles of organizational structure of large structural associations optimization [3, 4]: the subordination of the goals, objectives and basic requirements of the owner (parent company), the common goal, the optimal division of labor between managers and specialists within individual business units and between companies belonging to the integrated business structure, the presence of authority and responsibility of the individual companies for a particular area of operation due to vertical and horizontal types of relationships, matching functions and duties, the authority and responsibility, the adequacy of the socio-cultural environment that characterizes the degree of perception of organizational innovation, technological and other kinds of integrated business structure, the presence of control points for input and source of financial flows, characterized by the degree of fragmentation of the business definition of types of financial relationships between the business units.

In our case the system is an integrated business structure. Limitations of the system set limits, separating it from the outside world. It is assumed that the relationship with the outside world is fixed. Initial choice of the system limitations may be too strict. To get an adequate solution one should include into the system additional subsystems, but this leads to an increase in the dimension of the problem. One should represent system in the form of isolated subsystems, any of which can be considered independently.

Criteria can be economic or organizational (minimum value, maximum sales volume, maximum profit) depending on the particular task. Regardless of which criterion adopted by the characteristic, it must take the maximum (or minimum) value for the best option. If there is more than one criteria, then the problem becomes multi objective. There are many methods of solving multi criteria problems, but can this may lead to multi objective tasks. One of the criteria should be chosen as primary and others should be marked as secondary. The primary criterion is used as the characteristic, and the secondary form constraints optimization problem.

Selection of independent variables is based on the following recommendations: to divide the variables that fluctuate over a wide range and variables that are fixed or vary slightly. The first - independent, second - parameters of problem optimization. Parameters optimization problem is divided into fixed and those that experience fluctuations influenced by managerial actions. You must select only those variables that have the greatest impact on the characteristic criterion.

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Model system describes the relationship between variables and reflects the impact of these variables on the characteristic criterion. The model includes the basic equations of material and economic balances; equations describing managerial processes in the system; inequalities that define the region of permissible values of variables. Thus, the problem in a form suitable for decision optimization method combines the characteristic criterion, the number of independent variables and a model that reflects the relationship of these variables.

Efficiency of formation of the organizational structure of integrated business structure, which ultimately turns into a successful (profitable) operation of all components of the system can be achieved, provided that the following requirements are observed in its formation:

- clearly articulating goals of integrated business structure;
- maximum simplicity of IBS structure. The simpler and clearer integrated business structure is built, the easier it is to manage the union;
- clear communication and appropriate feedback;
- establishment of unity of command in decision making as a prerequisite for unity of action, coordination, strength, combining efforts;
- limited number of employees, defined the norms of governance (control range, which depends on the type of each member of the IBS, complexity);
- limited number of levels of management: the more levels the IBS has, the longer is information upward and downward disposal, the more possibilities of distortion are observed in the transmission;
- a clear distinction and coordination functions of line management and functional services;
- precise coordination of individual members of the association by senior management of integrated business structure.

Among the most common mistakes in shaping organizational structures of IBS, one can define the following [6]:

- The lack of clear management structure of IBS, formalized hierarchy;
- Plenty of horizontal connections. Usually this is a result of direction board desire to control as many of the processes going on inside the IBS as they can;
- Too deep vertical connections (many levels of subordination without installing horizontal communication links between the individual companies that make up the IBS). The consequence is unreasonable bureaucracy of IBS when all decisions are made at the top level;
- Lack of clear job commitment, formalization of functional and information links in the middle of the integrated structure [6, 7].

Support of non-optimized rotating structures within an integrated business structure results in large financial loss, duplication of functions, irresponsibility of company's employees, decreased initiative and other negative effects [5, 6].

Important role in the development of the organizational structure of IBS is played by its life cycle and size (table 1).

Table 1

**Determining the complexity of IBS organizational structure depending on its size and stage of the life cycle**

| Company type | Life Cycle Stages          |                             |                             |
|--------------|----------------------------|-----------------------------|-----------------------------|
|              | Origin                     | Functioning                 | Liquidation                 |
| Small        | Low level of complexity    | Medium level of complexity  | Medium level of complexity  |
| Medium       | Low level of complexity    | Medium level of complexity  | Medium level of complexity  |
| Large        | Medium level of complexity | Maximum level of complexity | Maximum level of complexity |

Data in Table 1 indicates the trend of IBS to become more complicated in organizational structure associated with the increase in its size and move to the next stage of the life cycle. Table 1 also shows a tendency to simplicity of the organizational structure of small businesses and immutability organizational structure of medium and large companies in liquidation. This means complications and inability of systematic monitoring of individual business units with increasing their size and inability to make timely decisions on business reorganization.

One indicator of optimal organizational structure is the duration of documentation flow in the system. Factors that influence the duration of this process are the number of management levels, and the average number of managerial tasks to be solved at the same level, the complexity of administrative tasks, the level of automation of production (table 2).

Table 2

**Scale of determination of the level of management automation in organizational structure**

| The level of IBS automation | All levels of management and all work places are automated | All level of management and most of work places are automated | Most of management levels and all work places are automated | Half of management and half of work places are automated |
|-----------------------------|------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------|
| Score                       | 4                                                          | 2                                                             | 1                                                           | 0                                                        |

*Developed by author.*

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It should be noted that only a comprehensive automation control systems, especially those of large enterprise groups as integrated business structure, is effective. Current economic trends that lead to the emergence of new organizational forms of management require radically new control technologies. In this regard, based on theoretical generalization scientific sources the author formulated the principles of optimization of organizational structure of IBS. Author defines the rate of synergetic effect from the interaction of individual business objects to be the optimal criterion.

Distribution and origin of synergetic effect can be represented according to the different elements and levels: from the interaction of institutional rules and regulations, the coordination interaction parameters, from the association potentials integrated entities as a result of resource synergy. The action of each of these types of synergies can have either one-time effect or spread out over a long period of time. Moreover, this synergy can also give positive, slightly negative or negative effects. This scheme takes into account the architectural approach to the formation of IBS and is based on the dual display of interaction between two members of the integrated structure (as may be extended during the development of customer relationships). That combination of knowledge about available resources (competence) of individual members within an integrated structure provides an opportunity to optimize their interaction on the criteria of maximizing the potential synergies and coordinated use of resources. Architectural division of members in integrated structure help to optimize the balance between aspirations and integrated part and to choose the options of consolidated distribution of resources. As a tool in implementation of architectural approach for optimizing organizational structure one can apply the models of Ya. Honcharuk and balanced scorecard (BSC) [1]. This key performance indicators correlate with parameters of transformational changes that occur during development, as well as with integration constraints and architectural level expectations that arise from the presence of actors in IBS and regulatory functions they produce.

According to O. Korol'chuk, with relatively high ability of small groups to accumulate collective goods in the absence of compulsion, the solution of optimization problem of organizational structure can be targeted either on the size of IBS after bifurcation transition, or on the insurance of compliance with the ruling of balance [2]. P. A. Layko, I. I. Dolzhenko believe that only with proper formal institutional structure of integrated structure one may solve the problem of increasing the usefulness of integrative collaboration [3].

However, the creation of an integrated space able to lead to an increase in inertia with respect to changes in the environment. Accordingly, technological breakthroughs can expand or destroy existing area of competence [4].

The interaction of the aforementioned trends can lead to so-called strategic tipping point (a manifestation of traps active inertia), features which were examined in detail by P. Oburay, M. Beyker [4]. In this case, to overcome the negative effects one should accept the offer of M. Porter, to consider the integrated network as a basis for dynamic resource allocation, in which resources or demand for them unpredictable ways change in the decision making process [5]. Thus the capacity of resources to individual members of the IBS updated concept of dynamic capabilities of individual members of structure. This can be seen as the ability to update the resource capacity to ensure that changes in environmental conditions: reconfiguration of existing skills and functional abilities of members of the integrated structure. Accordingly, the criterion becomes the optimization of resources and opportunities (potential) on the set of markets and products that can cover IBS. At the same resources and strategies of different actors involved in the interaction with the positive impact (the principle of guaranteed result) for each participant IBS [3].

