Volume 4

SOCIO-ECONOMIC REFORMS OF THE NATIONAL ECONOMY RECOVERY: THE EXPERIENCE OF UKRAINE

University of Economy in Bydgoszcz, Publishing House

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Collective monograph

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INTRODUCTION

On June 27, 2018, in Copenhagen, an International Conference on reforms in Ukraine was held, from which Ukraine expects further consolidation of the international community in promoting reforms in Ukraine. The current leadership of Ukraine admits that on the way to ultimate success one needs to do much more than it has been achieved by this time, and much more should be ready for further systematic work. Despite the fact that within the framework of the policy on accelerated economic growth a package of 35 bills was formed, which were intended to solve the main problems of the national economy recovery such as business protection, deregulation, the improvement of the business climate, facilitating access to financing and public resources, encouraging innovation etc., the top priority socio-economic reforms should include the fight against corruption, effective management of state-owned enterprises, the improvement of the business climate, infrastructure modernization, reforms of the energy sector and the development of innovation. Creating mechanisms for achieving social cohesion and restoring confidence, ceasing armed hostilities in the East of Ukraine, which are capable of self-development and increasing the level of protection of the population and public safety should become the key to the national economy recovery.

In the monographic research, unlike other scientific work on similar topics, one has used an interdisciplinary methodology for restoring the national economy in the global security environment and outlined the European priorities of Ukraine in the sphere of socio-economic reforms.

The monograph consists of five sections. The sequence of presenting the content and results of the research, the critical synthesis of the experience of Ukraine in forming the mechanisms for the economic recovery of regions in the conditions of the global economy allows us to reveal the methodological grounds for ensuring economic growth and macrofinancial stabilization, develop the strategies and priorities of development of the real

sector of the economy, and suggest a holistic, interrelated set of theoretical and methodological approaches to restoring a social infrastructure.

The first section systematises and summarises theoretical, methodological and applied mechanisms for strengthening the competitiveness of Ukrainian regions, proposes practical steps to tighten the external trade security of cooperation between Ukraine and the EU and intensify Ukraine's participation in scientific, technical and industrial cooperation with the EU countries. It has been proved that the main targets of state regulation of the economy should be focused in the sphere of the investment and innovation support and strengthening economic security by improving the institutional environment and strategic programming of structural and institutional transformations.

The second section reveals the contradictions of ensuring economic growth and macrofinancial stabilization, presents authors' work on the effectiveness of state regulation of the monetary sphere in the context of providing Ukraine's financial security and the system of key indicators of assessing the innovation development of regions. It has been found that the venture educational and scientific and production cluster is the basis for ensuring the competitiveness of innovative products.

The third section of the study is devoted to the definition of the priorities in developing the real sector of the economy. Thus, scientists are convinced that the development of machine engineering plays a leading role in the industrial and economic sector of Ukraine and becomes a key lever of transition of our country from lower technological models to higher ones. The strategic platform for efficient management of economic development of domestic enterprises, based on the formation of tactical and operational management platforms, has been outlined in detail. The authors are sure that the transition of the economy of our country to the green economy is a priority direction of socio-economic reforms of the economic recovery of Ukraine. In this monograph, the actualization of problems and issues in the gas sector of the economy allowed solving the issue of ensuring

transparency and clear principles for granting permits for the development of deposits by non-state enterprises.

The final section of the study contains scientific findings of the mismatch of qualifications that are manifested in the high rates of youth unemployment, the growth of shadow employment, the outflow of skilled labour abroad, which ultimately poses new challenges to society and the economy. In the researchers' opinion, in order to restore the social infrastructure and progress of reforms in the social sphere, it is necessary to ensure monitoring of qualifications in the labour market, which will be the basis for developing an effective policy on providing employment to the population. The problems of threats to social and economic security of Ukraine during the period of the intensification of armed conflicts are considered separately. It has been proved that in the globalized world, the number of asymmetric military conflicts is decreasing, but the destructive effect of short-term conflicts is increasing. Terrorism, as one of the types of contemporary asymmetric conflicts, has become a global problem of the 21st century.

The authors of the monograph believe that today the domestic economic complex continues to experience serious challenges connected with the outcomes of world financial and economic crises and losses caused by the aggression of Russia. At the same time, this helps to tighten up the stability of the Ukrainian economy. The problem of the development and implementation of a new model of Ukraine's economic development has become as acute as never before. Moreover, a decisive feature of the national economic strategy should be the protection of national economic interests under the conditions of continuous changes and uncertainty in Europe and the world. Self-reproduction of the national economy, strengthening its competitiveness, and countering geo-economic challenges become an objective prerequisite for modelling and substantiating socio-economic reforms of the national economy.

PART 1

THE GLOBAL SECURITY ENVIRONMENT AND EUROPEAN PRIORITIES OF UKRAINE

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JUSTIFICATION OF PRIORITIES OF THE COMPETITIVENESS STRENGTHENING OF UKRAINIAN REGIONS IN THE EUROPEAN INTEGRATION PROCESS

Abstract. The article is devoted to the development of priorities of the competitiveness strengthening of Ukrainian regions. The analysis of innovative potential and competitiveness of Ukrainian regions and efficiency of its use was carried out. The approaches to the definition of the concept of "competitiveness of the region" and the factors that form it in the global economy were studied. The feasibility and the defining characteristics of the dynamic competitiveness provision of regions were proved. The positions of Ukraine under the Global Competitiveness Index and the group of the EU member States in accordance with the Innovation scoreboard were studied. The differences in the formation and implementation of regional strategies of innovative development of Ukraine and the EU were revealed. The strategic priorities and means of the competitiveness strengthening of Ukrainian regions on the basis of innovation with the use of the European experience were substantiated.

JEL Classification Systems: O 018, O310, R100, R580
Keywords: region, competitiveness, innovative activity, competitivenessofregions, regional policy, innovation policy, and competitiveness innovative potential, European integration.

Introduction. An important long-term factor in the modern global economy development is not only the globalization of markets, but also the

intensification of innovation processes, which involves the intensification of competition among subjects at different levels with the use of successful innovation strategies. The influence of innovations on social and economic development, competitiveness of the economy and regions of Ukraine are fruitfully studied by domestic scientists. The problems of innovation policy implementation at the national and regional levels, financing of innovation activities, the functioning of innovation infrastructure, the formation of strategies and programs of innovation development, the development of methods for assessing the innovation potential and the effectiveness of innovation activities were widely covered. Although the source of economic growth and social development are scientific researches, innovation and technological development, Ukraine is significantly behind not only the developed economies, but also the post-socialist countries of Europe and the Baltic States.

The innovative intensification is a necessary response to the global challenges associated with the need to maintain and strengthen the competitiveness of business entities at all levels of the system hierarchy. Inconsistency reduces the chances of successful adaptation to new conditions and leads to negative social and economic consequences. The regional level of economic governance hierarchy is beginning to play an important role in the process of creating and using new knowledge. The innovation activity in the region depends on a number of factors, the main of which is the level of development and effective use of innovative potential. An important task is to justify the institutional basis and the development of infrastructure to support innovation activities of business entities in the regions. The competitiveness of the region is determined by its role in the economic space of the country, stability in the domestic and foreign markets, the ability to realize potential, the degree of increasing its own resources, etc.

Highly appreciating the achievements of domestic and foreign scientists it should be noted that, at present, the innovative development of Ukraine is accompanied by systemic problems, the solution of which

requires the systematization, generalization and implementation of the methodology and mechanisms of regulation of innovation activities, which have proved the effectiveness in European countries, because our country is able to take a leading position in the global market through innovative development using a European example.

The EU's innovation policy is being transformed under the influence of new regionalism. The evolution of the European regional policy is taking place with a gradual transformation and radical changes. Among the dominant characteristics of the innovation systems of the EU members it is possible to allocate complete and perfect institutional basis of innovative policies and mechanisms for its implementation, developed network of national and supranational organizations, the availability of European programs and projects, common approaches to the formulation of development strategies, the underlying basis for the development of regional innovation strategies based on unique characteristics for the development of competitive advantages and priorities achievement.

Innovation is crucial not only for competitiveness, but also for economic security, development and economic efficiency. The European concept of competitiveness includes a system of social support, environmental protection, health and the creation of conditions for improving the quality of life. Under such conditions, competition becomes a competition of strategies, and the strategic component of innovation becomes the dominant characteristic of competitiveness. The use of the acquired factors, related to the competitive advantages of high quality, becomes the determining factor for competitiveness. Various approaches, including creating new strategies or programs development, are used to strengthen competitiveness in the world. The development strategy of Ukrainian regions should be aimed at achieving the strategic goal of ensuring a rational high level of dynamic competitiveness on innovative principles.

The obtained and expected effects of the modern stage of European integration require an in-depth study of the problems and substantiation of

the strategic directions of strengthening the competitiveness of the regions on the basis of innovation, adaptation of the common heritage of the EU in science, technology and innovation policy in the context of global competition. In accordance with the Association Agreement between Ukraine and the EU, cooperation in the field of science and technology serves to strengthen and rationalize the scientific potential to solve the problems of participation in the global economic integration processes. It is planned to accelerate integration in the European research area, to approach the requirements and standards of the EU in the field of science and technology[1].

It needs to be noticed that the analysis of the implementation experience of the partnership and cooperation Agreement between Ukraine and the EU does not provide grounds for the conclusion of symmetrical and balanced relations in the scientific, educational and innovative spheres. We can assume that the implementation of the Association Agreement between Ukraine and the EU will not significantly affect the innovative development of the domestic economy in accordance with the global technological cycle of today. Moreover, it is impossible not to consider the risks and threats of such cooperation for the intellectual, scientific, technological and innovative potential of our country.

The evolution of the relationship between the competitiveness theory and innovative development confirms the change of the paradigm of regional development from the region-quasi-state, region-market and region-society to the region-participant of globalization. At the same time, competitive advantages are shifting from factored to intellectually-oriented, and growth factors have transformed from an explanation of the influence of endogenous to exogenous, by recognition of the dominant innovations for economic development and innovation to ensure competitiveness. The change of methodological approaches towards competitiveness strengthening on the basis of innovative development and identification of

[1] Association Agreement between Ukraine and the EU. (2014). Available at: www.kmu.gov.ua.

local dynamic factors is characterized by the formation of the theory of dynamic competitiveness of the region where the latter is considered as a territory with high standards, favourable living conditions and business attractiveness. Theoretical substantiations of the use of local competitive advantages, regional management and institutional changes become the basis of the spatial competitiveness concept. During the evolution process of the theoretical foundations of innovation development there was proved the recognition of competitive advantages, which are based on knowledge, as the basis of modern models of an innovative process; the relationship between innovation and the ability to create and use knowledge and study. The modern innovation process is becoming networked and integrated with the important significance of mechanisms efficiency for knowledge creation and spreading. At the same time, innovation policy is an important component of economic policy in terms of ensuring institutional changes at the horizontal and vertical levels of the system hierarchy.

As a result of a long systematic process of the latest development model formation technological structures arise, which create the preconditions for the efficiency of economic activity (transformation of innovation into a profitable business) and progress in the social sphere. It is about trend approval of progressive and cyclical growth by the transformation of quantitative changes into qualitative ones. At the same time, the structures are closely interrelated and they reflect the social and economic structure of the economy and society, and the changes of which determine the trends of national development.

Competitiveness becomes interconnected with the processes of economic transnationalization; innovation potential and innovation infrastructure are the dominant factors in attracting TNCs and realizing competitive advantages for the regional economy. The impact of globalization and regionalization offers glocals, which is linkages between local culture and global multiculturalism within regions, the complexity of the regional management functions towards the growth of responsibility of local authorities and the importance of devising development strategies

based on innovative principles. The formation process of the fundamental foundations of innovative theories contributed to the emergence of a scientific platform of innovative imperatives associated with the transition of society to new technological modes.

Depending on the dominant technological structure, economic development priorities and availability of factors of production, there are different innovative models of realization of competitive advantages in domestic and world markets which are characterized by: development of fundamental and applied science, a funding level and a set of activation methods; creating your own or by borrowing and spreading imported technologies; dynamics of development of education and science. The reason for the uneven development of the regions is the cycles themselves, and the “poles” of growth tend to shift depending on the origin of innovative products. The modern development period of innovative companies is characterized by the fact that innovation is considered as part of corporate policy, innovation has a clear network character on the basis of information technology, actively used cooperative models of innovation and technological cooperation. Further development of economic entities will be determined by the compliance with industry innovation trends, shifting the priorities of socially-oriented management, entrepreneurship development and strengthening competitiveness on innovative principles.

Ukraine took 85th position among 140 countries of the world (79th position in the previous rating) according to the global competitiveness Index in 2016-2017. The global competitiveness index covers more than 100 variables, combined into 12 benchmarks (“Institutions”, “Infrastructure”, “Macroeconomic environment”, “Health and primary education, “Higher education and vocational training”, “Goods market efficiency,” “Labour market efficiency”, “Financial market Development”, “Technological readiness”, “Market size”, “Compliance of the business to date”, “Innovation potential”) in three main groups: the “Basic requirements”, “Performance enhancers” and “Innovation and improvement factors”. In the context of the

individual components of this indicator, the benchmark “Innovations" shows the improvement of Ukraine's position by two points (from 54 to 52).

In particular, cooperation between universities and industry in research and development, public procurement of high-tech products and the ability to innovate have improved. However, the quality of scientific and research institutes and companies' expenditures on research and development have deteriorated. This index reflects the long-term trends in the formation of national competitiveness, so the results can be used to justify the country's development strategy.

According to the EU Innovation scoreboard 2016, the group of leaders includes the Netherlands, Germany, the UK, Finland, Denmark, and Sweden. The European average is much lower than these countries have reached. Active innovators (France, Austria, Luxembourg, Belgium, Ireland and Slovenia) have an index higher or close to the European (Table 1) one.

From our point of view, the most important criteria for consistency and completeness of the characteristics of the Innovative scoreboard includes:

- a rather exhaustive display of the main indicators of the effectiveness assessment of the national innovation systems of the EU member States;
- taking into account purely quantitative analytical estimates based on Eurostat data and other international statistical databases;
- a possibility to compare the achieved indicators of the EU and the main competing countries;
- focusing on identification of the problems of innovation development and tracking the innovation progress.

Table 1. Grouping of the EU member States according to the Innovation scoreboard 2015-2016.

Groups / Countries	2015	2016
Innovation leaders	The Netherlands, Germany, Finland, Denmark, Sweden	The Netherlands, Germany, the UK, Finland, Denmark, Sweden
Strong innovators	France, Austria, Luxembourg, the UK, Belgium, Ireland, Slovenia	France, Austria, Luxembourg, Belgium, Ireland, Slovenia
Moderate innovators	Croatia, Latvia, Lithuania, Poland, Slovakia, Hungary, Spain, Portugal, Italy, the Czech Republic, Malta, Estonia, Cyprus, Greece	Croatia, Latvia, Lithuania, Poland, Slovakia, Hungary, Spain, Portugal, Italy, the Czech Republic, Malta, Estonia, Cyprus, Greece
Modest innovators	Romania, Bulgaria	Romania, Bulgaria

Source: compiled on the basis of [2]

As we can see, the Netherlands, Germany, the UK, Finland, Denmark and Sweden are the innovation leaders; France, Austria, Luxembourg, Belgium, Ireland and Slovenia are the strong innovators; Croatia, Latvia, Lithuania, Poland, Slovakia, Hungary, Spain, Portugal, Italy, the Czech Republic, Malta, Estonia, Cyprus and Greece are the moderate innovators, Romania and Bulgaria are the modest innovators in 2016.

Foreign scientists understand the competitiveness of the region as its ability to win in competition with the regions of the country or other countries for attracting and creating new production resources, while providing competitive advantages in economic growth and quality of life. The existing material and technical base of enterprises, networks and

[2] European Innovation Scoreboard. (2016). Available at: http://www.knowledgetransferireland.com/About_KTI/Reports-Publications/European-Innovation-Scoreboard-2016.pdf;European Innovation Scoreboard. (2017). Available at: https://www.rvo.nl/sites/default/files/2017/06/European_Innovation_Scoreboard_2017.pdf

clusters, the development of market, production, the social and institutional infrastructure, the efficiency of investment, business activity of entrepreneurship are factors of an influence on the competitiveness of the regions. Thus, on the one hand, competitiveness can be determined from the standpoint of the presence of powerful sectors of the economy and, on the other, the ability of local authorities to create favourable conditions for the development of entrepreneurship on an innovative basis.

The basis for the formation of innovative potential of regional competitiveness are scientific and technical personnel, higher education institutions, research institutes, innovative enterprises; the basis for the development is the institutional infrastructure (business incubators, consulting firms, patent attorneys, technology transfer centers, technology parks, clusters, networks). Competitive enterprises, domestic regional demand for innovative products, the export of competitive products and the implementation of technologies are the results of their use.