Optimizing the integration of structure can lead to withdrawal of some members of IBS resources and resource allocation to other distribution system IBS. Criteria such as redistribution should be minimizing mismatch between desired and obtained configuration of organizational structure by changing the shape of IBS and knowledge about the union of IBS members.

According to some scholars (Y. P. Surmina, V. N. Volkov, S. I. Sokolenko) evaluation of the effectiveness of transition from one type of organizational structure to the more efficient is possible through reduced transaction costs (RTC), more competitive advantages of complementary assets (Ca) or display synergy (DS) [6]. Each structural unit of IBS strives to maximize its own profits ( $P(A_i) \rightarrow \max$ ) increasing the level of consolidated profit ( $CP \rightarrow \max$ ). Thus, we can evaluate the effectiveness or relevance to predict the transformation (optimization) organizational structure, including a system of constraints.

In view of the foregoing, the statement of the problem of optimization of the organizational structure of the integrated merger as follows:

$$CP(A_i) \rightarrow \max; CP \rightarrow \max \quad (1)$$

The combination of these types of distribution will expand the resource constraints integrated business structure governing the distribution of impacts in the coordinate system "architectural projection-level of detail." As another criterion optimization of organizational structure, some scientists propose to consider quality of members of the association from the point of view of the IBS architecture requirements and needs of the environment management [1].

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Putting these parameters as constraints optimization problem allows for a number of changes in the composition of integrated wholeness, namely:

- View the basic membership of the association as the implementation of the integration development bifurcation point with the appropriate institutional review rules of relations within the integration space;
- Change complementary membership Association as a reflection of evolutionary dynamics on the deterministic phase can be seen as the accumulation potential for transformation and diffusion of knowledge by reviewing the parameters of the integrated network entities
- Diffusion between the core and complementary membership IBS that diversifies the configuration and parameters of the integration process.

Modeling these viewing options organizational structure allows IBS development potential correlate of structuring the relationship between integrated members of the association on the grounds modeling capabilities of IBS to reconfiguration and treat it as a narrow zone of compromise between autonomy separate business units and the broad guidelines of the integrated space. But some scientists (L. V. Shtern, A. Y. El'-Ansary, E. T. Kaflan) believe that the main criterion that should be considered when optimizing organizational structure is the quality control of integration process [7].

Thus, according to most scientists, the optimization of the organizational structure of IBS should be viewed as the use of principles, techniques and rules for reviewing and ensuring that business models, organizational structures, logistics processes and systems of interconnected members of the structure. Optimization is to enable an option upgrade competencies integrated integrity according to the needs of the environment and its realization - to optimize the parameters of the architecture of an integrated space through reconfiguration of IBS participants. The criterion to initiate reconfiguration procedure (according to the formulation of optimization problem is a compliance accumulated resources and competencies desired outcome (overall and individual income), subject to the ruling of balance.

V. M. Shumeiko has determined the mechanism of optimizing organizational structure of IBS provides a basis to spiral approach to mapping the dynamics of the integration process, highlighting two stages: bifurcation and necessitation [8]. According to this scholar, the optimization process can be separated for different levels: for individual member IBS it will lie in the choice of contractors (or strategic areas of business), which allows to maximize the return on your interactions with them (the presence of them) for the rest of the IBS - in determining the types and how they interact. At the level of the integrated network, this process will be to optimize the membership eligibility criteria for IBS consolidated goals and growth potential of IBS as a whole (its maximization). Optimization of organizational structure limited to the creation

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of the correspondence between the target instructions participants IBS and system integration constraints. Optimization of the structure at the parent company can be reduced to the design of new attractors based on the possible implications of emergent intelligence, by involving members of IBS with strong positions of power.

O. Ye. Rodionova, O. H. Derov"ianko determine that the theoretical basis reconfigured approach to optimize the organizational structure is not simply the imposition of restrictions on the selection of those degrees of freedom which bring integrity integrated to obtain useful results, and determine the result on a chain vertical integration and disintegration of a new IBS with more effective interaction of components [9]. However P. A. Layko, I. I. Dolzhenko believes should also consider the relationship between the frequency and level of reconfigured dynamic variability (mobilization) input to IBS elements [3]. This situation may be disseminated only to a basic or complementary membership of the IBS and their elements. That base composition of members of IBS will create set nodes that define a specific formulation and optimization of the organizational structure of IBS (especially when heterogeneous actors).

Based on these provisions, organizational structure optimization IBS becomes a process of harmonization of business models for its individual members with the business model of integrated education, depending on the produced new routines and changes in accounting features powerful balance. In this case, the view of some scholars regards additional consideration in the limitations of those business units whose interests balances overbearing influence. However, the system of constraints to consider asymmetric distribution needed to create value-added resources between domestic economic agents. This asymmetry creates mobility structure, and hence the possibility of nodal actors sanctions to other participants IBS [4].

Limit degrees of freedom IBS members by imposing integration constraints, coupled with the introduction of dynamic stereotypes loop behavior can implement dynamic standards regulating the functioning of integrated actors and distribute them within the architectural integrity of the integrated representation [5]. This distribution reduces the optimization of the organizational structure of IBS to develop interaction protocols of individual system components.

H. O. Pasichnyk provides the basis for optimization of organizational structure put diffusion of knowledge and reconfiguration of IBS using system models multi agent interaction [10]. However, V. Shumeiko believes that this approach is reduced to develop principles and rules of matching - establishing mutually beneficial fit between their own interests and the parameters of the organizational structure of IBS [7], which allows members to transform the integrated structure of dynamic nature.

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Thus, given the conceptual provisions reveal the content of the theoretical and methodological basis of optimization of the organizational structure of IBS providing representation of the structure of activities, processes, information, members of IBS, behavior, constraints and business operations. Optimization of the organizational structure of IBS allows for co-organization (a term introduced V. M. Shumeiko) and many independent autonomous systems work by providing regular play shapes and properties of the whole and optimize the interaction processes. Targeting co-organization and combining knowledge integration within education can solve the problem of balancing centralization and decentralization of management integration process.

Each principles and optimization problems must meet the logistics approach to meet the needs of each member of the IBS and thus ensure in each subsequent period of growth adaptation and transformation potential composition of individual business units involved in the project change. One should emphasize the need for resource optimization study of the organizational structure of IBS as a whole and each of its allocated organizational components. Focusing on multi agent adopted approach to building functioning mechanism of IBS, it is appropriate to establish the composition of participants IBS resource fields that will determine the need for transformation and the possibilities for their implementation. This resource formed IBS compliance to the program changes the organizational structure. Thus all the requirements are defined in the formulation to optimize the organizational structure of IBS (including subordination and authoritative presence of asymmetry and opportunism in the relationship members IBS) for fully recycling program resourcing creating an integrated business structure.

**Conclusion.** The conceptual position described above reveal the content of the theoretical and methodological basis of optimization of the organizational structure of IBS, which give general information about, the structure, activities, processes, information, members of IBS, behavior, constraints and business its operations. Optimization of the organizational structure of IBS allows to organize many independent and autonomous systems through the provision of regular play shapes and properties and optimizing the entire interaction process. Targeting co-organization and combining knowledge integration within education can solve the problem of balancing centralization and decentralization of management integration process. The proceedings of this approach require the development of criteria options for structuring and definition of the work within the optimization of the organizational structure of IBS.

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JEL Classification: O470

УДК 336.77: (336.717-061)

**STEP-BY-STEP METHOD OF CREDIT SCORING  
MODEL DEVELOPMENT FOR RISK DYNAMICS  
ESTIMATION AND MANAGEMENT****PYSANETS K.<sup>1</sup>**<sup>1</sup>Kyiv National University of Technologies and Design**Keywords:**

Credit scoring, scoring model, credit risk, risk dynamics, credit risk management.

**ABSTRACT**

**Purpose.** Create scoring parametric model based on the concept of survival for application stage of credit cycle in the Ukrainian consumer loans market which allows to take into account factors' influence change on default risk in dynamics.

**Methodology.** Scientific and special methods were applied during the research: the historical, system and structure methods, methods of logical and economic analysis, economic-mathematical modeling methods as well as number of probability theory and mathematical statistics methods.

**Results.** Scoring model for assessment of credit risk dynamics was built based on proposed step-by-step method. Significant factors which determine default risk during whole loan term were defined. Credit scoring modeling methods were improved by consideration of factors influence change on credit risk measure in dynamics.

**Scientific novelty.** Step-by-step method is proposed for credit scoring model development which allows to assess credit risk dynamics considering factors influence change on credit risk over time.

**Introduction.** Credit scoring is an effective tool for credit risk assessment in modern risk management. The purpose of implementation process of credit scoring is to improve the mechanism of credit risk management through effective borrowers' differentiation. Modern methodology of scoring is well developed both theoretically and practically. Conceptual logic of credit scoring development and its use are well presented in fundamental works of Anderson R. [1] and Siddiqi N. [2].

Financial institutions build credit scoring to assess borrowers' creditworthiness in various stages of the credit cycle, based on different information and methods of scoring function construction. Thus, according to the stages of the credit cycle, we can distinguish application, collection and behavioral scoring. Based on the information used in the process of scoring creation, two types of scoring can be defined: internal credit scoring and credit bureau scoring. The principal difference between the two approaches is that the lender uses only own information that is available for him, but the credit bureau has complete information about the borrower's credit history, gathered from number of banks and other lenders from the whole market.

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Methods of credit scoring models development can be classified into parametric and nonparametric. Parametric methods include generic Bayesian parametric method, linear probabilistic approach, logistic regression etc. Nonparametric methods include expert method, a generic Bayesian nonparametric method, neural networks, nearest neighbors' approach, genetic algorithms etc. Basic statistical methods for credit scoring development are well represented in the literature, particularly by Anderson R. [1]. Expert scoring development methods in Ukraine were developed by Volyk N. [3] and Kaminsky A. [4]. The application of neural network technology, in particular for collection scoring were investigated by Kaminsky A. [5]. Malyugin V. in his article [6] compares different algorithms of application scoring: linear discriminant analysis algorithm, the logit models algorithm of binary choice, decision tree algorithm. In the research [7] Delamaire L. et al. describe genetic algorithms, decision tree method, cluster analysis approach, neural networks method for scoring that identifies fraud. Number of works was analyzed in the monograph of Thomas L. [8] and in the research of Man R. [9].

All the presented works consider the dependent variable in models as binary type that takes the value «Good» if the result is positive event and «Bad» otherwise. For example, for application scoring of biennium loans variable is set to «Bad» if borrower's delinquency has been lasted for 90 days or more. The borrower is considered «Good» if the delay in payments was absent. Building a collection scoring, variable «Good» characterizes the borrower who pays the debt to the lender, and the variable «Bad» describes borrowers who do not pay. The principal similarity among all these definitions is that borrowers with «Bad» and «Good» statuses are considered "in average" for the whole loan term, i.e. without reference to the time when they became «Bad» or «Good». Even in 1992 Narain B. [10] had proposed to include time parameter to credit scoring model that allows to evaluate not only the fact of the event (loan default), but the time of its occurrence, thereby opening new opportunities for credit risk management.

Today, there is a large number of scientific works, devoted to research of credit scoring with a time dependent parameters and the theoretical basis of it discloses the survival concept. This concept was originated in biology, but today its main ideas are used in many fields of knowledge, including economy. The essence of this concept is introduced for consideration and study of survival function  $S(t) = P(T > t)$ , where  $T$  - time of the organism death (in biology) or time to debt occurrence of the borrower (economy). This approach is actively developing in credit risk management. Credit scoring models are based on the concept of survival are presented in [10] - [15]. For example, Baesens B. et al. [11] describe neural network technology use for assessment of the borrower default at the date of the loan application.

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Bellotti T. and Crook J. proposed credit scoring model for estimation of dynamic of borrowers' probability of default [13] on the application stage, estimating parameters by maximum likelihood method.

The main idea of the use of an approach based on the concept of survival for credit scoring is that it allows building more adequate models of lending activities. Those borrowers who took credit and did not return it from the first payment bring much greater losses than those borrowers who stopped paying on the loan after a series of payments. In the second case, borrowers can even return the entire principal of the loan before the time of default. Thus, differentiation of borrowers' time to default is the actual task which can be solved by building scoring models for credit activities.

It is worth to mention that the majority of works are devoted to modeling of credit risk dynamics are based on the concept of survival and use addition of time parameter to the "classical" model scoring.

**Setting objectives.** In this paper we present a model of credit scoring in which all scoring weights depend on the time parameter, and suggest implementation of such a model to differentiate debtors for application stage of the credit cycle. Thus, the objective of this work is to create scoring parametric model based on the concept of survival and its application to develop improved application scoring model for the Ukrainian market. The primary interests are the model coefficients dependence on time parameter and characteristics that lead to differentiation of debtors.

**Research results.** The idea of building models of scoring systems to assess the dynamics of credit risk is innovative for the Ukrainian consumer lending market despite the fact that it was described in scientific works in the 90's of the XX century [11]. This is due to the fact that the massive lending in Ukraine began in the middle of the first decade of the XXI century, and domestic financial institutions until relevant period did not have a sufficient amount of information and material resources for such researches. The stimulus to find ways of the effectiveness improvement of credit risk management, including the use of models of risk dynamics assessment is caused by two main factors: the growing competition and the financial crisis of 2008-2009.

Let's consider these factors in more detail. The first factor is the competition in the segment of consumer lending. It requires financial institutions to conduct continuous improvement of credit risk management mechanisms that today mainly based on models of "risk-profitability". The model with lower losses on risk assessment error offers better loan conditions, such as lower interest rate. Another example is inclusion of default time parameter to the models to evaluate the dynamics of borrowers' risk and profitability. For example, consider borrowers, which despite of the fact of default time, cover interest and major part of loan principal.

Flexible credit risk management, which takes into account the time by default, allow for financial institution to keep client by offering a shorter loan term, or fewer loan amount. Another example is to evaluate borrowers who repay early.

The second factor was the financial crisis of 2008-2009, which allowed to show advantages of credit scoring systems for credit risk dynamics estimation over generic credit risk assessment which consider risk state for fixed time horizon. Models with time parameters allow to include macroeconomic parameters and provide stress test with the expected time of the crisis occurrence, as shown in the publications of Bellotti T. and Crook J. [13].

Consequently, the inclusion of time parameter into scoring systems models improves the credit risk management quality and it is a promising area of research for the Ukrainian market of consumer lending.

Explained by the first factor of need in scoring systems models improvement for borrowers' risk assessment we propose to build a modified model of Cox D. [14], the essence of which is to define the most important risk factors and assess their impact on the dependent variable taking into account differences in the degree of their influence over time, from loan issue to its repayment.

Let's consider Cox model with logic basic function in the next form:

$$h(x_i, t) = \ln\left(\frac{P(i, t)}{1 - P(i, t)}\right) = \beta_0(t) + \beta_1 x_{i1} + \beta_2 x_{i2} + \dots + \beta_n x_{in}, \quad (1)$$

$h(x_i, t)$  – borrower's  $i$  risk function at time  $t$ , presented as logarithm of event (default) probability to event absence (non-default) probability ratio;  $P(i, t)$  – probability that borrower  $i$  will take default status at time moment  $t$ ;  $x_{ij}$  – characteristic  $j$  of borrower  $i$ , where  $i = \overline{1, k}$ ,  $j = \overline{1, n}$ ;  $\beta_0(t)$  – basic risk function (without influence of factors  $x_{ij}$ ), which depends on time parameter  $t$ ;  $\beta_j$  – model coefficient, that describes significance of the characteristic  $j$ .

The model (1) comprises risk of borrowers as proportional in time, expressed by coefficient  $\beta_0(t)$ . In addition, set of characteristics  $x_{ij}$  is defined by their influence significance of default rate for the fixed period of time, which is basically limited by loan term (for example, 2 years). Because of this fact, some variables, which significantly influence the level of credit risk during certain time periods of loan term, can be missed. Another drawback of the model is equal level of borrowers' characteristic influence on default level over time (coefficients  $\beta_j$  do not depend on time parameter in model (1)).