We modify the methodology for calculating the competitiveness index which is used in international comparisons as a rating of the development dynamics of a particular sphere of the economy to assess the innovative competitiveness potential of Ukrainian regions. The competitiveness index (CI) consists of sub-indixes supplemented with indicators of competitive advantages in the field that is studied3. The index brings together different groups of indicators. The method provides ranking of quantitative indicators obtained from various sources of information, according to the formula:

$$IK = 6 \times \left(\frac{Vc - V\min}{V\max - V\min} \right) + 1 \qquad (1)$$

Where, **CI** - is the competitiveness index;
Vc - is the value of the indicator for a particular region;

[3] The Travel & Tourism Competitiveness Report. (2008). Balancing Economic Development and Environmental Sustainability. – World Economic Forum, Geneva, Switzerland. Available at: http://www.weforum.org.

V min - is the minimum,
V max - is the maximum value of the indicator.

To estimate the innovative competitiveness potential of the regions of Ukraine we use the modified competitiveness index on the basis of such indicators (sub-indexes) for 2016: (1) organizations that performed scientific and technical work, (2) the number of performers of scientific and technical works, (3) the number of researchers, (4) the number of innovative enterprises, (5) the volume of innovation costs, million UAH., (6) the volume of internal current costs for scientific and technical work, million UAH., (7) the number of enterprises that have implemented innovations, (8)the number of new technological processes, (9) the number of enterprises selling innovative products.

To assess the effectiveness of innovative potential use of competitiveness it is advisable to use the DEA method, according to which, among the totality of homogeneous entities can be found those that are more effective in using resources and potential ("inputs") to maximize (minimize) the targets ("outputs").

In its content, DEA is a set of methods for analyzing the efficiency of functioning, which allows you to easily interpret the visualization of data and determine the direction for finding improvements in the functioning of the subject[4]. It provides the subject to the appropriate meaningful selection of input and output parameters, bringing the structure of the complex performance indicator in the form of a ratio of a certain way weighted additive set of initial characteristics $Y_i (i = 1,2,...k)$ to the corresponding set of input parameters $X_s (s = 1,2,...m)$ on the basis of a formalized

[4] Lissitsa, A., Babicheva, T. (2003). Analysis of the data envelope (DEA) – a modern method of determining the efficiency of production. Available at: http://econstor.eu/bitstream/10419/28581/1/374265275.pdf

representation of the economic system which is characterized by the so-called efficiency coefficient f [5]:

$$f = \sum_{i=1}^{k} u_i Y_i / \sum_{s=1}^{m} V_s X_s, \quad (2)$$

Where, u_i is a positive weight coefficient characterizing the relative contribution of each of the output factors Y_i to the total efficiency coefficient f. Accordingly, v_s is a weight of input values X_s. The value u_i, v_s are not generally known and as a consequence $u_i \geq 0$, $v_s \geq 0$.

As a methodological basis for the numerical evaluation of the complex efficiency of each N object, it is assumed that the values of all indicators of complex efficiency f are finite and the ranking of these values is carried out on the numerical interval [0, 1] based on the condition of maximizing the efficiency indicators for each j system $(j = 1,2,...N)$:

$$f_j = \max\left(\sum_{i=1}^{k} u_i Y_{ij} / \sum_{s=1}^{m} V_s X_{sj} \right), \quad (3)$$

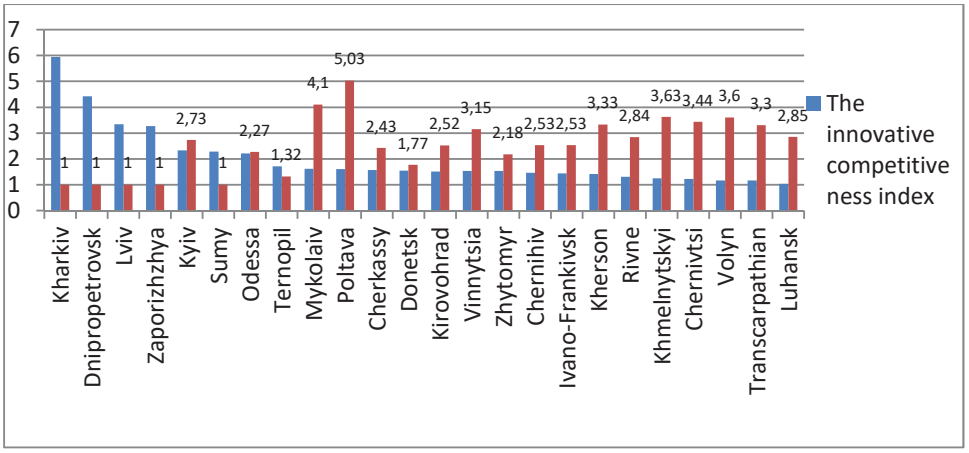
We will assess the effectiveness of the innovative potential use as a production (productive) system on the basis of the method of enfolded data (DEA). Given characteristics of innovative potential are taken in the role of “input” values; "initial value" - the gross regional product, reflecting both the competitiveness and territorial and sectoral specialization of the organization of the region's economy. The model is focused on the “output" that is a maximization of the gross regional product with the effective use of the innovative potential of the described “input” parameters.

[5] Farrell, M.J. (1957) “The measure of productive efficiency” Journal of The Royal Statistical Society.

The innovative potential of competitiveness of the regions of Ukraine for 2016 shows that the highest rates are in Kharkiv, Dnipropetrovsk, Lviv and Zaporizhzhya regions. The results show the effective use of innovative potential in the above-mentioned regions and Sumy region. Kyiv and Odessa regions show inefficient use of innovative potential of competitiveness at its high level (Figure 1).

The implementation instruments of the regional innovation policy are regional innovation systems that cover the organizational and institutional complex and the system of innovative potential management of the region for the innovative type of development. There is a low or critical level of innovation in most regions, which makes it impractical for regional innovation systems to operate autonomously. It is important for Ukrainian regions to adapt the experience of the EU member States to focus on the advantages of the regions, matching of resources and certain priorities, the elimination of duplication of efforts at different levels of management, the establishment of close ties between the participants of the innovation process, leveling of institutional barriers.

Figure 1. The competitiveness innovative potential index and efficiency of innovative potential in the regions of Ukraine as of 2016



Source: compiled by the authors on the basis of the research

The effectiveness and dynamics of innovation processes are influenced by the environment of innovation in our country. Unfortunately, the level of innovation development in Ukraine has not yet been monitored by the method of forming the European innovation scoreboard which complicates the comparison of indicators of innovation activity with other countries, especially with the EU-12. The imperfection of regional innovation development programs is associated with limited funding, unclear definition of priorities, lack of strategic programming and monitoring the achievement of goals. Regional governments do not have real mechanisms to stimulate the successful implementation of innovative strategies and programs, but only the competence to develop and monitor them. At the same time, in the EU member States regional programs are based on innovative projects.

The innovation activity of the EU member States acquires systemic features and strategic orientation with clear quantitative parameters and is based on a system of project and program management and continuous monitoring of the goals achievement. Unlike European innovation development programs, domestic ones are characterized by declarative priorities and goals, insufficient financing, excessive number of regulatory and coordinating bodies and uncertainty of specific elements of monitoring and estimation of the effectiveness of goals and objectives achievement.

Differences in the formation and implementation of innovation development strategies of the EU member States and Ukraine are in the appointment and direction of the developed policy documents, as well as their resource support; in functioning and structural construction of innovation infrastructure; in informative support of innovation policy; in development of the innovation monitoring system as well as decentralization of innovationactivity.

The regional policy of the EU has undergone transformations through the influence of the global economy, deepening of integration processes and aggravation of problems of “old industrial” regions and through the need to achieve economic and social unity (Table 2).

An important role in the process of its formation was played by institutional changes such as creation of special institutions and development of appropriate strategies, programs and mechanisms for the practical implementation of their priorities. The EU regional policy remains closely linked and harmonized with industrial and sectoral policies. The solidarity principles, economic development promotion, living conditions improvement, experience and achievements exchange are the basis for strengthening the competitiveness of the regions. As a result, the regional policy is characterized by multicentrism and it is focused on the use of domestic resources, innovative and creative potential promotion and creation of equal opportunities for regional development.

Table 2. Changing the priorities of EU regional policy

№	2007-2013	2014-2020
1.	Convergence and competitiveness: smoothing out, minimizing manifestations of social and economic inequalities between countries and regions, supporting economic growth and creating new jobs	Promote economic convergence (cohesion) to help less developed regions reduce the gap with developed regions and minimize regional development imbalances
2.	Regional competitiveness and employment: unemployment reduction, labor activity and regions' competitiveness growth, regions and authorities support in the actions of providing economic changes in the industrial sector and urban areas	Implementation of comprehensive measures to improve regional competitiveness and employment
3.	European territorial cooperation as a basis for guaranteeing harmonious development of the EU, the re-profiling of sectoral structures of the border areas.	Promote cooperation between regions and EU countries to reduce social and economic differences within the EU

Source: compiled on the basis of [6]

[6] Bila, S. (2016). Principles of the EU Regional Policy and Priorities for Regional Development by 2020. European Union Regional Policy: Textbook, Kyiv.

In the context of global challenges in the EU member States there was introduced a concept of innovation under the influence of internal and external factors, which covers innovative systems of different levels of governance based on legal, institutional, financial and information components. The creation of the Innovation Union is aimed to develop the European scientific space, to form prerequisites for the innovative business deployment and cooperation in the field of innovation, to reform the system of training for certain sciences to initiate innovative investment. The European technology platforms are gaining weight as a form of interregional cooperation and sectoral thematic forums combining business entities with higher education institutions, academic institutions, investors, governments and public institutions to strengthen the EU's innovation capacity.

At the same time, innovation remains an important object of regional policy. The EU member States at the local level determine the priorities of innovation and investment development, training and retraining of qualified personnel, improving innovation literacy and establishing consulting institutions. Innovation is recognized as the dominant feature of competitiveness, security and efficiency of economic activities, which are in constant interaction. Competitiveness is based on economic security, without which the economic entity of any level of the hierarchy will not be able to hold a competitive position in a dynamic environment. Overall, the modern concept of competitiveness of the national economy and its regions is based on the country's ability to adapt quickly to changes, to develop and implement innovations.

The European Commission has made the concept of reasonable specialization as one of the most important instruments of a cohesion policy. The experience of its development and implementation was used in Lublin region of the Republic of Poland, where the important sectors are understood as reasonable specialization areas that demonstrate specialization at this stage and have gained competitive advantages at the

national or international level. In light of the aforementioned, reasonable specialization has the following characteristics[7] :

- defines a strategy that sets priorities for building competitive advantage by developing science and innovation in accordance with business needs to meet emerging opportunities and market development avoiding duplication and fragmentation of effort;
- continues integrated economic transformation programs which were created to focus on the support and investment in the main regional priorities; stakeholders involvement into innovation activity;
- it is based on the assessment of the region's assets, challenges, competitive advantages and growth potential;
- it is understood as an area, as a critical mass of companies, the concentration of employment and value added, the existence of scientific and innovative potential.

The processes of globalization and European integration have multi-vector and ambiguous influence on the development of Ukrainian regions. The priorities of regional development of Ukraine are associated with the increase of regional competitiveness, territorial, social and economic integration, spatial development and effective public administration in the field of regional development. The state strategy of regional development of Ukraine for the period up to 2020 is aimed at defining tasks and tools for solving social problems, increasing the level of economic potential of the territories, the productivity of their economy, business profitability and incomes of the population and, as a result, creating conditions for the overall improvement of social standards, quality of life and development of the business environment (Table 3).

[7] Kociuba D. Regional Innovation strategy – from design to implementation. Lubelskie Voivodship Case Study / Kociuba D. // Barometr Regionalny. – 2017. – Tom15. – №2. – C. 99-114.

A significant factor in the transformation of Ukraine's regional policy is the need to use European approaches to regional policy and the Association Agreement between Ukraine and the EUnorms implementation.

Table 3. The transformation of strategic priorities of regional development of Ukraine

Regional development state strategy for the period up to 2015	Regional development state strategy for the period up to 2020
Improving the competitiveness of regions and strengthening their resource potential	Improving the competitiveness of regions
Ensuring the development of human resources	Territorial, social and economic integration and spatial development
The creation of institutional conditions for regional development	Effective public administration in the regional development field

Source: compiled on the basis of[8]

The Association's agenda includes a number of aspects of cooperation in the field of regional development. The achievement of real convergence should be one of the most important results of effective regional policy of Ukraine.

Strategic priorities of rational, spatial and sectoral specialization of domestic regions and programming of means to strengthen their competitiveness on the innovation basis should cover the formulation process of goals, objectives, definition of the subject, management object and methods of achieving the goals and should be based on a set of basic principles, institutions, information and financial support. According to certain priorities, the region should function as a social and economic subject of the mesosystem within the national macro system with the target function of ensuring the stability of competitive positions and their

[8] State Strategy for Regional Development until 2015. Available at: http://zakon2.rada.gov.ua/laws/show/1001-2006-%D0%BF;State Strategy for Regional Development until 2020. Available at: http://zakon2.rada.gov.ua/laws/show/1001-2006-%D0%BF

retention on innovative principles in the future. Achieving a high level of competitiveness of the region provides for measures based on a methodological problem - and program-target approaches aimed at finding the necessary resources to solve problems and achieve goals to strengthen the competitive position of the regions in the global competition.

Activities based on methodological problem and goal-oriented approaches and focused on the search for the necessary resources to solve problems and achieve goals to strengthen the competitive position of regions in the global competition are necessary to achieve a high competitiveness level of the region.

State innovation policy lacks consistency, effectiveness monitoring of measures taken, stability of the institutional basis and regulatory mechanisms. The regional policy formation and implementation peculiarities are associated with differences in the regional development. Regional development programs are characterized by common shortcomings, which are manifested in the lack of financial resources, inconsistency of the declared goals with available resources and imperfection of mechanisms for adjusting programs. There can be observed a disproportion in the innovative development of the country, the concentration of innovative activity in certain regions, the mechanisms inefficiency for solving the problems of depressed regions through innovation.

Adapting the successful experience of European countries in the development of innovation policies requires adherence to system principles and implementation of such activities:

- shifting the focus of innovation to the regional level to identify local challenges and opportunities and to concentrate resources to face them. It is advisable at the meso-level to develop the scientific and innovative infrastructure of dissemination and effective implementation of the results of intellectual work;
- the creation ofpreconditions for the full cycle of commercialization of domestic intellectual capital, the implementation of operational monitoring of innovation processes at the state and regional levels in

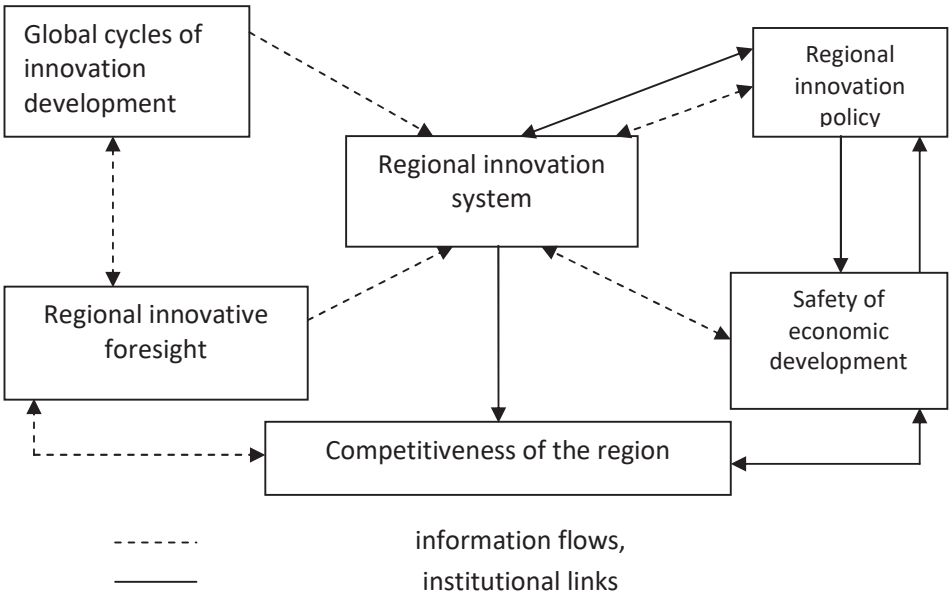
accordance with European standards and the requirements of the EU Acquis communautaire;

- increasing the level of protection and financing of intellectual property, which will contribute to the motivation of their practical creation and implementation;
- the expansion of domestic enterprises to participate in international scientific and technological exchanges, especially with countries that are EU members.

The strategy of regional development in Ukraine provides for the testing of the regional policy of European countries harmonized with the state innovation policy and business development programs. The basic principles of the strategy correlate with the generally recognized EU regional policy provisions as a combination of tools to improve the competitiveness of territories and policies to prevent regional imbalances. However, the development strategies of individual regions of Ukraine for the period up to 2020 mainly contain only the mention of innovative principles as one of the factors in achieving strategic or operational goals. The general disadvantages of regional development programs are the uncertainty of the sources of funding for certain activities, ambiguity or inconsistency of the set goals and objectives, the lack of coordination of feedback mechanisms. An objective prerequisite for ensuring dynamic competitiveness is the scientific justification of the regional strategy of innovative development, the effective use of innovative potential, the formation of a regional innovation system and the use of the results of international technological exchange.

The target function of the regional innovation system is the localization of the dynamic competitiveness of the region and the security of economic development (Figure 2).

Figure 2. Scheme of formation of regional innovation system



Source: compiled by the authorson the basis of the research

The study results prove the need for regional innovation policy in Ukraine to support and develop human capital, to promote an increase in the number of innovation-active enterprises, the practical implementation of the results of research and development work and the implementation of intellectual property in the foreign market. The regional development of innovative activity should be determined by creativity, especially in the sectors that determine the rational, spatial and sectoral specialization of the regions along with the combination of business motivation with the innovative needs of the region.

It is rationally expedient at the regional level to integrate the motivation of business structures and innovative needs of the local market, which is manifested in stimulating domestic demand for innovative developments as well as the use of European experience to stimulate the innovative activity of small and medium-sized businesses and increase their innovative awareness. Of particular importance is the factor of ensuring competitiveness as the possession of intellectual property arising from the

development of invention and its support at the local level, as well as providing financial assistance in the joint patenting of significant new inventions abroad.

Public administration also has a significant role to play in the creation of innovation infrastructure. It is about promoting the deployment of venture enterprises, technology parks, special economic zones of innovation, technological incubators, engineering centers, creation of a system of intellectual property protection, etc. At the regional level, it is necessary to stimulate innovative production cooperation between large local companies and representatives of small or medium-sized businesses.

Conclusions. The systematization and generalization of theoretical and methodological approaches to the justification of the region's competitiveness allowed us to identify the region's interpretation as a favourable environment for the activities of business entities or as an independent participant in the competitive relations of the national and world level. The competitiveness of the region is associated with the efficiency of social and economic development, the influence of the placement of productive forces, the use of competitive advantages and the increasing role of the region in the economic space of the country. Competitiveness is considered as a dynamic characteristic associated with the creation of new competitive advantages or dynamic innovation transformations of existing ones, the ability to anticipate and take into account external and internal influence factors in the medium and long-term perspective.

Innovative potential of regional competitiveness is considered as a source of growth under the condition of effective use of resources. Operational monitoring of the process of formation, development and use of innovative competitiveness potential of regions involves the use of modern calculating methods of the competitiveness innovative potential index and production systems efficiency. An appropriate level of regional competitiveness on an innovative basis is important for border regions in terms of economic security. There are contradictions when the regions with

a high level of innovative potential of competitiveness have low efficiency of its use.

The absence of homogeneity of innovative potential formation and development and significant differentiation of regions under the regional competitiveness potential makes it necessary to develop a strategy of rational specialization of the region on innovative principles which is based on the basic principles (partnership, interest in results, sustainability, integration, integrity, hierarchy, relationship, solidarity cooperation); the institutional infrastructure (regional scientific and technical (innovative) a council, office or commission for economic development of territories under regional (local) administrations); financial (state and local budgets, loans, domestic and foreign investments, venture business, international technical assistance programs) and information support (creation of bases of innovative projects, exchange of experience, provision of consultations, use of information and communication technologies) in the process of studying the entrepreneurial and, especially, innovative environment; the formation of goals, objectives and priorities; the development of organizational and economic mechanisms to achieve the goals; the strategy development; the solution monitoring and the strategy objectives adjustment; feedback.

According to European practice, competitiveness is determined by the level of the innovative potential implementation of the regions and their ability to respond to globalization challenges. The European experience in the formation of a new paradigm of regional development involves the creation of conditions for the development of territories and the effective use of competitive advantages while ensuring the integrity of the national economic space. In the methodology of formingmechanismsof economic development stimulation of the EU member countries,the concept of smart and rational specialization is very important as it involves the activation of long-term structural changes in the economy with a strategic focus on the policy of winning important unique niches in global markets.

Significant differences in the formation and implementation of innovation development strategies of Ukraine and the EU are the

differences between appointment and system maintenance of strategies and programs, the differences in functional and structural development of the innovation infrastructure, the effectiveness of the information components and the recognition of the dominant role of regions in economic growth. The inadequate level of institutional support for innovation in Ukraine is one of the factors of reducing the innovation activity of domestic enterprises achieving a critically threatening level of innovation development. The organizational and institutional component of the structural model of Ukraine's European integration in innovation involves a combination of tools of an internal and external influence and harmonization of innovation policy in terms of financial approximation of the innovation costs level, parity participation in EU programs and a systematic approach to the innovation development management.

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CHALLENGES AND OPPORTUNITIES FOR FOREIGN TRADE SECURITY ENSURING IN COOPERATION BETWEEN UKRAINE AND THE EU

Abstract. The risks of Ukraine`s foreign trade security in the context of rapprochement with the EU economy are considered. The potential of Ukraine`s commodity trade with the EU member states is analyzed. Preservation of the raw material and low-tech structure of Ukraine's foreign trade exchange with the EU is noted. The issue of trade turnover non-parity with the EU in terms of technological capacity is highlighted. The gap between the legal and actual implementation of the Association Agreement between Ukraine and the EU is fixed. The need to introduce the European standards is emphasized, and the problems being created in the process of ensuring compliance of the national systems with the EU technical regulations and standardization, accreditation and market surveillance systems are analyzed. The importance of ensuring the implementation of the Agreement on conformity assessment and acceptance of industrial products from the EU, without signing of which the entry of Ukrainian producers into the European market will be impossible in the near future, is emphasized. Practical steps to increase foreign trade security of cooperation between Ukraine and the EU and to intensify Ukraine's participation in scientific-technical and industrial cooperation with the EU countries are proposed. The range of measures aimed at strengthening the competitiveness of the economy and domestic producers in the context of the Deep and Comprehensive Free Trade Area between Ukraine and the EU, harmonization of economic interests of mutually beneficial cooperation at the level of economic entities of Ukraine and the EU are justified.

JEL Classification System: H560, F400
Key words: foreign trade relations, the European market, foreign trade security, competitiveness, export diversification, technical regulation, protection of the domestic market.

Introduction. Ukraine's cooperation with the EU is one of the priorities of Ukrainian foreign economic policy, which is based on the principles of economic openness and active participation in the globalization processes. Ukraine's European integration processes virtually have begun since gaining

independence, when shifting away from foreign trade mono-orientation on the block of former Soviet Union members was launched.

During 1993 - 2014, Ukraine prepared and implemented a number of key measures for the trade cooperation institutional provision, the logical conclusion of which was the entry into the World Trade Organization in 2008 and establishment of the Deep and Comprehensive Free Trade Area between Ukraine and the EU within the framework of the Association Agreement, signed in 2014 (came into force in full on September 1, 2017). With the signing of the Agreement, Ukraine legislated the process of deep liberalization of trade in goods, services, capital movements and, to some extent, the movement of labour.

The development of Ukraine's foreign trade relations with the EU offers significant opportunities for realizing the country`s economic potential, and creates a number of positive effects for the domestic environment. This results from the significant potential of trade with the EU for Ukrainian producers. With more than half a billion people, the EU countries form the world's largest market. Imports of goods into this market in 2016 amounted to over 5.1 trillion USD, and it was almost a third (31.9 %) of the total world commodity imports. For comparison, the US imports amounted to 2.2 trillion USD, and the imports of the Customs Union countries did not exceed 0.3 trillion USD. In addition, the introduction of international sanctions against the Russian Federation, in particular the EU-backed ones, allowed Ukrainian producers, under certain conditions, to partially replace some Russian commodity niches in the EU market.

At the same time, accelerating the convergence of the national economic system with the EU generates a number of risks for Ukraine's foreign trade security, some of which have already been transformed into real threats. In particular, this refers to:

1. **Low implementation capacity of Ukraine's potential in commodity trade with the EU member states**. As a whole, during 2011-2014, Ukraine maintained fairly sTable volumes of supplies to the EU market. It should be noted that the introduction of the autonomous

preferential trade regime for Ukraine by the European Commission in 2014, in which the duties on Ukrainian goods were substantially reduced or canceled, resulted in the growth of Ukrainian goods deliveries in 2014 compared to 2013 only by 300 million USD.

However, the strategic prospect of Ukraine's cooperation with the EU countries has been confirmed in the dynamics of Ukraine's exports to the EU in 2015-2017. Thus, after a record-breaking declines in exports by 4.0 billion USD in 2015, in the following year the increase by 0.5 billion USA was achieved. Based on 2017 results, it was possible to fully compensate losses of previous years and provide almost 17.5 billion USD commodity exports to the EU. This exceeds the level of 2013-2014 and corresponds to the maximum level of Ukrainian exports to the EU market in 2011 (USD 17.9 billion).

At the same time, losses in Ukraine's export supplies to the Russian Federation since 2012 have amounted to almost 16 billion USD in 2017. Therefore, **it is premature to conclude the full compensation of losses of Ukrainian trade with the Russian Federation at the expense of the EU market.**

Against the backdrop of the Russian military aggression that began in 2014, the economic activity of Ukraine was curtailed, which led to a decrease in foreign trade activity and a reduction in the volume of mutual trade with the EU in 2014 - 2016. At the same time, with the restoration of the economy and the external trade corresponding rise in 2016-2017, the rate and volume of imports growth outstripped the corresponding dynamics of commodity exports.

Thus, the growth of imports to Ukraine from the EU countries in 2016 amounted to 1.6 billion USD, and in 2017 this index reached 4.9 billion USD, which eventually provided 22.0 billion USD or 44.5 % of the total commodity imports to the country. It is transforming the EU into a major commodity importer to the domestic Ukrainian market.

Based on 2017 results, the volume of imports into Ukraine from the EU countries exceeded the level of 2014, and, if the dynamics of the last two

years will be maintained, in the period 2018-2019 import purchases can potentially be restored in the amount of more than 26 billion USD, which corresponds to the average annual value in 2011-2013.

In general, the analysis of the dynamics of Ukraine's foreign trade with the EU during 2007-2017 allows us to assert that the country lacks the ability to fully realize the benefits of a trade agreement with the EU.

2. **Ukraine`s commodity trade concentration on a comparatively narrow circle of the EU countries**. Thus, 68% of Ukraine's foreign trade turnover with the EU is limited to seven countries: Germany, Poland, Italy, Slovakia, Hungary, the Netherlands and Spain. This confirms the significant unrealized potential of Ukraine's bilateral trade relations with other EU countries that generates challenges due to: (1) the lack of proper representation of Ukraine's economic interests in more than 20 EU countries, which, by virtue of closer ties with the Russian Federation, can act as a source of pressure on the European Commission in behalf of Russia's interests on a number of Euro-integration issues that are sensitive for Ukraine; (2) significant trade risks for Ukraine in case of conjunctural and / or political changes in these EU countries.

3. **Preservation of the raw material and low-tech structure of Ukraine's foreign trade turnover with the EU.** The signing of the Association Agreement with the EU has enabled Ukraine to export significant volumes of products both on a duty-free basis and at a significantly reduced tariff. At the same time, even after the withdrawal of many tariff barriers by the EU, the access of Ukrainian products to the European market remains complicated as a result of a number of non-tariff barriers that, due to the technologically outdated production base of Ukraine, virtually eliminate its opportunities for full-scale entry into the EU market.

In 2014, the exports of food products and agricultural raw materials from Ukraine to the EU for the first time exceeded the exports of metallurgy products. Thus, in 2014, farmers exported to the EU products worth 4.8 billion USD (or 28.0 % of Ukraine's total exports to the EU), while exports of metallurgy products amounted to 4.4 billion USD (or 26.0 %). Based on 2017

results, the exports of agrarian sector products to the Ukrainian economy amounted to 5.6 billion USD (or 32.2 % of total exports), and metallurgy products - 3.8 billion USD (or 21.4 %). Such dynamics of agrarian exports secured for Ukraine the fourth place among agricultural suppliers to the EU.

In general, agricultural products and products of metallurgy in 2013-2017 accounted for an average of about 54% of Ukrainian exports to the EU. Therefore, the raw materials and low-tech specialization of Ukrainian exports to the EU is maintained.

In general, 6 commodities - corn (25.1 %), sunflower oil (23.6 %), rape (12.7 %), oil cake and other oil by-products (7.9 %), soybeans (5.5 %), wheat (3.9 %), poultry (2.4 %), honey (1.8 %) – are accounted for more than 80% of Ukrainian agricultural exports to the EU. During 2014-2017, the exports of agricultural products to the EU markets were characterized by sharp market fluctuations in volumes of supplies. Thus, the export of corn (the main export culture to the EU markets) was marked by a rapid fall in 2015-2016, which amounted to 275.0 million USD and 252.0 million USD respectively. The supply of these products to the markets of the United Kingdom, Belgium, Italy, Spain and Lithuania showed the most significant decrease. At the same time, based on 2017 results, Ukrainian farmers were able to substantially restore positions on the European market, exporting 1.4 billion USD worth of maize (an increase by 0.4 billion USD compared with 2016), and thus having approached the level of 2013.

Another major Ukrainian agricultural export product is sunflower oil, the rising supply to the EU markets of which have been gradually increasing since 2013. At year-end 2016, exports of sunflower oil to the EU countries exceeded 1 billion USD, and amounted to 1.3 billion USD in 2017.

Exports of metallurgy products to the EU countries after a sharp decline in 2014-2015 began to recover in 2016-2017. Thus, in 2014 the sales revenue from iron ore exports (code UKTZED 2601) and semi-finished iron and steel products (code 7207) decreased by almost 0.5 billion USD, and then in 2015 it fell by 1.5 billion USD. The main losses in these products exports were experienced in trade with the Central and Eastern European

countries - Poland, Hungary, Slovakia, the Czech Republic, Croatia. However, at year-end 2017, the increase in exports of iron ore to the EU amounted to over 0.5 billion USD, including the traditional markets - Slovakia (+152.5 billion USD), Austria (+112.5 billion USD), Poland (+94.1 billion USD), the Czech Republic (+73.4 billion USD).

Commodity imports from the EU decreased in 2014-2015, while in 2016 - 2017 there was a restoration of their volumes for all product groups with the exception of mineral products.

4. **Disparateturnover with the EU in terms of manufacturability level of goods**. Foreign trade between Ukraine and the EU is not equal, as indicated by a significant negative trade balance, which in 2014 was -3.77 billion USD with a turnover of 37.8 billion USD, in 2015 -2.5 billion USD (turnover 28.6 billion USD), in 2016 -3.6 billion USD (trade turnover of 30.6 billion USD), in 2017 -4.5 billion USD (trade turnover of 39.6 billion USD). At the same time, in the exports of Ukraine to the EU, the trade model for medium-low-tech and low-technological goods was fixed, and in the import from the EU - the purchase of medium-high-tech and high-tech goods.

In particular, in 2017, 37.9 % of Ukraine's exports to the EU were medium-low-tech goods (37.4 % in 2016, 38.8 % in 2015, 45.7 % in 2014), and 31.0 % - low-tech products (in 2016 - 32.5 %, in 2015 - 27.4 %, in 2014 - 24.2 %). It is for low-tech products that Ukraine holds a positive balance in trade with the EU, which in 2017 amounted to 1.9 billion USD, in 2016 - 1.3 billion USD, in 2015 - 0.9 billion USD.

In 2017, medium-high-tech goods accounted for 14.0 % of Ukraine's commodity exports to the EU (in 2013-2016 their share varied from 12.4 % to 14.0 %), and agricultural commodities – for 15.0 % (in 2013-2016 their share varied from 13.6% to 17.4 %). High-tech goods in 2017 accounted for only 2.4 % (in 2013-2016 - 2.2-2.7 %%).

The structure of Ukraine's import demand for the EU goods is significantly different from the structure of exports. In 2017, medium-high-tech accounted for 34.0% of import deliveries (in trade under this category of goods, the negative balance was 5.1 billion USD), and high-tech – for 8.7%

(negative balance - 1, 5 billion dollars). In the same year the medium-low-tech products accounted for 39.4% of imports, and low-tech – for 16.0%. The sTable trends in reducing the share of low-tech imports (in 2013-2014 their share exceeded 18.0 %, and in 2017 it was 16.0 %) and agricultural products (in 2013-2014 their share was 3.4- 3.7 %, and in 2017 - 2.1 %) should also be noted.

Thus, there is almost 5-fold excess of high-tech imports from the EU over similar exports from Ukraine, which testifies to the non-parity of the technological products exchange and the low technology specialization of Ukraine in trade with the EU.

At the same time, the experience over the past years shows that Ukraine has significant prospects in the market of technologically more complex products both in the production of food products and in the field of electrical engineering. For example, in 2014 - 2017, the average annual volume of isolated wires exports (code UKTZED 8544) to the EU exceeded 1 billion USD, and by the end of 2017, their volume has amounted to 1.3 billion USD, which is almost one third higher than the level of 2013. It is obvious that such a dynamics of these products exports was the result of the relevant domestic production capacity preparation to meet the EU market requirements.