Let's consider a model to assess the level of default risk of the borrower that takes into account the dynamics of influence power of risk factors during time interval of evaluation:

$$h(x_i, t) = \ln \left( \frac{P(i, t)}{1 - P(i, t)} \right) = \beta_0(t) + \beta_1(t)x_{i1} + \beta_2(t)x_{i2} + \dots + \beta_n(t)x_{in}. \quad (2)$$

To estimate the parameters of the model we propose to use "step-by-step" method. In the first step we determine the time periods and for each factor calculate dynamics of "information value" indicator [2, pp. 81-82]. In the second step based on correlation and regression analysis, «p-value» indicator and the business logic, in each period we determine significant independent variables and estimate logistic regression model parameters. In case of the quarterly data and the time horizon of two years, it is required to build 8 models (we will name them "models from the second step" further). In the case of monthly data, we should build 21 models (three months need for default happening). In the third step we build models to assess the significance of each factor dependence  $\beta_j$  on the time parameter  $t$  (we will call them "models from the third step" further). These can be, for example, models of linear or nonlinear regression. In the fourth step we combine obtained models from the second and third step into a basic model of the form (2).

We built the model of credit risk assessment of borrowers and conducted estimation of its parameters for application stage of the credit cycle using data from more than 16,000 borrowers in Ukraine for consumer loans, issued in 2012 with full credit history for two-year period.

The result of the first step - an assessment of the information value – gave 46 (among 62 initially selected) factors with strong, average or weak predictive power for at least one period of selected time horizon of two years. In the second step correlation matrix was built and dependent variables were discarded according to the principle: among two correlated factors we excluded the one that has less information value. Then, for each month the model of logistic regression was built (21 models), which excluded factors with «p-value» less than 0.05 [16, p. 266-237]. Thirteen independent factors included in 21 models and their characteristics are given in Table 1.

Table 1

**Factors of step-by-step model for borrowers' credit risk assessment**

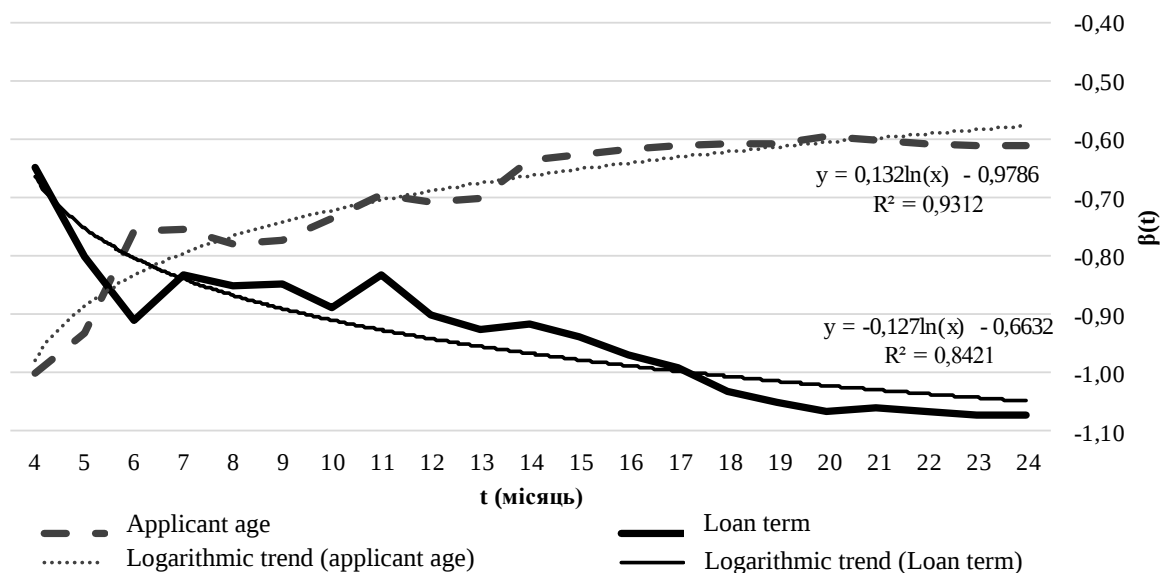
| #  | Factor name                                        | Information value, t=4 | Information value, t=24 | Max correlation coefficient with other factors, modulus | p-value, t=4 | p-value, t=24 |
|----|----------------------------------------------------|------------------------|-------------------------|---------------------------------------------------------|--------------|---------------|
| 1  | Applicant age                                      | 0,55                   | 0,14                    | 0,433                                                   | 0            | 0             |
| 2  | Job experience at the last place of work           | 0,44                   | 0,10                    | 0,433                                                   | 0            | 0             |
| 3  | Loan term                                          | 0,11                   | 0,10                    | 0,138                                                   | 0            | 0             |
| 4  | Number of requests to Credit bureau for last month | 0,22                   | 0,09                    | 0,165                                                   | 0            | 0             |
| 5  | Marital status                                     | 0,37                   | 0,07                    | 0,192                                                   | 0            | 0             |
| 6  | Registration region                                | 0,16                   | 0,06                    | 0,159                                                   | 0            | 0             |
| 7  | Broker presence in loan obtaining process          | 0,01                   | 0,05                    | 0,165                                                   | 0            | 0,001         |
| 8  | Residence term at the last place                   | 0,08                   | 0,04                    | 0,297                                                   | 0,002        | 0,001         |
| 9  | Third party person alliance                        | 0,05                   | 0,04                    | 0,087                                                   | 0            | 0             |
| 10 | Loan purpose                                       | 0,13                   | 0,03                    | 0,163                                                   | 0            | 0             |
| 11 | Number of active loans                             | 0,01                   | 0,03                    | 0,104                                                   | 0,031        | 0             |
| 12 | Gender                                             | 0,04                   | 0,02                    | 0,212                                                   | 0            | 0             |
| 13 | Availability of telephone number                   | 0,10                   | 0,02                    | 0,156                                                   | 0            | 0             |

Source: Calculated by the author

Therefore, estimating models parameters from the second step, we have received 21 values for each coefficient  $\beta_0, \beta_1, \beta_2, \dots, \beta_{13}$  for model (2). These coefficients show the dynamic of impact strength of relevant characteristics on the level of borrowers' default risk. Two types of factors behavior over time can be defined, with increasing or downward dynamics. Two parameters demonstrate this below in Fig. 1.

For all estimates of coefficients with increasing (decreasing) dynamics we detect significant growth (fall) from the fourth to the sixth month from the date of loan issue, followed by a period of moderate growth (decline). Since 18th month, value of coefficient estimate stabilizes and tends to constant. The ration of scattering coefficient of factor to its mean value can range from 20% to 90% (Fig. 1).

To simulate the curves of received form, we propose to use the logistic trend that will be applied in the next step.



**Figure 1. Types of coefficients dynamics from models of the second step**

*Source: Calculated by the author*

In the third step we assessed 14 models to get a set of functions, each of which describes the ratio of the respective factor depending on the time parameter. Thirteen of these models are designed to factors listed in the Table 1, and one more - for constant. To estimate coefficients from the third step we used least squares method. Depending equation for the coefficient  $j$  is:

$$\beta_j(t) = \alpha_{0j} + \ln t \cdot \alpha_{1j}, \quad (3)$$

where  $\beta_j(t)$  – the coefficient of the model from the second step for characteristic  $j = \overline{1, n}$ ;  $t$  – time parameter;  $\alpha_{0j}$  and  $\alpha_{1j}$  – coefficient of the model from the third step.

Unlike linear trend and exponential regression, this assessment approach provides a smaller error for the early and late periods. Coefficients of all characteristics near  $t$ , except loan term and number of active loans have growing trend. This means that their impact on the default risk decreases with time (see table 2).