As the experience of Ukraine's accession to the WTO has shown, the sectors of Ukraine`s traditional exports - producers of ferrous metallurgy and agricultural products - receive the greatest benefit from global trade agreements. The initial period of domestic exporters` operation within the context of the Deep and Comprehensive Free Trade Area with the EU has shown a significant gain for exporters of agricultural products. At the same time, domestic exporters of metallurgical products were not able to take full advantage of the FTA benefits, including due to the location of a significant part of the industry's capacity in the anti-terrorist operation area. Thus, the incentives are created to increase production volumes and direct investment in these sectors, which will hinder the development of new innovative

production capacities and stimulate deindustrialization of the national economy.

The challenges for Ukraine's foreign trade security, which are being generated directly in the process of implementation of the Association Agreement, are the following:

1. There is a gap between the legal and actual implementation of the Association Agreement. There is a risk that the economy of Ukraine will not be able to timely and fully transfer to the new rules of the game during the transition period. Obviously, the transition to the new principles of technical regulation and compliance standards will require producers to pass a long period of adaptation to new requirements, the length of which in a difficult economic situation will only increase. In general, according to the estimates of the Government Office for Coordination of European and Euro-Atlantic integration of Ukraine, in 2017 the overall level of the Association Agreement provisions implementation by Ukraine amounted to 41.0 %, in particular in the field of technical barriers to trade - 59.0 %, sanitary and phyto-sanitary measures - 33.0 %, customs issues - 33.0 %, consumer protection - 48.0 %[9]. The rather slow pace of the Agreement provisions implementation should be noted that creates both image-building and material losses for Ukraine in the form of missed profit due to the insufficient EU – Ukraine trade turnover growth.

2. *The implementation of European standards will require the government, producers and consumers - individuals to meet significant financial costs*. It should be borne in mind that products that do not meet European standards, but are likely cheaper, will be consistently pushed out from the domestic market. This will apply to the goods of national producers who cannot adapt to new requirements, as well as to a large number of imported goods with inadequate quality and safety characteristics. This will adversely affect low-income consumers, although in the long run, the use of

[9] Report on the implementation of the Association Agreement between Ukraine and the European Union in 2017. [Text] Government Office for Coordination of European and Euro-Atlantic Integration of Ukraine. - Kiev - 2017. - 86 p.

better-quality products will improve the health and safety of the population that in some way will compensate for additional consumer spending.

In turn, an increase in state expenditures for adaptation to European standards[10] is conditioned by the need to shape an appropriate administrative structure, to create a regulatory approval and authorization systems, as well as to introduce licensing procedures. This should also include additional government funding aimed at: developing an implementation program, modernizing the infrastructure; normative settlement of issues on compliance with quality requirements; ensuring the environmental quality monitoring, etc.

At the same time, most of these expenses are hidden, so in practice they should be carried out by state authorities in accordance with their functional duties. Therefore, the compulsory nature of such costs should be additionally taken into account in determining the total funding of the institutions that will meet them.

The additional spending of the state and national producers on adaptation to the European standards should be mentioned separately. Foreign investments or international financial assistance can be the alternative source of such spending. These costs, as a rule, relate to the transition to new technologies. In this case, economic entities will need funds to finance additional costs for ensuring environmental standards, technological upgrading or procurement of higher quality raw materials. For enterprises that ensure that the products meet the European standards and require full technological upgrades such costs will be even higher.The foreign experience has shown that the EU's environmental legislation implementation in the field of environmental protection for ten new member states of the Union cost from 50 to 80 billion euros, with direct spending of these countries themselves accounting for 2-3 per cent of

[10] In particular, see: Costs and Benefits of FTA between Ukraine and the European Union// Institute for Economic Research and Policy Consulting, Kyiv 2010, p. 70 – Retrieved from http://www.ier.com.ua/files/Books/ Ocinka_vytrat/ocinka_vitrat_eng.pdf

GDP[11]. Similar costs for Ukraine are estimated by experts in the amount of about 30-40 billion euros[12].

3. *A partial crowding out of domestic producers from the domestic market should be expected.* The tariffs reduction on the import from the EU will boost competition in the domestic market. First of all, this will be the case for food manufacturers (reduction of import duties from 10.8 % to 1.5 %) and textiles (decrease from 6.4 % to 0 %). At the same time, the probability of mass displacement of domestic producers due to the reduction of import duties on the EU goods is low, since Ukraine has already substantially reduced its duties after accession to the WTO.

4. *The imbalance in the national producers` orientation between the EU and domestic market is possible*. Obtaining the right for duty-free exports to the EU market in majority of commodity positions will be an incentive for domestic producers to fully concentrate their efforts on it without paying attention to the needs of the domestic market and losing their local positions. The mistake of underestimating the internal market value in a certain way can be exampled by the domestic machine-building industry experience. It is largely oriented to the needs of Russia`s market, and the current realities of military confrontation with this country-aggressor endangered the future existence of a significant number of these enterprises.

5. Another significant risk associated with the functioning of the FTA with the EU is the *possibility of the competitiveness lag maintaining for individual enterprises and, in some cases, even for entire industries of Ukraine, due to their low marketability*.It is obvious the risks that arise in the process of deepening Ukraine's integration into the European economic

[11] Kremlis G. and Dusik J. The challenge of the implementation of the environmental acquis communautaire in the new Member States. Retrieved from http://www.inece.org/conference/7/vol1/Kremlis_Dusik.pdf

[12] On Economic Markets Related to the Existence of Non-Trade Barriers in the Relations Between Ukraine and the European Union. Analytical Paper. Retrieved from http://www.niss.gov.ua/articles/1733/

space require to be taken into consideration to be eliminated in a timely manner.

At the same time, the processes of Ukraine`s European integration form additional opportunities for strengthening foreign trade security as a result of the expansion and diversification of the markets for Ukrainian products, the emergence of alternative sources of resources supply (including energy), increased access to financial resources, stimulation of the national economy institutional structure improvements, etc.

The strengthening of foreign trade security of Ukraine is ensured, including through the implementation of the EU technical regulations in Ukraine. Within the framework of the Agreement, the relevant EU standards in Ukraine are adapted to the regulatory framework in trade-related areas. It will consistently eliminate non-tariff (technical) barriers to trade and provide extended access for exporters to the domestic markets of Ukraine and the EU. In addition, according to the Association Agreement, Ukraine has committed itself to ensuring that the national systems comply with the EU technical regulations and EU standardization, accreditation and market surveillance systems and adhere to the principles and practices stipulated by the EU's current decisions and regulations. Thus, Ukraine`s system of technical regulation will also be fully harmonized with the European norms and procedures.

At the same time, it should be borne in mind that the European market will become open for domestic producers only if Ukraine successfully implements the relevant changes to national legislation. This, in particular, is about ensuring the implementation of the Agreement on conformity assessment and acceptance of industrial products from the EU (ACCA Agreement). Without signing it, the entry of Ukrainian producers into the European market will be impossible in the near future.

The ACAA Agreement is a special form of the Mutual Recognition Agreement, aimed at harmonizing the legislative system and infrastructure of the country with the interests of the European Community. The conclusion of the ACAA bilateral agreements within the separate sectors

contributes to the mutual assesses of industrial products to the markets of partner country and the EU. The introduction of these type agreements involves the actual complete adaptation of national legislation to the EU legislation on products covered by these agreements. The ACAA agreement provides that trade in goods between the EU and Ukraine in the sectors covered by it will be conducted under the same conditions as are applied to trade between the EU member states. Such agreements have already been concluded by the EU with the candidate countries for membership and the countries of the Mediterranean, and have enabled their products to move freely in the EU market.

An important component of the ACAA process is to hold regular consultations with the relevant EU bodies in obtaining information regarding regulatory acts, the implementation of which is a prerequisite for its conclusion. It should be noted that consideration of such normative acts implementation is under competence of a wide range of Ukraine`s central executive bodies.

In addition, in the context of work on the conclusion of the ACAA Agreement, the European party informed Ukraine about the expediency of the Action Plan preparation (with appropriate timeframes) aimed at implementing a specific list of the EU legal acts into the national legislation. This Plan is expected to be included into the Plan on Implementation of the Association Agreement between Ukraine and the EU. This will contribute to the process of signing ACAA, and thus will stimulate the expansion of Ukrainian exports to the EU.Given the high level of product safety requirements in the EU market, access to it forms the prospect for the penetration into other markets and conclusion of new trade agreements there.

Therefore, the possibilities of ensuring foreign trade security in cooperation with the EU are determined primarily by Ukraine's ability to: increase the volume of export trade; diversify the commodity nomenclature; increase the level of technological processing and added value in export products; optimize the supply of imported products to Ukraine, including

through expansion of industrial cooperation and application of business models that will help to reduce Ukraine's import dependence; protect and enhance the competitiveness of national producers in the process of implementing commitments undertaken under the Association Agreement.

The potential opportunities to increase the volumes of Ukraine's export trade are due to its liberalization. One of the most significant benefits provided by the Association Agreement is a significant reduction of import duties. Experts expected that Ukrainian exporters would save almost 500 million euros annually due to the reduction of import duties from the EU side[13]. In addition, in 2014, Ukraine was granted additional customs privileges, including autonomous preferences for Ukrainian exporters, which allowed increasing exports of agricultural products, mineral products, precious metals and their products to the EU by 1.5 billion USD during 9 months of 2014.

As a result of the Association Agreement, Ukrainian producers are opening new opportunities for expanding volumes and diversifying their own exports. It is clear that this requires the implementation of appropriate domestic reforms, the introduction of which for a long time was curtailed, among others, because of the uncertainty of the integration direction pursuing by both the authorities and business circles. In order to expand the range of commodity exports to the EU, Ukraine has to accelerate the processes of ensuring the compliance of the national system with the EU technical regulations and standardization, accreditation, conformity assessment and market surveillance work, as well as adhere to the principles and practices stipulated by the EU rulings and regulations. It is necessary to intensify the implementation of large-scale advertising campaigns to popularize Ukrainian products in the EU. It is possible to conduct such companies at the expense of both the state and European structures. The work of agencies the mission of which is to promote abroad the brand of

[13] The EU is ready when Ukraine is ready: Statement by EU Trade Commissioner Karel De Gucht on Ukraine. Retrieved from http://europa.eu/rapid/press-release_STATEMENT-14-35_en.htm

products made in Ukraine should be also ensured. In this context, mentioning Ukraine in the world media can be valuable.

Another step towards ensuring foreign trade security in co-operation with the EU is the adaptation to their modern system requirements of technical regulation and consumer rights protection, which are not contrary to the WTO. In order to achieve this, it is necessary: to bring the national legislative and regulatory framework on technical regulation and consumer protection in line with the requirements of the WTO Agreement on Technical Barriers to Trade and EU Directives; to improve the procedure for providing information on standardization to domestic and foreign users; to ensure the introduction of international standards and standards of the EU member states to the national economy; to stimulate the business entities to introduce the modern quality management systems to the production of goods, performance of works and provision of services; to provide state market supervision over the safety of goods, works and services; to create an effective mechanism for financing and logistical support to develop the sphere of technical regulation and consumer rights protection.[14]

Conclusions. In order to ensure Ukraine`s national economic interests in the context of necessity to increase the foreign trade security of Ukraine's cooperation with the EU, following steps should be taken:

1. To develop a national action plan for increasing the competitiveness of the economy and domestic producers in the context of the Deep and Comprehensive Free Trade Area between Ukraine and the EU. This plan, in particular, should include:

- target benchmarks and timeline of the competitiveness level upgrading towards the new EU member states` levels, and subsequently – to the EU-15`s ones;

[14] White Book "Policy for domestic legislation adaptation to the European requirements in the field of norms and standards " // The Center for Support of the Civil Service Institutional Development under the Main Department of the Civil Service of Ukraine, 2006, p. 45 – Retrieved from http://icps.com.ua/pub/files/45/16/White%2009%20%20Technical%20Regulation%20Committee%20U.pdf

- a program of activities that, in the medium term, will ensure the achievement of GDP per capita indicator value at the level of the new EU member states` one;
- actions towards the labour productivity increasing by sectors of economy and kinds of economic activity with orientation towards the similar indicators of the new EU member states;
- measures to stimulate the activity of small and medium-sized businesses in the EU markets, including through the introduction of a system for informing about the potential of the EU markets, activating Ukraine's trade missions in the EU states, establishing associations with the participation of Ukrainian entrepreneurs, etc.;
- development of appropriate levers of domestic and foreign policy in order to increase the attractiveness of the national economic environment, strengthen motivation for the transfer of capital, technologies and resources to Ukraine, as well as ensuring the entry of national producers into the industrial production and technological chains of the EU;
- introduction of mechanisms and incentives for preventing the labour force and resource outflows from Ukraine;
- exploration of new business models that will help to reduce Ukraine's dependence upon imports and restrain the excessive imports of products with high added value from the EU.

2. To ensure the economic interests harmonization within the mutually beneficial cooperation at the level of economic entities of Ukraine and the EU, for which it is expedient:

- to intensify meetings and information exchange between representatives of Ukrainian SMEs and their European partners within the framework of the program for organizational and technical assistance to Ukrainian exporters;
- to increase the awareness of the EU public authorities and economic agents by creating and ensuring access to the national base of

investment projects in the priority fields of the finished and high-tech production;

- to coordinate mutual protection measures on the national and European investments, as well as observance of investor rights in Ukraine and the EU;
- to create EU-supported educational programs for Ukrainian entrepreneurs to inform about the EU requirements on quality and standards in the provision of goods and services, and to introduce for them practical marketing courses that will enhance the adaptability of Ukrainian enterprises in the markets of the EU states;
- to introduce monitoring of unfair competition cases between Ukrainian producers and producers from the EU both in the domestic Ukrainian market and in the markets of the EU member states in order to prevent the possibility of business entities discrimination;
- to develop a strategy for expanding industrial technological, as well as scientific and technical cooperation between Ukraine and the EU countries, and propose mechanisms for pooling resources to finance joint projects in this area.

3. To activate Ukraine's participation in scientific and technical, as well as manufacturing cooperation with the EU, especially at the stages of output commercialization. It is strategically important to make a radical breakthrough in Ukraine's entry into the system of industrial technological, as well as scientific and technical cooperation with the EU member states. The existing scientific and resource potential in Ukraine allows, with the introduction of appropriate state programs, forming strong vertical integrated circuits capable to produce products with high added value for the needs of both national and global markets. Consistent steps towards achieving this goal are the expansion of international scientific and technical cooperation, the attraction of licenses and new technologies to Ukraine, and active participation in global and regional high-tech international projects.

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INSTITUTIONAL FACTORS FOR IMPROVING THE INVESTMENT AND INNOVATION SUPPORT OF ECONOMIC SECURITY OF UKRAINE

Abstract. The dependence of the state policy efficiency towards the formation of the investment and innovation support of the state's economic security and the conditions of creating a favourable institutional environment for this is proved. Its key levers (formal, informal, and organizational) are considered. The institutional factors for improving the investment and innovation support of economic security of the state are identified. Among the directions of forming and developing the institutional basis of the investment and innovation provision of economic security of Ukraine, the following areas are distinguished: the improvement of formal institutions, the formation of informal institutions, the development and expansion of competences of organizational and managerial institutions. The tasks and results of improving the institutional basis of the investment and innovation provision of economic security of Ukraine are presented. The directions of improving the legal and regulatory framework for investment and innovation activities in the system of economic security of Ukraine are formed, namely: the guidelines for improving the Law of Ukraine "On Investment Activity", the guidelines for improving the Law of Ukraine "On Innovation Activity", the basic principles of the draft law "On Investment and Innovation Support of Economic Security of Ukraine ".The conceptual and analytical model and the optimal format of a mechanism to

manage the investment and innovative provision of economic security of the Ukrainian economy are suggested.

JEL Classification System: H560, E 200, E 620
Key words: national economy, economic security, state regulation, investment and innovation support, innovation activity, investment, institutional environment.

Introduction. The effective management of economic security of the national economy presupposes the priority of its investment and innovation support. Thus, the main tasks consist in finding, attracting financial and investment resources, and their efficient usage for performing basic types of economic activity by enterprises, in particular, the active implementation of an efficient innovation policy, conducting research and development work as well as design engineering works etc.This will certainly lead to strengthening of macroeconomic, production, financial, investment, scientific and technology, foreign economic, energy and ecological components of economic security and it will allow ramping up the volumes of GDP, first of all due to the production and sales of competitive products (goods, works, services) which at the time will help to meet social and private needs, improve the main characteristics of the system of economic security of the state.

However, the imperfection of a state structure and innovation policy caused the saturation of the domestic market with imported products and driving out of the domestic producer, which is dangerous for foreign economic, social, and food security, and specifically its national economic complex. The state should pay close attention to solving the problems of minimizing the risks and threats of reducing the level of competitiveness of the national economy and domestic goods and services, exacerbation of the problem of import dependence, the decrease in the volume of GDP, an increased level of shadowing economic relations, worsening of the volumes of activities and financial and economic results of enterprises of the real sector of the economy. Moreover, in our opinion, the state regulation of the economy should be focused on the investment and innovation support and

strengthening of economic security through the improvement of the institutional environment. Therefore, it is necessary to develop and substantiate effective management decisions on the implementation of an efficient state policy to improve the investment and innovation provision of Ukraine's economic security as the ability of the state to realize the potential of the national economy, protect national economic interests, and preserve and renew the social reproduction process.