Implementing the fourth step, models from the second and the third steps are combined into basic model of the next form:

$$h^*(x_i, t) = (0,57 + 0,66 \cdot \ln t) + (-1,2 + 0,2 \cdot \ln t) \cdot x_{i1} + (-0,74 + 0,1 \cdot \ln t) \cdot x_{i2} + (-0,43 - 0,2 \cdot \ln t) \cdot x_{i3} + \dots + (-0,48 + 0,06 \cdot \ln t) \cdot x_{i13}, \quad (4)$$

where  $h^*(x_i, t)$  – estimated risk function, that depends on time parameter  $t$  and on vector of parameters  $x_i$  for borrower  $i$ .

Table 2

**Factors and coefficients estimated in step-by-step model of  
borrowers' default risk dynamics estimation**

| $j$ | Factor $j$ name                                    | Estimate $\alpha_{0j}^*$ | Estimate $\alpha_{1j}^*$ |
|-----|----------------------------------------------------|--------------------------|--------------------------|
| 1   | Applicant age                                      | -1,20                    | 0,20                     |
| 2   | Job experience at the last place of work           | -0,74                    | 0,10                     |
| 3   | Loan term                                          | -0,43                    | -0,20                    |
| 4   | Number of requests to Credit bureau for last month | -1,76                    | 0,18                     |
| 5   | Marital status                                     | -0,71                    | 0,04                     |
| 6   | Registration region                                | -0,94                    | 0,09                     |
| 7   | Broker presence in loan obtaining process          | -0,29                    | 0,04                     |
| 8   | Residence term at the last place                   | -0,42                    | 0,05                     |
| 9   | Third party person alliance                        | -1,15                    | 0,15                     |
| 10  | Loan purpose                                       | -0,94                    | 0,08                     |
| 11  | Number of active loans                             | 0,05                     | -0,19                    |
| 12  | Gender                                             | -0,56                    | 0,08                     |
| 13  | Availability of telephone number                   | -0,48                    | 0,06                     |
| 14  | Constant                                           | 0,57                     | 0,66                     |

*Source: Calculated by the author*

**Conclusions.** We have built the model (4) for evaluating borrowers' credit risk dynamics and estimated its coefficients for consumer credit segment of the Ukrainian market which allows to manage credit risk more efficiently. The higher value of the risk function, the higher probability of borrowers' default. The main difference of proposed approach is improvement of risk parameters influence compared to the Cox model. Information value indicator allowed to define significant risk factors considering the dynamics of their impact on the risk of default, and step-by-step method - to estimate the influence of factors on the dependent variable in each time moment with monthly periodicity. There were determined 13 most significant variables (Table 2) which can be useful for risk managers to estimate default risk on application stage of credit cycle in the Ukrainian consumer segment of credit market.

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JEL Classification: O340

УДК 351.72: 355.02

**SCIENTIFIC AND METHODOLOGICAL  
APPROACHES AND INTEGRATED ASSESSMENT  
OF ECONOMIC SECURITY IN UKRAINE****A. MUZICHENKO<sup>1</sup>**<sup>1</sup>Pavlo Tychyna Uman State Pedagogical University**Keywords:**

economic security, threats, factor analysis, integrated assessment, security level, impact of factors, security measures.

**ABSTRACT**

This article offers the scientific and methodological approaches to integrated assessment of economic security on the basis of the indicators each of which reflects some aspects of the national security and establishment of the basic economic trends. The article is focused on the indicators of integrated assessment of the country's economic security that include the use of multiplicative form of integral index, standardization of the indicators, verification of the threshold values and weighting coefficients with the purpose of determining of the integral indices of economic security; the approbation by assessment of the economic security level in Ukraine has been performed.

**Statement of the problem.** The economic security of the country is an important component of the national security, but at the same time, it is a complex tenuously closed system that possesses its own structure, internal logic continuously changing under the influence of the internal and external factors, and this determines the relevancy and the need to improve the methodology of the integrated assessment of the country's economic security for the purpose of ensuring the appropriate identification of the disrupting factors and enabling the prompt response.

The analysis of the currently available formal approaches to integrated assessment of the country's economic security reveals a number of flaws that restrict the possibility of their usage and require an improvement of the methodological approaches. These flaws relate to both the composition of indicators, the difficulty in practical use due to their great variety, lack of statistical information, maladjustment to the current economic situation (change of the development strategy resulting from the military aggression in the east of the country, loss of markets and some industrial facilities, adaptation of a number of branches of industry to the war, demographic changes etc.) and integrated evaluation methodology yielding incorrect results of the integrated assessment.

The **purpose** of the article is to determine and monitor the threshold and optimal values of the indicators, identify the major threats, development of the program measures ensuring an acceptable level of economic security of the country in terms of its components.

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In order to enable the public authorities to make informed decisions, it is necessary to monitor the indicators (criteria) of economic security that primarily provide the actual monitoring, analysis and forecasting of the major groups of economic indicators.

**Review of the literature sources.** It is worth mentioning the following domestic and foreign authors whose works are devoted to these issues: V.M. Heyets, B.V. Gubsky, B.M. Danylyshyn, G.Y. Darnopykh, M. M. Yermoshenko, V. Cable, L. Kisterskiy, O.Y. Kononenko, E.D. Kormyshkyna, V.O. Kosevtsov, A.S. Lysetskiy, V.I. Muntiyan, E.A. Oleinikov, M.A. Pavlovskiy, G. Pasternak-Taranushenko, A.V. Stepanenko, A.I. Sukhorukov, A.M. Fedorysheva, L.G. Cherniuk, S. Shenfield.

Research of the literature sources suggest a contradiction about many theoretical and methodological aspects that require theoretical substantiation and development of a number of new categories, criteria and indicators that would make it possible to describe and analyze the basic trends of economic security and of the measures necessary to ensure it. It is the combination of the theoretical principles and concepts with practical activities that can generate a reliable mechanism ensuring the economic security.

Development of methodological guidance on the integrated assessment of the economic security is a scientific basis for setting specific goals of socio-economic policy in quantitative form; formation of the strategies (energetic, economic, social, environmental) for the future development; predicting the outcome of the intended measures.

The methods of assessing the national security enumerate the main indicators of its condition, their threshold values as well as determine the algorithm. It is based on a comprehensive analysis of indicators of economic security with the discovery of potential threats to economic security in Ukraine, and has to be used by the main executive authorities for the general integrated assessment of the economic security of Ukraine in the economy and specific branches of industry.

Research institutes or other institutions may determine the level of economic security within their authority in order to make managerial decisions on the analysis, avoidance and prevention of the existing and potential threats to the national interests in the relevant areas.

The defined indicators actually reflect the dynamic changes occurring in any process or characteristic, especially in case of monitoring the effectiveness of activities; the degree of sensitivity to changes; clear definition of positive or negative bias.

There are a number of criteria that can be used in the selection of the indicators for the integrated assessment of economic security. These criteria can

be separated in groups according to the 10 main components of economic security (Table. 1, 2).