The proper efficiency of state policy on forming the investment and innovation provision of the state's economic security depends to a large extent on and is determined by the creation of a favourable institutional environment for this purpose; the levers that belong to the institutional environment are formal (legislative amendments, other normative and legal acts, improvements of the regulatory environment, etc.), informal (the evolution of "unwritten rules", distribution or elimination of institutional dysfunctions, a change of behavioural stereotypes, traditions, customs, business culture) and organizational ones (activities of civil society institutions, local self-government bodies, mass media, educational institutions and scientific institutions, courts, etc.). The capacity and possibilities of rational use of the investment and innovation support in the system of economic security of the state are provided by a coherent interaction of its existing and created subjective and qualitative elements.

The lack of alternatives to the investment and innovation path of the Ukrainian economy development is a recognized hypothesis. Therefore, this process must be properly planned, organized and backed up by a sufficient institutional and managerial basis. In our opinion, the activity in this direction performed by the Ukrainian government is not sufficiently effective, and the functions implemented by the current Investment Attraction Department and the Department of Intellectual Property under the Ministry of Economic Development and Trade of Ukraine are only partially performed. According to the results of the conducted researches[15],

[15] Kizin H.V. Disadvantages and directions of improving state regulation of the investment and innovative provision of economic security of Ukraine in the context of the managerial

the strategic planning and programming of state policy in the analysed area should be considered unbalanced and insufficient.

That is why we believe that general management of the formation and implementation of the strategy and the coordination of the interaction between the main elements of the system concerning the investment and innovation provision of Ukraine's economic security should be delegated to the government commission for the investment and innovation development, which is specifically designed for this purpose. We consider such a measure to be the first necessary step of the government in forming institutional support for the implementation of state policy. In fact, its further formation and ensuring its effective functioning should become one of the main tasks of the above-mentioned government commission.

We are aware of the lack of a budget financial and organizational resource, as well as the negative experience of creating a large number of various commissions and committees in our country, the activities of which are burdensome, costly and inefficient. Yet the arguments in favour of the establishment of an appropriate governmental commission can be as follows: there are countries, where such structures are functioning and they become the basis of opportunities for implementing a number of much wider functions, such as:

- assistance to structural reforms and institutional changes, the concentration of capital and intellectual and personnel resources on the priority investment and innovation directions of the national economy development;
- ensuring the real and operational monitoring of the efficiency of the investment and innovation infrastructure functioning, the investment

aspect / H. V. Kizin / [ed. board : Kutsyk P. O., Barna M. Yu., Semak B. B., and others.]. - Lviv: Publishing House of Lviv University of Trade and Economics, 2016. - Issue 51. - P. 97-102. - (Economics).

and innovation activity and the implementation of its tasks in the system of economic security of the state;
- the creation of conditions for developing competition (as the basis for innovation), the stimulation of investment and innovation activities of non-state entities of the real sector of the economy;
- coordination of the cooperation of authorities and public institutions for the purpose of innovative development and ensuring economic security of the state;
- the implementation of foreign economic policy with an innovation direction, the creation of conditions for attracting foreign high-tech enterprises as investors;
- regulation of the activities of domestic state-owned enterprises, including natural monopolies, through the implementation of programmes of their investment and innovation development.

We want to add that one of the key instruments of coordination should be the mechanism of investment and technological "platforms", within the framework of which science, the state, financial market entities, business structures and consumers will develop a common vision of the prospects for investment and technological development of the appropriate sector, industry, a type of economic activity or an investment and technological direction as well as reform and implement promising research and development programmes.

The direct implementation of strategic and tactical measures elaborated by the government commission must be carried out by the executive authorities within the limits of their competences. The key ones are the Ministry of Economic Development and Trade of Ukraine, the Ministry of Finance of Ukraine, the Ministry of Education and Science of Ukraine, the Ministry of Information Policy of Ukraine. At the same time, other central and regional executive authorities should be involved in the implementation of state policy, which, within the boundaries of their own competences, will be responsible for the investment and innovation

development of the corresponding sectors of the economy and social sphere, public administration, including their restructuring, in order to increase overall efficiency of the state investment and innovation and security policy, reduce the level of consumption, resource and energy intensity and switch to modern technologies.

We suppose that in order to ensure the coordination of activities of executive authorities at different levels, as well as the proper involvement of public, business and other structures in this process, it is necessary for authorities and each of the elements of the national investment and innovation system to delegate power to a separate subdivision thus forming the coordination mechanism which is able to make the most of the tools and institutions supporting investment and innovation activities.At the same time, sectoral strategies for the investment and innovation development or special sections within strategies and programmes of socio-economic development of territories or certain types of economic activities that include the mechanisms, tools and measures of the investment and innovation development will be elaborated (and more importantly – they will be co-ordinated with each other, including with joint measures and co-financing, investment and resource support).

In this regard, an instrument for the exchange of information on promising investment and innovation projects between state bodies and organizations that finance the research and development phase and created state development institutions that support these projects at the stage of their implementation and commercialization should become the main mechanism for ensuring coordination within the organizational and institutional framework of improving the investment and innovation provision of economic security of the state. The application of this mechanism will facilitate the integration of business, the research and development sector, investors, as well as the creation of new (transformation of existing ones) strategic enterprises based on the results of applied research.

It is expedient to regard the creation of a national database of

information on prepared and implemented investment and innovation projects, research and development works as a result of implementing this mechanism.

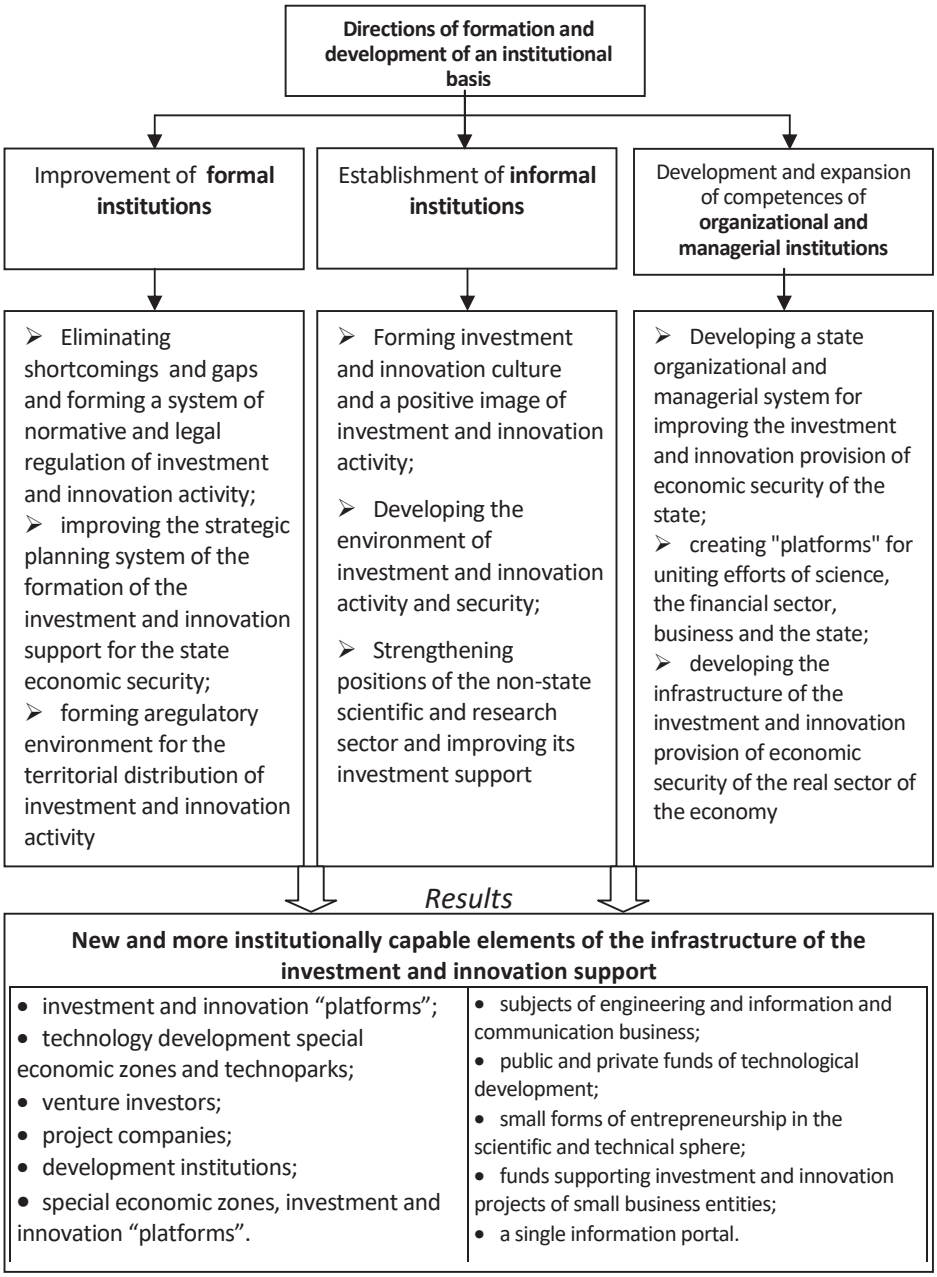
A separate aspect of the proper development of the investment and innovation provision of economic security of the state should be the coordination of national, regional and local investment and innovation policies, the improvement of the efficiency of existing tools and formation of new ones for supporting the investment and innovation development at local level[16].

We believe that the above-mentioned mechanisms and tools have to be mainly realized within the framework of one of the directions of forming the institutional basis of the investment and innovation support for Ukraine's economic security i.e. the development and expansion of competences of organizational and managerial institutions. The total set of tasks that must be implemented as a whole is shown in Figure 1

We want to note that such a link of institutional provision of investment and innovation activities as the functioning of informal institutions remains the least secured in the domestic economy today. Instead, in the practice of developed countries, the role of this component is one of the decisive ones. In fact, it is aimed at increasing the influence of certain factors that are not a manifestation of clearly defined entities or are not regulated by law, but they are perceived in a particular environment and they encourage its subjects to take certain actions, even if they are not prescribed in any regulatory act. These factors operate at the socio-psychological level; therefore, their implementation is very important, especially because their control does not require significant expenses.

[16] Zaiarna N.M. Characteristics of the components of the management system for the investment and innovation support of economic security of the national economy / N. M. irna, H. V. Kizin // Modern Science. Modernivěda -. - Prague, Czech Republic. - 2016 - №3. - P. 117-123

Figure. 1. Tasks and results of improving the institutional basis of the investment and innovation support of economic security of Ukraine



Source: compiled by the authors on the basis of the research

In our opinion, one of the most important elements in the system of informal institutions is the formation of economic agents in the environment, as well as certain culture in the society. In this case, we speak about the investment and innovation culture and a positive image of investment and innovation activity. We are referring to cultural prerequisites, and the active implementation of information and education policy with the joint efforts of the state, business, the financial sector and non-governmental structures.

Actually, the Ministry of Information Policy of Ukraine, which has the appropriate resources and opportunities and has access to the use of a popularization tool, should become the main subject of the implementation of state policy in this area. This is mainly about competitive budget support for the creation of cycles of television programmes, radio broadcasts, Internet broadcasts, motion pictures, periodicals that promote scientific and research activities, innovation business, investors who finance entrepreneurial innovation projects, personal success of citizens and business entities that are engaged in innovations, and reveal features of managing investment and innovation projects and research activity, its business planning and business engineering.

The projects of creating museums which exhibit achievements at the leading technical higher educational institutions of Ukraine should be considered as having rather great potential in the context of forming culture and the image of investment and innovation activity (or, rather, its creative component i.e. research activity). Such museums, besides displaying exhibits and operating models, may also include training and experimental laboratories for pupils and students, youth research organizations, business incubators and centres for the development of business activity of young creative people.

We consider enhancing the prestige of science and education, as well as promoting wide public discussion (including decision-making) of the problems of integrating economic interests and the development of cooperation between representatives of education, science, business,

investors and the state regarding the implementation of scientific research, development and commercialization of the results of innovation activities (in all spheres of public life), the formation of sufficient investment support for the functioning of the centres of producing and putting innovations into practice to be the main motives of such a social and informational influence.

Within the framework of regional programmes supporting small entrepreneurship, in particular youth one, it would be reasonable to allocate funds for the activities aimed at the publication of popular scientific literature to familiarize potential successful entrepreneurs with current trends in the development of science and technology, their role in the economy, the prospects for the development and implementation of technical and technological innovations in different types of economic activities, sectors of the national economy and spheres of public life of the population.

We believe that the development of the investment and innovation culture in our country will also be facilitated by wider participation of business associations in these processes, which would take on the role of encouraging investment and innovation activities, for example, by organizing national or regional awards (with the widest possible dissemination of relevant information on winners in national and local mass media) for the best implemented investment and innovation project, or an innovative consumer product or technology, capable of improving the living standards, innovative products brought to foreign markets, etc.

It should be noted that the involvement of leading Ukrainian scientists in the popularization of these processes and the implementation of competition support for the corresponding projects and programmes being realized by organizations of the education and science sector, chariTable foundations, other non-profit organizations must be an important condition for the effective realization of the tasks of forming the investment and innovation culture and a positive image of investment and innovation activity in our country.

In any case, the main result of the active state policy on forming

informal institutions of the investment and innovation provision of economic security should be the created sector of investment and innovation business, whose subjects (founders, owners, managers, personnel, representatives of the main and auxiliary enterprise infrastructure etc.) have a clear and strong belief that there is no alternative to the investment and innovative way of functioning and development of their own business. This will be the best way of informal promotion of investment and innovation activities in Ukraine, especially in the area of active entrepreneurship.

Taking into account the aforementioned, in our opinion, the main focus of state policy in this direction must be: the maximum elimination of obstacles that restrain innovative activity of enterprises and individuals that are business entities, the distribution of advanced technologies in the real sector of the national economy; the introduction of factors – stimulators of constant innovation activity of business entities, linking its results with the competitive advantages of enterprises and their products; the formation and development of new segments of the market of high-tech products.

Therefore, as regards the latter, we suppose that the tools of state policy here are active cooperation with regional and branch business associations, domestic and foreign investors in creating and using for these purposes innovative technological platforms based on the partnership of business, the financial sector, science and the state.

The measures to deregulate procedures for managing rights to objects of intellectual property are low-cost for the state, but very important for active investment and innovation business entities. Today, these complex, long-term and costly procedures restrain the protection and commercialization of the results of intellectual creative activity in our state. There is a necessity of simplifying the order of transferring the used rights to the results of intellectual activity, including the transfer of data from the right holder to their direct creators and authors, the introduction of wider administrative responsibility of employees liable for issuing security documents and servicing of actors that carry out operations with the

registration of rights or directly with rights to intellectual property objects.

Of course, a financial incentive, in particular, a fiscal one is the greatest for activating investment and innovation activities of business entities; positive practices of changing taxation conditions in order to revitalize both innovation and investment are characteristic of Ukraine. However, today practically all of them are cancelled. In addition, this, among other things, has led to critical issues of investment and innovation security of the real sector of the domestic economy. Consequently, we are convinced that a significant improvement of tax conditions is needed in order to implement wider investment and innovation activity in Ukraine.World experience has proven that these measures should focus on improving the investment and financial ability of business entities to support technical and technological modernization of their own production capacities, easing the tax burden on micro, small and medium-sized enterprises, which are innovative and technologically active. The tools for this can be defined as follows: providing additional privileges regarding compulsory social payments for small businesses, as well as the residents of special economic zones and technology parks that implement technology; directing tax benefits at the formation of investment support for the implementation of all types of innovations; creating a favourable tax regime for venture capital investment; providing tax privileges concerning compulsory social payments for engineering and information technology business.

In addition, the environment of investment and innovation activity has to have a high level of investment attractiveness besides the taxation. Therefore, within the framework of state policy on the formation of informal institutions in the analysed sphere, it is important to ensure the improvement of the investment climate, including through qualitative privatization together with the involvement of foreign strategic investors with high innovation and technological competencies, the reduction of the level of a regulatory influence of the state on the processes of the internal market, the implementation of measures (including, using the tools of public and private partnerships, tax and tariff regulation) to raise the innovation

attractiveness of priority innovative sectors of the economy, the guarantee of high transparency in attracting, using and returning investment resources involved in the national economy and social sector (the process of investing in the creation of new high-tech production facilities and upgrading material, technical and technological base of innovatively active businesses should be especially flawless (including, state guarantees), the simplification of the procedures for granting patches of land, permitting and conciliation procedures and the procedures of joining the engineering communications when creating new enterprises (business objects) at the expense of investment.

In our opinion, when forming and extending competences of the informal sector of the institutional basis of the investment and innovation provision of economic security, it is necessary to ensure the development and strengthening of the positions of subjects of the non-state research sector and improve its accessibility to the investment resource.