Table 1

**The components of the economic security of the country**

| <b>Components</b>             | <b>Outcome</b>                                                                                                                                                                                                                      |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Economic security          | resistance to internal and external threats, competitive advantages in the world economy ensuring the ability of the national economy to continue growth and sustainable development                                                |
| 2. Production security        | effective usage, update and expansion of the existing production capacities in the country, facilitation of innovations in the production and fostering the competitive abilities of the national economy                           |
| 3. Demographic security       | development of the country with consideration of the collective generalized interests of the country, society and individuals according to the constitutional rights of the citizens of Ukraine                                     |
| 4. Energetic security         | effective usage of the country's energy resources, availability of the sufficient number of energy producers and suppliers in the energy market, availability, differentiation and environmental safety of the energy resources     |
| 5. External economic security | minimization of the losses of the country resulting from the negative external economic factors and ensuring favorable conditions for economic growth due to an active integration of the economy into the world labor distribution |

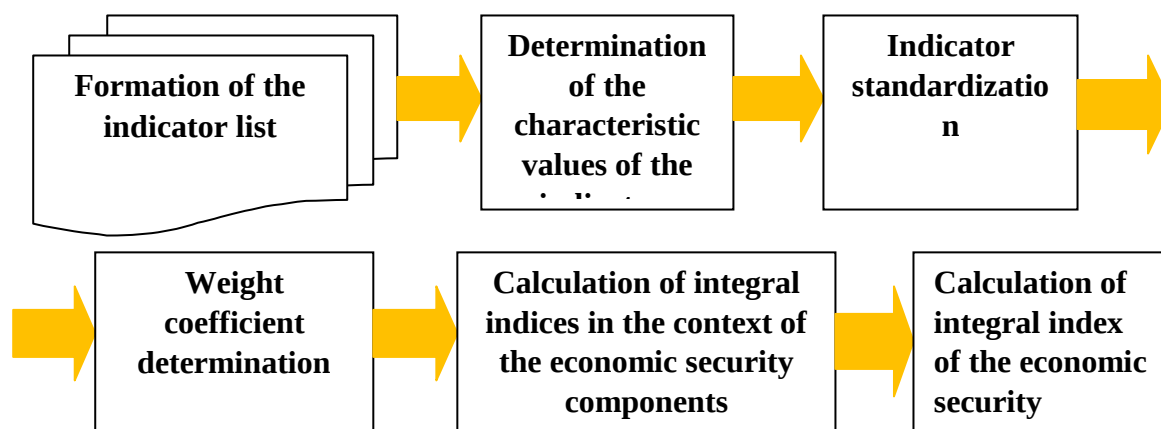
*Continuation of Table 1*

|                                         |                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6. Innovational and investment security | encouragement of the domestic and foreign investors to invest the funds into the expansion of production in the country, promotion of the high-tech production, integration of the research and production sector with the purpose of increased efficiency, broadening of the national economy specialization by developing the products with a high percentage of added value |
| 7. Macroeconomic security               | balancing of the macroeconomic proportions                                                                                                                                                                                                                                                                                                                                     |
| 8. Food security                        | satisfying the need of each member of society in the quality food, reasonably priced and balanced nutrition                                                                                                                                                                                                                                                                    |
| 9. Social security                      | securing the decent and quality living standards of the population irrespective of the age, sex, income, facilitation of development of the human capital assets as the most important component of the economic potential of the country                                                                                                                                      |
| 10. Financial security                  | creating the conditions for stable social and economic development of the country, maintenance the country's resistance to financial shocks and distress, facilitation of the conditions for sustained integrity and consistency of the country's financial system                                                                                                             |

Calculation of integral indices in the context of the given subindexes (components of economic security) is based on the assessment of the certain indicators obtained from the statistical data as well as the respondents data received from the survey.

It should be noted that the division of indicators into the 10 components is rather tentative. Being specific indicators, some indicators, however, may reflect different aspects of sustainability.

The procedure of integrated assessment of economic security is depicted on Fig. 1.



**Fig. 1** - Scheme of the procedure of economic security integrated assessment

Source: author development.

The list of indicators is completed according to the principle of representation, that is, selection of the most important parameters influencing the country's economic security, reliability (reflect the relevant condition of the security component) and information accessibility (official statistics and public expert assessments are used during the calculation).

The set of indicators generated by means of correlation coefficients should be checked for the degree of density of the statistical links between their numerical series to avoid an enhanced effect when calculating the integral index. And the most important indicators (without which any security assessment would be incomplete) in the case of discovery of a considerable pair correlation of numerical series receive less weight.

The characteristic values that determine the level of economic security have been developed for each indicator of the components of the economic security of Ukraine. The characteristic values of each indicator range from 0 to 1 (or from 0 to 100%) divided into five intervals:

$Y_0$  - minimal or absolutely unsafe level of economic security and the level of economic security equal to 0;

$Y_c$  - critical level of economic security and the level of economic security equal to 0.2, or 20% of the optimum value;

$Y_{\text{dang}}$  - dangerous level of economic security and the level of economic security equal to 0.4, or 40% of the optimum value;

$Y_{\text{un}}$  - unsatisfactory level of economic security and the level of economic security equal to 0.6, or 60% of optimal value;

$Y_{\text{sat}}$  - satisfactory level of economic security;

$Y_{opt}$  - optimal level of economic security and the level of economic security equal to the optimal value.

The indicators may vary by type (favorable, destructive or mixed), the informational bias and interpretations of the characteristic values are enabled by standardization.

Assigning the characteristic features to a certain value of the indicator of economic security component (see below) is enabled by means of the analog method (the indicator values in the countries recognized as leading in this area are deemed optimal, determination of average values, namely "satisfactory level" and "unsatisfactory level", is provided by grouping and summarizing the indicator values achieved in other countries); legal and regulatory criteria (critical or optimal level is determined in accordance with the threshold set forth in the national legislation or by the relevant international organizations) or expert assessment.

**Indicators of economic security** are the real statistical indicators of the economy development that offer a complete characteristic of the phenomena and trends in the sphere of economy. Particular attention should be paid to the following general indicators of economic security:

### 1. Production security

| Indicator name                                                                                                                                                  | Indicator parameters |            |          |           |           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------|----------|-----------|-----------|
|                                                                                                                                                                 | $Y_c$                | $Y_{dang}$ | $Y_{un}$ | $Y_{sat}$ | $Y_{opt}$ |
| Average correlation of the scope of gross value added of the industry of Ukraine and the gross value added of the industry of the certain European countries, % | 20                   | 30         | 40       | 60        | 80        |
| Degree of deterioration of the main industrial assets, %                                                                                                        | 50                   | 40         | 45       | 20        | 30        |
| Percentage of the high-tech production in the total amount of the produced industrial products, %                                                               | 1                    | 2          | 3        | 5         | 7         |
| Labor intensity of the industrial production, %                                                                                                                 | 4                    | 8          | 10       | 15        | 20        |
| Total construction work performed, %                                                                                                                            | 10                   | 20         | 40       | 60        | 90        |
| Harvesting capacity of the main grain and legume crops, hundred kilograms per hectare of the harvest area                                                       | 15                   | 20         | 25       | 35        | 45        |

### 2. Demographic security

| Indicator name                                                                                                                 | Indicator parameters |            |          |           |           |
|--------------------------------------------------------------------------------------------------------------------------------|----------------------|------------|----------|-----------|-----------|
|                                                                                                                                | $Y_c$                | $Y_{dang}$ | $Y_{un}$ | $Y_{sat}$ | $Y_{opt}$ |
| Estimated population, % up to 1990                                                                                             | 85                   | 90         | 95       | 97        | 100       |
| Expected duration of life since the birth, years                                                                               | 66                   | 68         | 70       | 75        | 78        |
| Coefficient of the natural population increase, per 1 thousand people of the existing population                               | -2                   | -1         | 0        | 1         | 1,5       |
| Percentage of the aged people in the total number of population (as of the end of the reporting period), % (aging coefficient) | 11                   | 13         | 15       | 17        | 18        |
| Potential support ratio, %                                                                                                     | 35                   | 36         | 38       | 40        | 45        |
| Total coefficient of migration increase, decrease (-) (per 10 thousand people)                                                 | -2,0                 | -1,0       | 0,0      | 1,0       | 2,0       |

**3. Energetic security**

| Indicator name                                                                         | Indicator parameters |            |          |           |           |
|----------------------------------------------------------------------------------------|----------------------|------------|----------|-----------|-----------|
|                                                                                        | $Y_c$                | $Y_{dang}$ | $Y_{un}$ | $Y_{sat}$ | $Y_{opt}$ |
| Percentage of the own sources in the total fuel and energy resources of the country, % | 40                   | 50         | 60       | 70        | 80        |
| Deterioration of the main production funds of the fuel and energy enterprises, %       | 5                    | 10         | 15       | 20        | 30        |
| Ratio of investments into the fuel and energy enterprises to gross domestic product, % | 0,5                  | 1,0        | 1,5      | 2,0       | 2,5       |
| Energy intensity of the gross domestic product, kg of reference fuel/hryvnias          | 0,7                  | 0,5        | 0,45     | 0,35      | 0,25      |
| Natural gas reserve, months                                                            | 2                    | 2,5        | 3        | 4         | 4,5       |
| Hard coal reserve, months                                                              | 2                    | 2,5        | 3        | 4         | 4,5       |
| Percentage of renewable sources in the total primary energy supplied, %                | 2                    | 3          | 3,5      | 4         | 6         |

**4. Foreign economic security**

| Indicator name                                                                                                            | Indicator parameters |            |          |           |           |
|---------------------------------------------------------------------------------------------------------------------------|----------------------|------------|----------|-----------|-----------|
|                                                                                                                           | $Y_c$                | $Y_{dang}$ | $Y_{un}$ | $Y_{sat}$ | $Y_{opt}$ |
| Export-import coverage ratio, times                                                                                       | 0,85                 | 0,9        | 0,95     | 0,97      | 1         |
| Share of the raw materials export and export of low degree process ing products in the total amount of export of goods, % | 0,1                  | 3          | 5        | 8         | 15        |
| Share of import in the home consumption of the country, %                                                                 | 5                    | 7          | 10       | 12,5      | 15        |
| Trade condition index (pricing index), %                                                                                  | 85                   | 90         | 95       | 105       | 110       |
| Load of the transit capacities of the oil transporting system, %                                                          | 50                   | 60         | 70       | 80        | 90        |
| Load of the transit capacities of the gas transporting system, %                                                          | 50                   | 60         | 70       | 80        | 90        |

**5. Investment and innovation security**

| Indicator name                                                                                | Indicator parameters |            |          |           |           |
|-----------------------------------------------------------------------------------------------|----------------------|------------|----------|-----------|-----------|
|                                                                                               | $Y_c$                | $Y_{dang}$ | $Y_{un}$ | $Y_{sat}$ | $Y_{opt}$ |
| Gross accumulation of the main capital, % gross domestic product                              | 18                   | 20         | 23       | 25        | 30        |
| Ratio of the cost of the newly implemented fixed capital and the capital investments, %       | 55                   | 65         | 70       | 75        | 85        |
| Integral index of the investment opportunities of the business environment, %                 | 50                   | 60         | 70       | 80        | 90        |
| Ratio of the net increase of the direct foreign investments and the gross domestic product, % | 4                    | 4,5        | 5        | 6         | 7         |

## Continuation

|                                                                                                                                                       |      |     |     |      |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|-----|------|-----|
| Share of the products sold at the competitive markets of the country, % of the total amount of products (as of the beginning of the year)             | 50   | 55  | 60  | 70   | 80  |
| Size of the economy of Ukraine, % in comparison with the world gross domestic product                                                                 | 0,15 | 0,2 | 0,5 | 1,5  | 2,5 |
| Cost of scientific researches and scientific and technical work covered by the government, % gross domestic product                                   | 0,2  | 0,3 | 0,5 | 0,75 | 1   |
| Number of employees performing the scientific and technical researches in comparison to the number of the occupied population (per 1 thousand people) | 5    | 10  | 13  | 17   | 22  |
| Share of the enterprises implementing the innovations in the total number of the industrial enterprises, %                                            | 5    | 10  | 15  | 25   | 35  |
| Share of the realized innovational goods in the total industry, %                                                                                     | 3    | 7   | 15  | 20   | 25  |

## 6. Macroeconomic security

| Indicator name                                                                                                                                      | Indicator parameters |                   |                 |                  |                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|-----------------|------------------|------------------|
|                                                                                                                                                     | Y <sub>c</sub>       | Y <sub>dang</sub> | Y <sub>un</sub> | Y <sub>sat</sub> | Y <sub>opt</sub> |
| Ratio of growth rate of the gross domestic product of Ukraine and the growth rate of the gross domestic product of the developing countries, scores | -2                   | -1,5              | -1              | 1                | 2                |
| Consumer price index (till December of the last year)                                                                                               | -2                   | -1                | -0,5            | 1                | 2                |
| Ratio of the income of the population and the gross domestic product, %                                                                             | 40                   | 43                | 45              | 50               | 53               |
| People's tendency to save, %                                                                                                                        | 3                    | 5                 | 8               | 10               | 12               |
| Ratio of salary and social aid as well as other current transfers, times                                                                            | 1                    | 1,1               | 1,2             | 1,4              | 1,6              |

## 7. Social security

| Indicator name                                                                                                        | Indicator parameters |                   |                 |                  |                  |
|-----------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|-----------------|------------------|------------------|
|                                                                                                                       | Y <sub>c</sub>       | Y <sub>dang</sub> | Y <sub>un</sub> | Y <sub>sat</sub> | Y <sub>opt</sub> |
| Ratio of the average nominal monthly wage and the living wage per one capable person, times                           | 1,5                  | 1,8               | 2               | 2,5              | 3                |
| Ratio of the average retirement and the living wage of the persons who have become incapable, times                   | 1                    | 1,5               | 1,5             | 1,75             | 2                |
| Share of the summary budget spent for healthcare, % gross domestic product                                            | 3                    | 4,5               | 5,5             | 6,5              | 7                |
| Share of the summary budget spent for education, % gross domestic product                                             | 3                    | 4,5               | 5,5             | 6,5              | 7                |
| Total number of the secondary school pupils, % as compared to the total number of the resident population aged 6 - 17 | 55                   | 60                | 65              | 70               | 80               |
| Occupation of the population aged 15 - 70, % of the population of the relevant age category                           | 50                   | 53                | 55              | 58               | 60               |

**8. Financial security**

| Indicator name                                                                                                                      | Indicator parameters |            |          |           |           |
|-------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------|----------|-----------|-----------|
|                                                                                                                                     | $Y_c$                | $Y_{dang}$ | $Y_{un}$ | $Y_{sat}$ | $Y_{opt}$ |
| Ratio of the bank loans and deposits in the foreign currency, %                                                                     | 50                   | 70         | 80       | 85        | 90        |
| Share of the foreign capital in the authorized capital of the banks, %                                                              | 10                   | 12         | 15       | 18        | 20        |
| Ratio of the long term loans and deposits (for over a year), times                                                                  |                      |            |          |           |           |
| Profitability of the assets, %                                                                                                      | -1                   | 0          | 0        | 0,5       | 1         |
| Ratio of the liquid assets and the short term obligations, %                                                                        | 0,5                  | 0,65       | 0,8      | 0,85      | 1         |
| Ratio of the bank loans and deposits in the foreign currency, %                                                                     | 50                   | 70         | 80       | 85        | 90        |
| Insurance integration degree (insurance premiums and gross domestic product), %                                                     | 1                    | 2          | 4        | 6         | 8         |
| Degree of capitalization of the listed companies, % gross domestic product                                                          | 15                   | 30         | 40       | 50        | 70        |
| Ratio of the scope of official international reserves and the scope of the gross foreign debt, %                                    | 20                   | 36         | 41       | 45        | 50        |
| Ratio of the budget deficit/surplus and the gross domestic product, %                                                               | -6                   | -5         | -4       | -3        | -2        |
| Deficit/surplus of the budgetary and non-budgetary funds of the nationwide management sector, % and the gross domestic product, %   | -3                   | -2         | -1       | -1        | 0         |
| Redistribution degree of the gross domestic product in the summary budget, %                                                        | 18                   | 19         | 20       | 23        | 25        |
| Index of change of the official currency exchange rate of the national currency and the USD, average per the certain period of time | 90                   | 94         | 95       | 96        | 97        |

**Table 3. Weight coefficients for calculation of the integrated index of economic security**

| Sub indices of economic security   | Weight coefficient |
|------------------------------------|--------------------|
| Production security                | 0.1218             |
| Demographic security               | 0.0913             |
| Energy security                    | 0.1148             |
| External economic security         | 0.1095             |
| Investment and innovation security | 0.1089             |
| Macroeconomic security             | 0.1224             |
| Food security                      | 0.1007             |
| Social security                    | 0.1013             |
| Financial security                 | 0.1294             |

The integrated index for each component is calculated according to the following formula:

$$I_{j1} = E_i a_{ij} \cdot z_{ij1} \quad (1),$$

in which  $a_{ij}$  are the weight coefficients determining the degree of contribution of the  $i$ - index into the integrated index;

$z_{ij1}$  are the standardized values of the introductory values.