We want to note that the effective functioning of the entities in this sector is especially important, as state-owned (or those that are largely funded from the budget) research structures tend to be more inert, less efficient or innovatively capable. In contrast to them, the private sector is more active in this type of activity, it is forced to look for orders and funding on its own, hence it has a stronger orientation towards the applied nature of research, the search for new creative ideas and the development of new solutions for which there is market demand. For example, the indicator, such as the "share of the non-state sector in research activity", is used among the main indicators of the volume and effectiveness of innovation activity by the Organisation for Economic Cooperation and Development (the structure unites 34 countries of the world, most of them are countries with high incomes and a high index of human development and they are considered to be developed).

Today, in our country, there are many structures of non-economic security and they operate, mainly, due to writing and implementing grant programmes, receiving orders from business entities, responding to various

types of public enquiries. For the most part, financial, economic and legal activities of such structures are not accounted for, and it hinders the further progress and implementation of the mission of this sector. We believe that the state should work on a gradual increase in the number of non-state entities of research and development, as well as the share of financing of their activities, including at the expense of financial resources of business entities.

As a result, it is important to get a positive effect in the form of forging stronger and more flexible links among scientific researches development and meeting the economic security needs of domestic entrepreneurship for innovations, and investors who intend to finance promising investment and innovation business projects.The state here is endowed with sufficient capabilities and tools that can be implemented. For example, they can be: providing access (on a fair competitive basis) of non-state scientific and educational institutions with specialists who have relevant experience and qualifications to all types of public funding for fundamental and applied research; the formation of databases of non-state research structures and their project stories (what projects were financed and implemented, what were their results, efficiency, timeliness of works, the absence of misuse and irrational use of funds, etc.), assistance in establishing contacts and receiving orders for research on the part of state enterprises, communal structures and other leading subjects of domestic business, especially investment and innovatively active ones; ensuring access of interested organizations to the use of the infrastructure of technology transfer centres, databases of the state system of scientific and technical and economic information, the material and technical base of state scientific and educational organizations.

The financial support is of particular importance for forming and developing the subjects of the non-state scientific research sector. However, it must necessarily be linked to fiscal and financial support of innovatively active business, in particular, a small one. The world experience in this direction shows the positive practice of creating public and private funds of

technological development, funds for the promotion of small forms of entrepreneurship in the scientific and technical sphere, funds for support of small business projects, which are innovative and have great applied importance for socio-economic growth of less developed territories, funds for the co-financing of enterprises' expenditures for conducting applied research, etc.

In the end, the government can engage foreign international financial technical assistance with the purpose of financial support for innovatively active entrepreneurship and giving medium- and long-term (3-5 years) low-interest loans for conducting R & D, expenses of business entities concerning patenting, the creation of industrial designs, certification, consulting and methodical support of investment and innovation projects with the participation of subjects of the non-governmental sector of the research area. In turn, sufficient control over the receipt and use of budget and financial support, as well as a high level of responsibility for the misuse of such a resource, should be ensured.

In the part of formal institutions of the investment and innovation provision of economic security of Ukraine, it is appropriate, first of all, to make an inventory of the already established infrastructure of investment and innovation activity in our country, identify its shortcomings and gaps, ensure the reformation and modernization, increase the efficiency of functioning and the ability to influence the intensification of investment and innovation activity, in particular, in the system of forming the principles of economic security of the state.

Given the problems of investing, we believe that it is reasonable to ensure further development of the domestic investment and innovation infrastructure in the directions, the first of which concerns the improvement of the infrastructure of financial support for investment and innovation activities, and the second one deals directly with the infrastructure of innovation activity. Therefore, in view of the complicated state and limited possibilities of domestic investors, the task of creating direct investment funds for innovative projects and enterprises of high-tech sectors of the

economy with the participation of state capital, ensuring the proper coordination of the development institutions activity aimed at supporting investment and innovation projects in order to form a holistic balanced system of investment support at all phases and stages of the innovation process, becomes more and more important.

We would like to emphasize that it is essential to develop the system of institutions of the investment support for innovation activity in Ukraine on a case by case according to the types of investment and innovation projects, as well as their specialization by types of economic activity, branches of the economy. It is important to form and implement the principles of transferring technology and managerial competencies, which are mandatory to comply with, when financing projects, funds and programmes. In order to ensure the optimum use of resources of development institutions, it is advisable to organize interaction at the interface of the areas of responsibility between development institutions as they realize investment and innovation projects and enterprises that implement them.

Providing cooperation and implementing the procedures for joint work on projects can become a means of ensuring the coordination of the activities of development institutions and regional executive authorities in order to increase the effectiveness of commercialization of the results obtained in the process of carrying out state and regional targeted programmes.

In our opinion, it is important to establish the functioning of an information resource that would combine the existing information capabilities of development institutions and related to them by a functional orientation, agencies of the executive branch in order to create a mechanism for exchanging information and organizing continuous interaction when supporting and implementing investment and innovation projects.

In the future, there are all prospects for creating a single information portal on the Internet, reflecting the results of activities of development

institutions and their support for investment and innovation projects, as well as investment and innovation programmes initiated and implemented by the authorities, in particular regional and local ones, in order to ensure access of all interested parties to complete and up-to-date information on the existing system of state support for investment and innovation activities.

The adaptation of existing forms and the creation of new organizational, legal and contractual ones in order to ensure functioning of venture funds and project companies and enterprises, in which venture funds have invested money, can be an extremely powerful institutional basis for establishing a sufficient financial infrastructure for investments and innovations; this also involves making appropriate changes to domestic legislation, in particular, the Law of Ukraine " On Investment Activity ".

According to the next direction, that we have identified – the development of other elements of the investment and innovation infrastructure - it is vital not only to ensure the availability of most of its vital elements, but also to provide them with sufficient opportunities and competences. The domestic experience has confirmed most of the postulates that were proved by classics of institutionalism, in particular, by R. Coase, O. Williamson D. North[17], etc. several centuries ago, that institutions are extremely important, but they cannot function effectively when they are artificially created. Therefore, in our country it is essential to switch to slightly different approaches in the state regulation of the development of the investment and innovation infrastructure, in particular, in compliance with the following principles: support for the distribution of market models of forming and developing objects of the innovative infrastructure and its investment provision; giving additional support to technology development special economic zones, improving the regulation

[17] Coase R. H. The Problem of Social Cost / R. H. Coase. // Journal of Law and Economics. – 1960. – Vol. 3. – P. 1–44.; Williamson Oliver E. Theeconomic Institutions of Capitalism: Firms, Markets and Relational Contracting / Williamson Oliver E. - K.: Artek, 2001. - 472 p.; North D. Institutions, Institutional Change and Economic Performance/ translated from English by I. Dziob – K.: Fundamentals – 168.

of their creation and functioning: providing additional support for investment and innovation towns and other isolated territorial entities with high scientific and innovative potential.

As regards the distribution of market models for the development of the innovative infrastructure objects, there is a positive global experience of the functioning of innovation centres, science and technology parks and other technopark structures. To make these entities have their own market incentives for the creation and further operation, it is necessary to form a favourable economic and legal environment for these processes. We speak about the availability of sufficient volumes of state orders for their services, granting them tax and other privileges and preferences, supply of workers, etc.

Regarding additional support and improvement of the regulation of the activity of technology development special economic zones, we think that today in Ukraine there is a growing need to lighten the burden on residents of technology development special economic zones, which is connected with making payments to state non-budgetary funds, simplify the customs regime for the import of advanced technology, improve the availability of loan-based financing for the implementation of investment and innovation projects together with subsidizing of interest rates, provide state guarantees concerning credit reimbursement and involve financial and investment support from development institutions for appropriate projects; ensure the accelerated formation of objects of the investment and innovation infrastructure in the territory of technology development special economic zones.

We note that within the framework of forming the sector of formal institutions, one should give priority to the real creation in our state of so-called investment "platforms" as institutional entities, where financial and economic interests of representatives of the educational, scientific, financial-investment, innovation and entrepreneurial sectors will come closer and overlap. International practices suggest that special economic zones, as territories with a special economic status and preferential

economic conditions for national and foreign investors, are an important and effective instrument for regional development and they proved to be highly efficient in terms of boosting innovation in the real sector and accumulating a sufficient investment resource for this purpose. Residents of special economic zones receive tax and customs preferences with opportunities for duty-free import of products and technologies that are necessary for investment and innovation activities. Experience suggests that a complex of preferences and administrative support can reduce the investors' expenses to 30%.

We want to add that the objects of engineering and transport infrastructure of special economic zones are created at the expense of state investments. Also, for reducing the level of administrative burden on residents of investment "platforms", activities are organized on the basis of a "single window", that is, investors, in case they have any questions, interact with the structure that provides full support of the investment and innovation project. This complex of support allows residents of investment "platforms" to achieve their goals: to master new markets for selling products (goods, works, and services), bring their production closer to consumption, minimize costs due to the absence of export and import customs duties, gain access to the existing infrastructure and completely eliminate corruption and bureaucratic barriers.

We are convinced that regional and local authorities have all the possibilities for organizational and resource support of projects to create "platforms" for the implementation of investment and innovation projects. It concerns both land plots and vacant premises, as well as support for the formation and provision of the necessary infrastructure. At the same time, we emphasize that it is expedient and appropriate to delegate most of the privileges and preferences (and thus the opportunities of regional and local authorities) from the central to the local level, since local authorities are, to a much greater degree, interested in supporting such kinds of projects and initiatives. This innovation would become a sufficiently significant factor and condition for activating the creation of "platforms" in Ukraine to intensify

investment and innovation activities.

Yet the institutional basis for forming the investment and innovation support for Ukraine's economic security requires the implementation of the above-mentioned tools and techniques in the legislative field, which will allow them to become mandatory and ineviTable. Here we speak about the two main normative and legal acts in the analysed area – the laws of Ukraine "On Innovation Activity" and "On Investment Activity", the provisions of which today do not serve as a motivating factor for intensifying investment and innovation activity in our state, moreover, they do not ensure the coordination of activation of investment and innovation activity, strengthening of the competitiveness of the real sector of the domestic economy and increasing the efficiency of the functional and structural components of economic security of the state. On this basis, we believe that the expediency and appropriateness of adopting a new and better legal act, namely, the Law of Ukraine "On Investment and Innovation Provision of Economic Security of Ukraine", is becoming more and more relevant today.

Additional arguments in favour of the adoption and implementation of such a legal act are possibilities of activating and obtaining a positive socio-economic effect not only in the real sector of the national economy of Ukraine, but also in all other areas of public life of the state, such as socio-demographic, financial, foreign economic, energy, and food, ecological and in others. The implementation of the investment and innovation model of complex socio-economic development necessitates creating effective institutional mechanisms for the reproduction, development and use of the country's scientific and technological and innovative potential, ensuring the active introduction of modern technologies into production activities, production and sales of new types of competitive goods, works, services, as well as technological solutions (Figure 2).

Figure. 2. The directions of the improvement of normative and legal provision of investment and innovation activity in the system of economic security of Ukraine

Source: compiled by the authors on the basis of the research

Figure 2 shows the main guidelines for changes that, in our opinion, should be implemented in the main normative and legal acts concerning the investment and innovation provision of economic security of Ukraine, as well as the result of reforming the basic normative and legal act in this area.

In general, in order to improve the Law of Ukraine "On Investment Activity", in our opinion, it is important to improve its provisions in the context of boosting the investment potential of supporting innovation activities (usage of real incentives and conditions for making the interests of investors, representatives of the research and business sectors come closer), increasing volumes and a clear identification of conditions for fiscal investment (which projects, in which volumes, in which types of economic activity and sectors, according to what directions and quotas they have to be financed at the expense of budgetary funds at all levels of management), the formation of a positive and favourable investment climate (as the current reflection of the state of the investment environment, its qualitative and quantitative characteristics, the effectiveness of implementing the elements of state investment policy), decentralization and providing more opportunities at local level concerning the change in normative and legal conditions of functioning of the elements of the investment and innovation infrastructure.

As to the elimination of the general shortcomings of the Law of Ukraine "On Innovation Activity", the main guidelines here should be the improvement of the motivation field for activating investment and innovation activities, the formation of an appropriate environment for this, the establishment and development of the internal market of intellectual property and research activities and the implementation of their results, development of their segments, strengthening of cooperation between representatives of the real sector of the economy and the EU countries in the investment and innovation sphere.

However, the adoption and implementation of the provisions of the Law of Ukraine "On Investment and Innovation Support of Economic Security of Ukraine" would be much more efficient. We believe that with

the help of this law it would be possible to form qualitatively and efficiently the appropriate systemic links between the elements of the investment and innovation provision of economic security of the real sector of the domestic economy, develop a full-fledged infrastructure of investment and innovation activity, ensure the positive impact of investment and innovation activity on all, without exception, components of economic security of Ukraine, i.e. those of financial, economic, and social nature.

As it should be added, it is important to sufficiently intensify investment and innovation activity at the micro level of management, and for this purpose, it is necessary to determine the most promising directions of the development and introduction of innovations, as well as their investment support, which is the subject of the next research section.

Thus, in a certain way, summarizing the results of this scientific and applied development, we consider the following statements to be objective: when devising a new format of the mechanism for managing the investment and innovative provision of economic security of the national economy together with its adaptive levers and regulators, strategic and applied tools, one should synchronously take into account the position of system, process, resource and functional, system and institutional approaches to the formation of six constitutive-key sub-mechanisms.

Compliance with the afore-mentioned and the unconditional incorporation of the mechanism into the overall system of economic security will ensure the effectiveness of its implementation. Taking into account certain importance, characteristics and parameters of the development of basic types of economic activity, the reasonableness of priority objects of efforts localization, the conditions of the national economy functioning and the existing level of socio-political threats and risks to sustainable development of the state and its regions, one can single out six basic elements of the established mechanism (Figure 3). They are as follows:

1) the formation of informal institutions of the investment and innovation provision of economic security;

2) the development and support of the functioning of the fund that finances projects of entities from the entrepreneurial sphere of activity;
3) the improvement of elements of the system of economic security and rationalization of its functional and structural components;
4) the improvement of financial and resource conditions for conducting investment and innovation activities;
5) normative and legal support of the effectiveness of investment and innovation activities in the real sector of the state economy;
6) the improvement and introduction of the information and methodical provision in the management practice.

Peculiar functions of implementing the mechanism for managing the investment and innovation provision of economic security of the Ukrainian economy are the following: a) forming the investment potential of development and modernization of the national economy; b) securing a high level of safety and guarantees of preserving authorship and ownership of the results of intellectual creative activity (including the results forming the intangible assets of the entities of economic management); c) rationalization of profits in the process of commercializing innovative solutions and developments; d) stimulation of inventors and venture structures; e) capitalization of the results of innovation activity and transforming them into goods that can be sold both on the domestic and on the foreign markets; f) accumulation of powerful financial and investment potential and available reserves for the development of applied education, science and "platforms" for the cooperation of innovation developers and businesses; g) strategic investment in the creation of revolutionary and basic innovations that are important for the economy (given the importance of their influence on the comprehensive strengthening of competitiveness of the national economy and defence capabilities of the state); h) planning and forecasting of investment and innovation activity in the context of raising the level of economic security of the economy, strategizing; k) organization and regulation of investment and innovation activity in the basic fields and

industries; l) motivation and permanent control (concerning the effectiveness of investment and innovation activities and levels of economic security, as well as research intensity of products and services); m) monitoring, analysis and diagnostics; n) eliminating threats and risks of various nature: macroeconomic, subjective, resource, process and structural ones.

The implementation of the proposed mechanism is to be carried out according to six levels: national, at the level of territorial natural and economic districts; regional; sectoral; district; local; micro level. In addition, it should be mentioned that, besides the substantiated in this section and the proposed ways to improve the investment and innovation support for economic security of the national economy of Ukraine, the subjects of different levels should apply well-established management techniques and methods. In particular, they can be: means of direct management such as delegation of authority and tasks; criticism and encouragement; service supervision and control over the results; information support and improvement of communications; optimization of receiving, selection, distribution, transformation, accumulation, transmission and application of information bases; quasi-means of management: clear delineation (or restriction) of centralization, depending on the scale of resource provision; formalization of organizational structures of management in accordance with the conditions of functioning of a certain type of economic activity and economic security of the national economy; improvement of industrial-economic, interregional and inter-sectoral interaction; motivation of investment and innovation activity, etc.

Taking into account the visualized (Figure 3) and substantiated dominants of the original mechanism for managing the investment and innovative support of economic security of the national economy, we consider it appropriate to formalize the conceptual and analytical model of the latter in the form of the formula (1):

$$\boldsymbol{M_{mes} = S_{ES}\ ]}(\{\text{a, в, c ...}\}\boldsymbol{N^6} \cup \{\boldsymbol{R_V} \wedge \boldsymbol{R_R}\}\boldsymbol{N^6})$$
$$\left(\boldsymbol{S_{35}^3} \wedge \{\boldsymbol{P_I}\}: \rightarrow \{\boldsymbol{S}(\boldsymbol{M^R}, \boldsymbol{S^C}, \boldsymbol{F^K}, \boldsymbol{SU^F})\}\right) \cup \boldsymbol{f}: \boldsymbol{R_n^6} \qquad (1)$$

Where, ***Mmes*** is the mechanism for managing the investment and innovation support of economic security of the economy of Ukraine;

Ses - is general systems of economic security;

$\{а, в, с \ldots\}\boldsymbol{N^6}$– six target subsystems of the original mechanism for managing the investment and innovation provision (sub-mechanisms - Figure 3);

$\{\boldsymbol{R_V} \wedge \boldsymbol{R_R}\}\boldsymbol{N^6}$ – six groups of system-forming levers and regulators of the author's mechanism (Figure 3);

$\boldsymbol{S^3_{35}}$ – a strategic tool for implementing the policies of the various nature; the coordination of their direction should be ensured by the new content of the improved policy on managing the investment and innovation support of economic security of Ukraine (they are defined in the form of thirty-five types of policies of different nature, which are divided into three groups - Figure 3);

$\boldsymbol{P_I}$ – applied tool of the mechanism; $\boldsymbol{S}(\boldsymbol{M^R}, \boldsymbol{S^C}, \boldsymbol{F^K}, \boldsymbol{SU^F})$ - available strategic potential of Ukraine, composed of elementary potentials, divided by nature into four groups (material, social and factor potentials, as well as potentials of systemic and universal functioning);

$\boldsymbol{f}: \boldsymbol{R^6_n}$ - levels of the implementation and introduction of the authorial mechanism into the management practice (is proposed according to six levels - Figure 3).

With regard to this, we note that the introduction into the management practice and the implementation of the author's format of the mechanism for managing the investment and innovation provision of economic security of the national economy will allow regenerating the research intensity of industrial technologies in the medium-term (until 2020) perspective to the level of 2013 with an increase in the share of high-tech productions (25,8%) in the technological structure of the Ukrainian industry, to the values, which are represented by the candidate for a degree based on their predictive solutions in the Table 1. In the same period (until 2020), according to the author's conviction, there will also be regeneration (restoration) of the volumes of sold industrial products (up to the level of 136.8 billion USD).

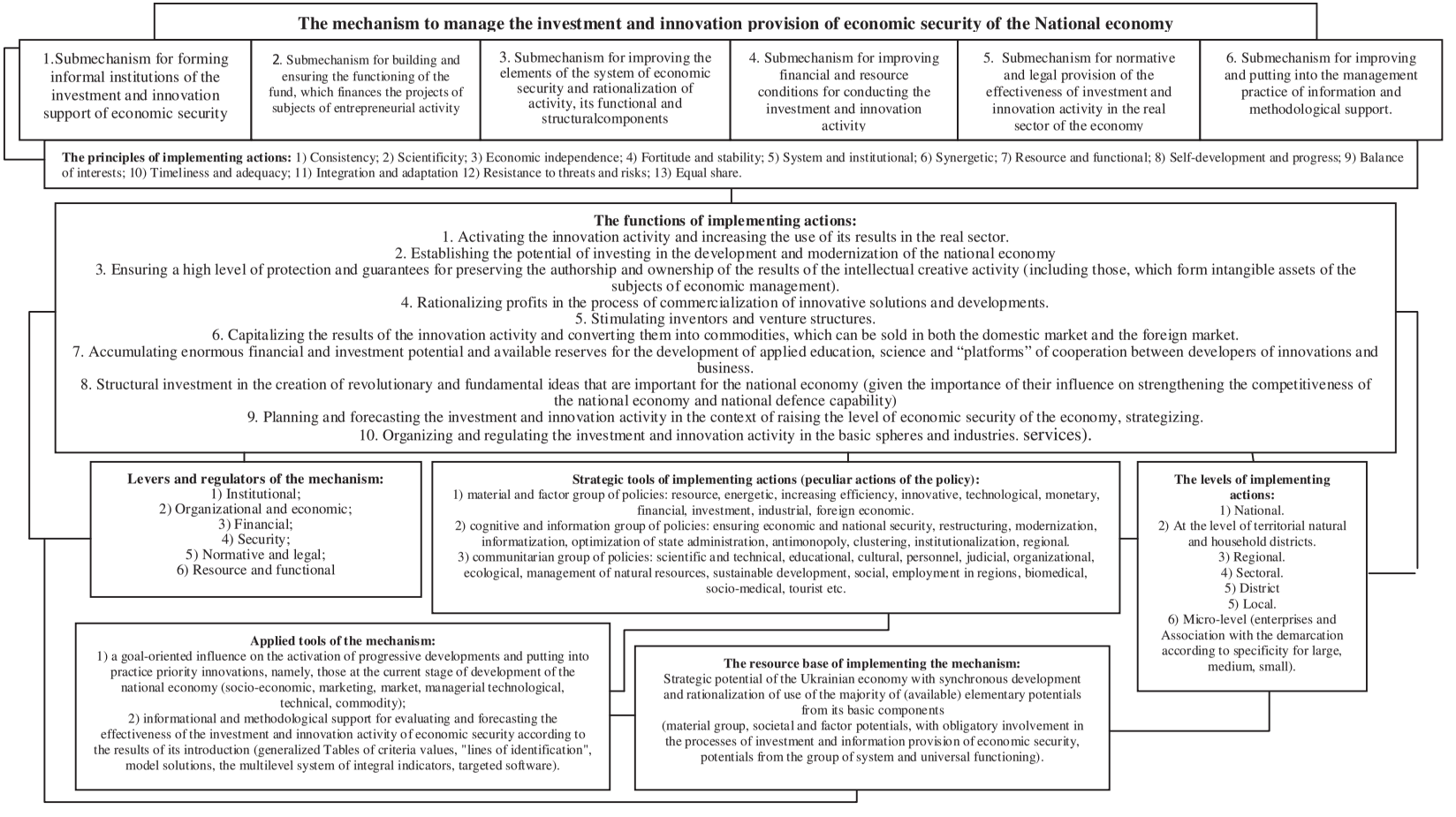


Figure. 3. Dominants of the modern mechanism for managing the investment and innovative provision of economic security of the National economy.

Source: compiled by the authors on the basis of the research

However, this, in fact, does not secure a sufficient recovery (to the level of 2013), as it will require simultaneous rationalization and a dramatic increase in the scale of the investment and innovation support for the real economy.

Table 1. Retrospective and predictive dynamics of the main macroeconomic and technological measurements of the Ukrainian industry functioning (period 2001 - 2020)

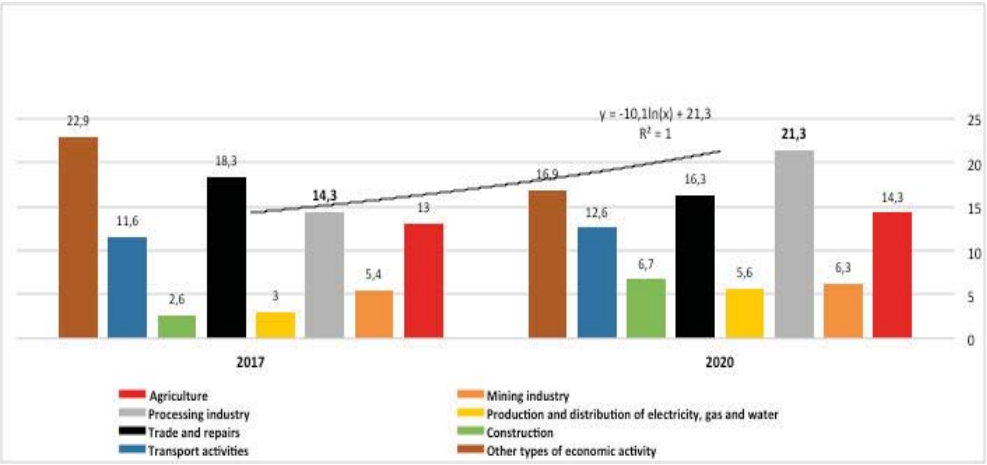
Period, years	Volumes of sold industrial products	Research intensity of industrial technologies	Technological structure of the real sector of the economy,%	
	billion dollars of the USA	relative value	Low-tech	High-tech
2001	39,5	7,12	-	-
2002	43,2	6,77	-	-
2003	54,2	5,84	-	-
2004	79,7	4,72	-	-
2005	92,8	5,05	-	-
2006	109,3	4,55	-	-
2007	142	4,12	-	-
2008	113,4	3,55	-	-
2009	83,7	3,12	88,4 %, including: Low-tech - 37,0%; medium-high tech - 51,4%	11,6 %, including: medium-high-tech -10,4 %; high-tech - 1,2 %
2010	134,4	3,01		
2011	167,1	2,56		
2012	175,3	3,12		
2013	169,6	3,45		
2014	91,1	2,54		
2015	75,6	2,61		
2016	82,3	2,52	77,6 (30,0/47,6)	22,4 (19,1/3,3)
2017	93,0	2,57		
2018	97,5	2,89		
2019	116,8	3,12	73,5 (26,3/47,2)	26,5 (20,5/6,0)
2020	136,8	3,36		

Source: composed on the predicted model solutions

Using the econometric apparatus, we have devised a medium-term forecast of the volumes of sold industrial products (up to 2020) in case of the

introduction into the management practice of the author's mechanism for managing the investment and innovation provision of economic security of the national economy, which enables the volumes to grow up almost to the level of 2013. At the same time, one of the decisive conditions for increasing the share of high-tech industries in the real sector of economy (i.e. medium- and high technology up to 20.5%, high-tech – up to 6.0%) - is the correlates' use (according to the defined levels) of a complex of direct and indirect means in practice which are offered by the author. Therefore, the afore-mentioned will cause a change in the structure of forming GVA according to the form presented in Figure. 4

Figure.4. Predictive transformations according to the structure of GVA formation in 2020



Source: authors' own calculations

Based on the results of the conducted study, we can argue that within the scope of the domestic economy of budget-forming types of economic activities, structural rationalization will take place: an increase in the share of gross value added of the processing industry (due to improving research intensity of processing plants - with the coefficient of determination 0.76) – up to 21.3% ; production and distribution of electricity and gas (with energy efficiency) - up to 5.6%; construction industry – up to 6.7%; agriculture (also,

due to the use of high-tech technologies and the reduction of resource intensity) - up to 14.3%.

Thus, according to the author's definitions, justifications, methodical calculations and verification of them in terms of adequacy in relation to the actual processes that take place in the state, we consider the following to be objective: the introduction of the devised and proposed for application (Figure 3) mechanism for managing the investment and innovation support of economic security of the national economy into the management practice and the implementation of all its dominants (including the justified and outlined in the dissertation strategic priorities, a set of means and measures of state policy, together with the material and factor, cognitive and information, communitarian groups of policies) will make it possible to critically change the situation in the direction of a significant improvement of the investment and innovation provision of economic security of the national economy. Moreover, such a policy allows intensifying processes of the formation in our country of the economic and legal framework and the infrastructure for systemic activation and use of the results of investment and innovation activity for the purpose of sustainable socio-economic progress.

Conclusions. The proper efficiency of the policy on forming the investment and innovative support of economic security of the state depends to a large extent on and is determined by the establishment of a favourable institutional environment. In order to identify the main tasks in this area, the primary directions of the formation and development of the basic levers of the institutional environment have been identified. In particular, for improving formal institutions, it is necessary to eliminate shortcomings and gaps and form a system of normative and legal regulation of investment and innovation activity; improve strategic planning for the formation of the investment and innovation support of the state economic security; form the regulatory environment of the territorial distribution of investment and innovation activity; for establishing formal institutions – it is vital to form investment and innovative culture and a positive image of investment and innovation activity; develop the environment of investment and innovation activity and security;

strengthen the positions of the non-state R&D sector and improve its investment support; for developing and expanding the competences of organizational and managerial institutions – it is essential to form a state organizational and managerial system for improving the investment and innovation provision of economic security of the state; create "platforms" of united efforts of science, the financial sector, business and the state; develop the infrastructure for the investment and innovation support of economic security of the real sector of the economy**.**

There is no doubt that general management of the formation and implementation of the strategy and the coordination of the interaction between the main elements of the investment and innovation system of economic security of Ukraine should be delegated to a government commission specifically set up for these purposes, which will operate on the principles and in accordance with the principles established in the adopted draft law "On Investment and Innovation Support of Economic Security of Ukraine ".

The proposed conceptual and analytical model and optimal for Ukraine format of the mechanism for managing the investment and innovative support of economic security of the economy are formed on the basis of synchronous use of the provisions of system, process, resource and functional, system and institutional approaches to the formation of six constitutive-key sub-mechanisms. They are: 1) the establishment of informal institutions of the investment and innovation provision of economic security; 2) the development and support of the functioning of the fund, which finances projects of entities from the entrepreneurial sphere; 3) the improvement of elements of the economic security system and rationalization of its functional and structural components; 4) the improvement of financial and resource conditions for conducting investment and innovation activities; 5) legal and regulatory support for the effectiveness of investment and innovation activities in the real sector; 6) the improvement and introduction of information and methodical support in the management practice.

According to the presented econometric model, we have created a medium-term forecast of the volumes of sold industrial products (up to 2020) in case of the introduction into the management practice of the author's mechanism for managing the investment and innovation support of economic security of the national economy, which is likely to boost: a) their growth almost up the level of 2013, (to 136.8 billion USD); b) an increase in the share of high-tech industries in the real economy (medium-high technology up to 20.5%, high-tech - up to 6.0%); c) structural rationalization within the national economy of budget-generating types of economic activity (with an increase in the share of GVA in the processing industry - up to 21.3%; production and distribution of electricity, gas and water – up to 5.6%; construction industry - up to 6.7% ; agriculture, due to the increase in research intensity of production and technology - up to 14.3%).

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STRENGTHENING OF ECONOMIC SECURITY OF DEVELOPMENT OF THE REGIONS OF UKRAINE IN THE PROCESS OF STRUCTURAL AND INSTITUTIONAL TRANSFORMATION

Abstract. The essence of economic security as a system of economic relations between economic entities and between them and the state in the process of neutralization of threats, minimization of risks and adaptation to the conditions of uncertainty of the economic environment arising out of the maximization of profit, maintenance of vital functions and optimization of the structure of the economy is revealed. The methodological approach to the use of a multiplicative model for calculating the integral indicator of economic security of regional development is proposed. The results of the analysis of the dynamics of changes in the level of economic security of the regions of the Carpathian economic region show that the excess of the threshold values of indicators of economic, scientific and technical, socio-economic security leads to the formation of crisis and pre-crisis phenomena. The conceptual foundations of the methodology of institutional designing of the socio-institutional environment based on the use of theory and methods of fuzzy logic and institutional analysis for modeling the desirable and real state of the socio-institutional environment of Ukraine, the regions of the Carpathian economic region and the predicted values of indicators of economic security are substantiated. The modified SWOT matrix for the regions of the Carpathian region is proposed, which made it possible to quantify the existing threats and weaknesses of the socio-economic status of the region and can be used as a basis for the development of structural policy of the region, strategic programming of structural changes, the design of an institutional basis and definition of the impact of threats on the economic security of the region.

JEL Classification System: J21, E24

Keywords: socio-institutional environment, structural institutional transformation, economic security, region, antidepression component, institutional infrastructure, structuralpolicy, strategies of regional development.

Introduction. The urgency of solving an important scientific and applied problem of transforming the structural and institutional basis of the economy of the regions of Ukraine on the basis of scientific substantiation of strategic priorities of strengthening the economic security of the state and measures in the process of implementing regional policy is conditioned by objective prerequisites for strengthening the influence of global factors. Insufficient justification and rationality of structural changes have led to a significant lagging behind the development of transition economies in other countries, deepening disproportions between the existing production structure and the strategic goals of national development.

The economic security of the state as a single, purpose-oriented system requires in-depth research to outline the methodological basis of the security of the industry, the economic sector, the regional economic complex, enterprises, households, individuals, that is, at all levels of the system hierarchy of the socio-economic macrosystem of the state. The study of problems of strengthening the state's economic security is associated with the development of theoretical foundations of security, the outline of the main threats, and the analysis of the state of economic security in the context of participation in the processes of global economic integration[18].

The regional security and security of economic entities related to it are still insufficiently researched. In the context of globalization, the interconnection and interdependence between the structure of the economy and the quality of the institutional basis are increasing, and economic security becomes an objective prerequisite and a general objective of socio-economic development. The structural shifts, supported by institutions, provide

[18] Resolution of the Verkhovna Rada of Ukraine "On the adoption of the draft Law of Ukraine on National Security of Ukraine"]. (2018, 04, 05). Retrieved from http://rada.gov.ua.

economic growth, and their implementation is regulated by the criteria for ensuring the economic security of the state and the region[19].

The critical analysis of the evolution of the theory of economic security suggests that since uncertainty, risk and danger are the properties of the economic system, then, firstly, the problem of security has a general character, and secondly, the economic system in a specific period of time has a certain level and security potential. Finally, thirdly, security is an inherent property of the economic system.