The integrated indicator ( $I_j$ ) for each area for determination of the standardized values of the indicators is calculated according to the following formula:

$$I_j = (I_{j1} + I_{j2}) / 2 \quad (2)$$

The integrated indicator of economic security of Ukraine is calculated according to the formula:

$$I_j = \sum b_j \cdot I \quad (3),$$

in which  $b_j$  are the weight coefficients of the economic security components.

The weight coefficient of the  $j$  - component is determined by the experts as the ratio of the total score assigned by the experts of the certain area and the total score.

Also, these coefficients may be determined by principal components method on the basis of the integrated indices of certain sectors of the economy. The use of this approach makes it possible to determine the dynamics of the integral indices of the components of economic security of Ukraine as a whole.

6 of the 10 components of economic security are below the lower threshold value (investment, innovation, social, demographic, financial and energy security), which signifies unfavorable trends in the country's economy. Two components of economic security (macroeconomic and foreign economic security) barely exceed the lower threshold, and only two components of economic security (financial and food security) are within the acceptable range.

Ukraine's economic development trends suggest that there is a **reduction in the real gross domestic product** in the country. In 2014, Ukraine's gross domestic product was reduced by 6.8% compared to 2013, and supposedly, it will keep down and reach the bottom-line in 2015. The economic recovery will start in difficult conditions due to the destruction of economic complex by foreign aggression. According to the State Statistics Service of Ukraine, the highest rate of decline in gross added value in 2014 was registered in the construction industry (-19.9%), mining industry (-4.2%), wholesale and retail trade (-12.8%), water supply (-12.1%), processing industry (-12.0%), professional, scientific and technical activities (-11.0%), electricity and gas supply industry (-8.1%), transport, storage, postal and courier business (-6.6%), financial and insurance area (-4.5%), information and communication industry (-3.9%).

A slight increase in gross added value in 2014 was achieved in healthcare and social assistance area (+ 3.9%), agriculture, forestry and fisheries (+2.9%),

public administration and defense, compulsory social insurance (+ 2.6%). However, the progress in the mentioned areas of the economy does not compensate for the overall economic decline in 2014.

The nominal gross domestic product per capita in 2014 in Ukraine decreased by USD 951 and constitute USD 2979, which is 2.8 times less than in Belarus, 3.4 times less than in Romania, 4.8 times less than in Poland, and 12.1 times less than in the EU countries. This speaks of a deep crisis and infeasibility of the Ukrainian model of economic development as well as the increase of the economic gap with other countries.

Worsening of the foreign economic situation caused by the military operations in the Donbass region has led to a decline in the foreign economic activity. Reduction of the export of goods and services in 2014 has reached 14.6%, reduction of import constituted 28.0% compared to 2013. There have been no positive structural changes in the export and import of goods. Reduction of industrial goods production by the exporters has resulted in a significant curtailment of the export. The highest rate of decrease was registered in metallurgy (the production was reduced by 14.5% and the export was curtailed by 13.1% compared to 2013), machine building industry (-20.6% and -30.4% respectively), production of chemicals (-14.2% and -28.2% respectively).

Reduction in gross savings of the fixed capital in 2014 was 23.0%, and the downfall tendency has continued up to the point of the 2013 values (-8.4%). This is the evidence of a continuing stagnation in the investments and a systemic reduction of the investment potential of the national economy. The share of investment in gross domestic product has fallen to the point of 14.0% of gross domestic product (in 2013 it was 16.9%). The capital investments in 2014 were reduced by 11.8% after the downfall of 2013. The domestic enterprises meet 71.5% of capital investment requirements by their own funds. The Ukrainian economy really needs to improve the investment opportunities to attract the foreign investments. In 2014, only 2.7% of capital investment expenses were covered by the foreign investors. Besides, the reduction of direct foreign investment into the economy of Ukraine in 2014 constituted 12.2 billion dollars or 21.0% compared to 2013. The long-term stagnation of investment processes significantly limits the recovery potential of the national economy.

The fixed assets are enormously obsolete in both moral as well as physical terms. The low investment activity problem is exacerbated in the conditions of depreciation of the fixed assets in the economy of Ukraine. In 2014, the overall degree of depreciation of the assets in all areas of economy has reached 77.3% (as of early 2014). The depreciation of fixed assets was 56.9% in the industry, 63.6% in telecommunications, 61.9% in electricity and gas supply, 57.1% in the mining industry, and some branches of industry have almost exhausted their amortization potential (the depreciation degree in the transport

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industry has reached 96.7%). This level of depreciation of fixed assets proves their technological obsolescence. Most of the sectors of industry of Ukraine urgently need almost a complete upgrade of production facilities to correspond to the modern technological base.

The substantial reduction of domestic demand goes on. The consumer price index in 2014 has increased by 24.9% (against 0.5% in 2013) and the industrial product prices have risen 31.8% (against 1.8% in 2013). The reduction of final consumer expenditures for the year was 7.4% (in particular, 9.6% in the household sector), and the retail turnover downfall in 2014 has reached 8.6% (in 2013 it has increased by 8.6%). Given the expected high inflation rate in 2015 (33.5-40.1%), the compensatory factors maintaining an effective demand should be developed.

**Conclusions.** The low integral level of the economic security in Ukraine is largely caused by a number of indicators falling below the lower threshold, namely:

- in the macroeconomic security there is a high level of “grey” economy; informal capital replenishment; excessive levels of “grey” intermediate consumption;
- in the investment security there is a small degree of growth of the foreign direct investment (equity) to the gross domestic product;
- in the innovation security there is a low level of scientific and technical work expenditures; scientific and technological downfall; low proportion of professionals performing the scientific and technical work; low share of the enterprises engaged in innovation activity in the total number of industrial enterprises; low share of the enterprises that have implemented innovations in the total number of industrial enterprises; low share of companies that have implemented innovative products in the total number of industrial enterprises; small proportion of sales of the innovative products in the total amount of the realized industrial production;
- in the financial security there is a low level of gross international reserves of the National Bank of Ukraine (in the import); a threshold level of the lost shadow revenue; high cost of bank loans; insufficient financing of the real sector of the economy; low share of loans allocated for the processing industry;
- in the foreign economic security, the level of innovation products in the export of goods is critically low; there is a tendency to a high import dependence; a significant proportion of the imported goods in the country’s domestic consumption;
- in the social security, a high level of shadow wages in comparison with the official wages is maintained; low subsistence rate to the average wages; significant pension expenditures in comparison with the gross domestic product;

a high level of deficit of the Pension Fund of Ukraine in comparison with the gross domestic product;

- in the food security, the production of milk and dairy products is quite insufficient;

- in the demographic security, there is a high crude mortality, infant mortality, morbidity; a significant demographic burden of incapable population in comparison to the number of capable population;

- in the energy security, there is a high output ratio of the shadow economy; a large share of gas import from a single country in the total volume of the gas import; a large share of oil import from a single country in the total oil import;

The official statistical research conducted on the basis of the given indicators suggests a tendency to the formation of a dangerous rate of curtailing of the domestic market, and even more dangerous rate of decline of the living standards of common people.

Improvement of the economic security of Ukraine depends on immediate implementation of a fundamentally new economic development model.

To ensure the economic security it is necessary to do the following: develop a reliable system of economic security that would provide the monitoring and identification of threats to the economic security, create the strategy and tactics for the prevention and neutralization of these threats; generate an optimum economic model and implement a total economic restructuring; correctly identify the national competitive advantages and use them effectively in the foreign economic activity; diversify the sources and routes of oil and gas transfer to Ukraine and promote the energy saving policy; facilitate the development of scientific and technological progress, identify the benchmarks to mobilize the domestic investment resources; improve the quality of state and economic management and carry out the activities aimed at socialization and humanization of economic transformation; eliminate the "shadow" economy by effective legal, administrative and economic measures.

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