Together with the negative influence of the processes of globalization (virtualization of financial globalization, illegalization of world economic relations, asymmetry and inequivalence of the movement of capital, information, results of intellectual work, human capital) this increases the uncertainty of the development of the global economy and national socio-economic macrosystems related to it. Accordingly, the external threats to the national security of the state, in particular, economic security are growing to critical limits[20].

The in-depth analysis of national and foreign theoretical concepts of economic security made it possible to identify their contradictions and complementarity with a unifying feature with recognition of the role of the state in ensuring economic security. In general, state regulation of the economy is aimed at optimizing the proportions between production, exchange, distribution and consumption. The institutional basis - institutions of property rights, contract law and stimulation of competition, aimed at reducing the transaction costs of economic operations serves the stated purpose. It is production in terms of resource allocation that requires an effective structural policy of the state.

The object-subject approach to the interpretation of the category of economic security is realized on the meta-level (global, world, economic

[19] The National Security Strategy of Ukraine. Approved by the Decree of the President of Ukraine]. (2007, 02. 12). Available at:http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=105 %2F207.

[20] Horbulin, V. P., Kachynskyi, A. B. (2009). Principles of National Security of Ukraine, Kyiv, Intertekhnologiia, 123 p.

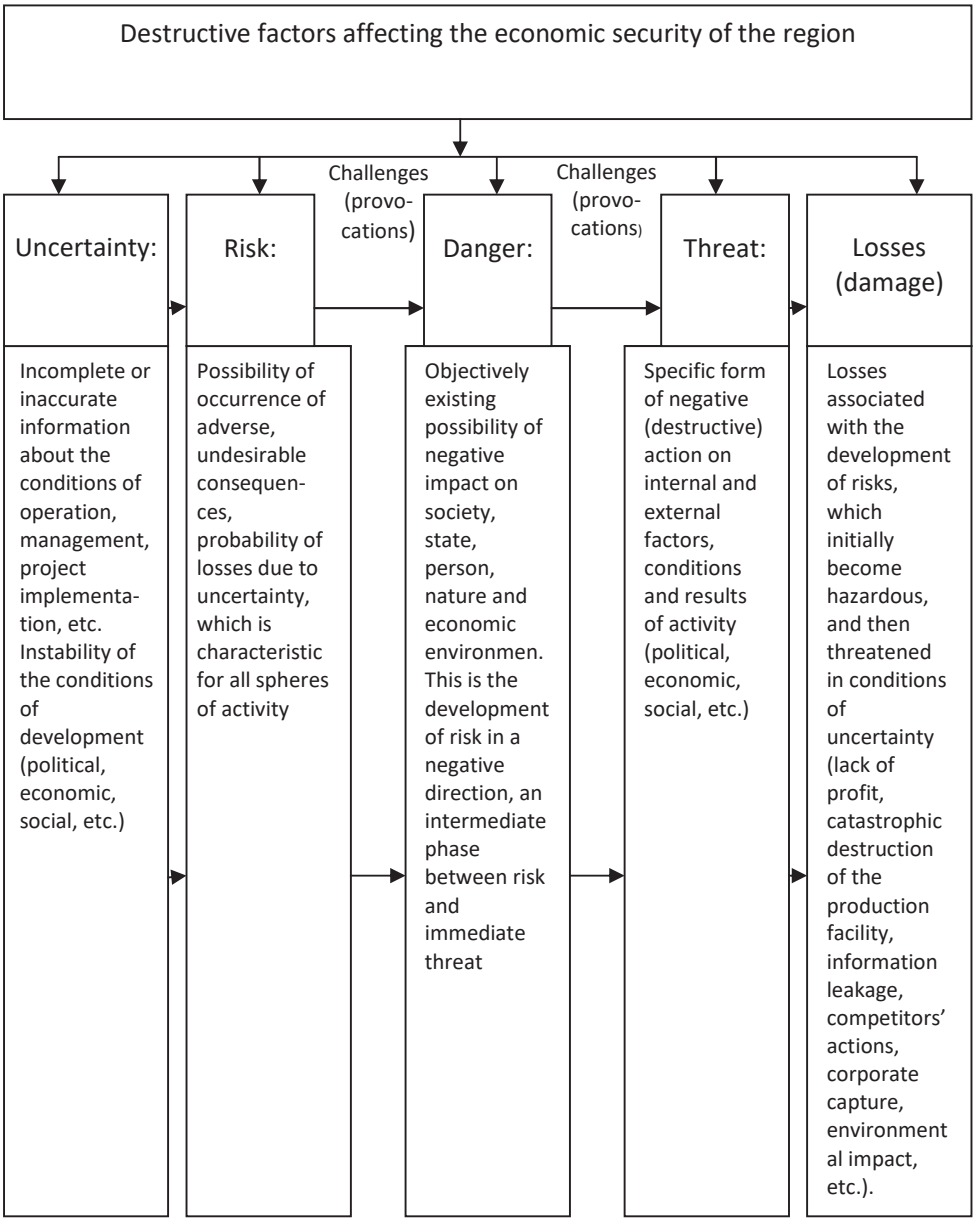
security); macro level (security of the national economy); meso-level (economic security of a region, industry, sector); micro level (economic security of an enterprise, household); nanoscale level (economic security of a person).

The study allowed identifying economic security as a hierarchical system, conceptualized as: 1) the need of economic entities, determined by the degree of satisfaction of other socio-economic needs; 2) the system-functional property of an economic system that permeates all production relations and is defined by a "security matrix"; 3) the state of the national economy, characterized by an optimal ratio of productivity, efficiency, flexibility, and adaptability; 4) the state's target function in providing the necessary and sufficient level of security. The integrated set of these characteristics allows the system to be self-sufficient, dynamically sTable, adequately respond to internal and external challenges, develop and improve[21].

The requirements for ensuring economic security are formed under the influence of a number of factors: objective and subjective, internal and external, predicted and unpredicTable. In a concentrated form, they can be presented as destructive ones, affecting the economic security of the region[22]. Based on the foregoing, the following categories should be distinguished: uncertainty, risk, danger, threat, losses[23] (Figure 1).

[21] Humenyuk, A. M. (2014) The security of the structural and institutional transformation of the region's economy: the theoretical foundations and applied aspects], Kyiv, NISR, 38 p.
[22] Kuzmenko, V. V. (2008). Economic security and sustainable development: a regional dimension, Donetsk: donNUET, 73 p.
[23] Kachynskyi, A. B. (2004). Security, threats and risks: scientific concepts and mathematical methods, Kyiv, 217 p.

Figure 1. Destructive factors affecting the economic security of the region



Source: authors' own calculations.

Thus, the threats to the economic security of the regions are reflected in the dominant characteristics of regional development: geographical location,

historical cycle, regional specialization, national-ethnic composition. The essential characteristics of the regional economic security include the achievement and preservation of a homeostatic equilibrium with a constantly changing environment and systemic effects: multiplicative, synergetic, and emergent[24].

If man-made disasters are an internal threat to the region, then various fluctuations of business activity cycles are external threats that increase as a result of the region's integration into the global economy. At the same time, at the regional level there is no means of influencing the processes of globalization. The region is not able to prevent fluctuations in economic cycles, or to influence them in a certain way, but can adapt to these fluctuations by means of economic shock absorbers, in particular. Such shock absorbers are aimed at minimizing the negative effects of cycles, and specifically, the crisis and recession in the global economy, including the world financial ones. The region is a subject of the global economic cycle, not its object and depends on crises and recessions, but does not affect their occurrence, depth and duration[25].

The analysis of the socio-economic development of Ukraine confirms that the emergence of threats to the country's economic security is predominantly regional in its nature, and further socio-economic development will depend on a well-grounded development of the strategy of a particular region. A reliable and complete assessment of the level of economic security of the region, as well as measures and mechanisms for its provision under the influence of internal and external factors, plays an important role in the strategy shaping.

[24] Humenyuk, A. M. (2012). Regional dimension of the security of structural and institutional transformation. Socio-economic problems of the modern period of Ukraine. Structural rebuilding of the economy: regional aspect. NAS of Ukraine. Institute of Regional Studies, Lviv, 3(95), 118 p.

[25] Vlasiuk, O. S. (2010). External threats to Ukraine's economic security and ways to overcome them. Problems of increasing efficiency of the functioning of enterprises of different forms of ownership, Donetsk: NAS of Ukraine. Institute of Industrial Economics, 157 p.

We will calculate the integral indices of economic security of the Carpathian economic region (Zakarpattia, Ivano-Frankivsk, Lviv, Chernivtsi regions) using the multiplicative method by the formula (1)[26].

$$I_m = \prod_{i=1}^{n} z_i^{a_s}, \quad (1)$$

Where, a_i – weight coefficients determining the degree of contribution of the i-th indicator to the integral index, and, $i = \overline{1,n}$, z_i – indicators of the level of economic security.

The analysis of the dynamics of the change of the integral index of economic security of the regions of the Carpathian economic region (Table 1) gives grounds for distinguishing the region with the highest and lowest level of economic security. The integral index of economic security indicates that Chernivtsi region has the best indicators with a tendency to increase. If in Lviv region for 2005-2008 the integral index grew, then in 2010-2017 there was a significant decrease. In Zakarpattia (Transcarpathian) region, the integral security index increased for 2005-2017. However, in absolute terms, the values of the indicators of Zakarpattia region are somewhat lower than in other regions (except Ivano-Frankivsk region). Ivano-Frankivsk region is characterized by gradual growth (2005-2010), and reduction of the integral index of economic security for 2010-2017[27].

Thus, the analysis of integral indexes of economic security enables to assess the economic development of the region separately and in the structure of the region, to compare the dynamics of their development with the border regions of the countries of Central and Eastern Europe and the neighbouring regions of Western Ukraine. The proposed methodology provides the basis for determining the integral indices of the components of economic security, the analysis of the state of economic security of economic entities. In their turn, integral indices of economic security reflect the

[26] Kharazishvili, Yu. M. (2006).Methodological principles of the integrated assessment of the regions. The formation of the market relations in Ukraine, 10, 131-136 p.
[27] Official website of the State Statistics Service of Ukraine. Available at: http://ukr.stat.gov.ua.

tendency to change the level of economic security as the basis for making strategic decisions for socio-economic development of the region with the necessary ensuring of economic security.

Table 1. Dynamics of the change of the integral index of economic security of the regions of the Carpathian economic region, 2005-2017.

Region / Years	Zakarpattia	Ivano-Frankivsk	Lviv	Chernivtsi
2005	0,3254	0,2576	0,3518	0,3595
2007	0,3545	0,2843	0,3743	0,3946
2008	0,3340	0,3285	0,4013	0,4396
2010	0,3795	0,3535	0,3841	0,4397
2015	0,3885	0,3533	0,3752	0,4398
2017	0,3944	0,3239	0,3750	0,4386

Source: authors' own calculations.

The institutional basis is dominant in the system of economic security. Currently, its basis does not create rational legal preconditions for ensuring economic security, as there is no holistic legal approach to solving this problem. There are a number of factors in the modern legal framework that restrain the system of ensuring economic security. At the post-Soviet stage of development it is current legislation that has not yet been formed as a system of protection of an individual's security and the state from threats. The normative-regulatory and organizational components of the activities of economic security entities, especially on the meso-level, have not been completed either. The significant disadvantage is a lack of legislated strategic documents of strengthening of economic security of the state, organizational and institutional definition of economic security in the public administration of various levels of the hierarchy with the outlined powers and responsibilities,

as well as monitoring and forecasting, legally mandated standard of economic security[28].

To strengthen the economic security of the state, it is necessary to form new economic and legal mechanisms, institutions, as well as to increase the efficiency of existing institutions. The most promising directions are: 1) introduction of institutional reforms that facilitate the coordination of the functioning of functional institutions; 2) development and observance of the conceptual principles of economic and social behaviour of participants in economic activity due to their unification and legislative restriction or approval of lobbying rules in the process of implementation of the requirements and customs of its implementation in the European Union; 3) control over the implementation of these rules by economic entities and public administration; 4)an improvement of the mechanism of solving problems of economic relations strife; 5) ensuring social stability and counteracting the growth of social tension as a social component of economic security at different levels of the system hierarchy (person, household, community, region, state).

In this context, we consider the applied aspects of designing institutes, using methods of the theory of fuzzy logic and institutional analysis to simulate the desired and actual state of the social and institutional environment of Ukraine's regions and the values of indicators that provide it. The final result of the modeling of the institutional environment is an intersection of fuzzy sets of goals and constraints on a knowledge-based society; development of human potential; institutional development; quality of life; source elements of the state of the institutional environment described by the membership function of the solutions:

$$\lambda_i = \max_k \left\{ \max_j \left\{ \sup_{z \in Z_j} \left(\min \left\{ \mu_{z_{N_j}}(z), \mu_{z_{N_{jk}}}(z) \right\} \right) \right\} \right\}, \tag{2}$$

[28] Kvasniuk, B. Ye. (2000). Modern institutionalism and the peculiarities of the institutional environment in Ukraine, The strategy of economic development of Ukraine, Kyiv: KNEU, 2–3, 207 p.

where: **λi** – a degree of membership of the indicators of influence on the i^{th} level of the institutional environment: a knowledge-based society; development of human potential; institutional development; quality of life;

Zj - area of values of j^{th} parameter (range of values of qualitative terms $j=\overline{1,5}$**);** $\mu_{z_{N_j}}$ **,** $\mu_{z_{N_{jk}}}$ - the functions of the factors of influence sets (z_1, ..., z_{16}) on the institutional environment,

$\mathbf{N_{jk}}$ - the number of factors of influence sets.

The results of the analysis show that such positive indicators as: life safety; perfection, or competitiveness; efficiency and rationality; the security of the social and institutional environment, depend not only on the material indicators (state of infrastructure), or traditional indicators of the development of the institutional environment (efficiency of government), but also on indicators of the quality of development of society; political consciousness and influence of religious institutions (Table 2). It should be noted that high indicators associated with the influence of spiritual and religious institutions, despite the average level of other indicators (political consciousness, efficiency of state power), provide a high level of social and institutional environment, for example, for Lviv region.

Modernization of the state strengthens the interconnection and interdependence between the structure of the economy and the institutional basis, the quality of institutions. In these conditions, economic security becomes a prerequisite and a general objective of socio-economic development. That is, the structural shifts supported by the institutions provide economic growth, and their implementation is regulated by the criteria for ensuring economic security of the state.

Table 2. Quantitative assessment of the impact of institutional development indicators on the state of the social and institutional environment ofeconomic regions in theCarpathian region in 2017

Indicators / Regions	Institutional development			Source data			
	Political consciousness (z9)	Impact of religious institutions (z10)	Efficiency of state power (z11)	Life safety (R1)	Perfection (competitiveness) (R2)	Efficiency (R3)	Rationality (security) (R4)
Zakarpattia	0,452	0,789	0,561	0,5	3,9	27,5	0,6
Ivano-Frankivsk	0,494	0,741	0,504	0,6	3,9	27,5	0,6
Lviv	0,52	0,903	0,437	0,7	3,95	32,5	0,7
Chernivtsi	0,488	0,607	0,477	0,6	3,9	27,4	0,6
Ukraine	0,472	0,601	0,422	0,6	3,9	27,5	0,6

Source: authors' own calculations.

The analysis of the problems of structural transformations in the region's economy proves the necessity of introducing a structural indicator of the integral efficiency of elements of the structure of the economy, which accumulates indicators of the efficiency of production resources and allows diagnosing ineffective elements of the structure of the economy. The structural changes in the economy are characterized by quantitative and qualitative certainty. The main qualitative characteristic of structural changes in the economy is determined by the indicator of the direction of socio-economic progress. In a formalized way, the quality is measured by the index of structural shifts of a certain direction (progressive or regressive) in a given set of shifts in the economic structure. Reflecting the dynamic component of structural development, the effectiveness of structural shifts shows how structural shifts reach their goals, that is, how quickly they lead to a new quality of economic systems.

The indicator of the effectiveness of structural changes is expedient to represent as a ratio of the cost of assessing the mass of the structural shift to the amount of costs necessary for the transfer of resources (factors of production) due to changes in the structure of needs[29]:

$$E_s = \frac{M_i}{I}, \quad (3)$$

Where, $\mathbf{E_s}$ - the effectiveness of structural changes in the economy;
$\mathbf{M_S}$ - the mass of structural change in value indicators, ths. hryvnias;
I - the cost of making structural changes and the transfer of resources.

The mass of structural change is determined by the amount of resources that falls on a certain element of the structure of the economy in relative terms:

$$\mathrm{M} = D_1 - D_2, \quad (4)$$

Where, **M** - the mass of structural change in the economy in relative terms;
$\mathbf{D_1}$ - share of the structural indicator in the current period;
$\mathbf{D_2}$ - share of the structural indicator in the base period.

The intensity of structural shifts is estimated by the mean squared deviation of the elements of the structure of the regional economy:

$$\delta_d = \sqrt{\frac{\sum_{i=1}^{n} (d_{j1} - d_{j0})^2}{m}}, \quad (5)$$

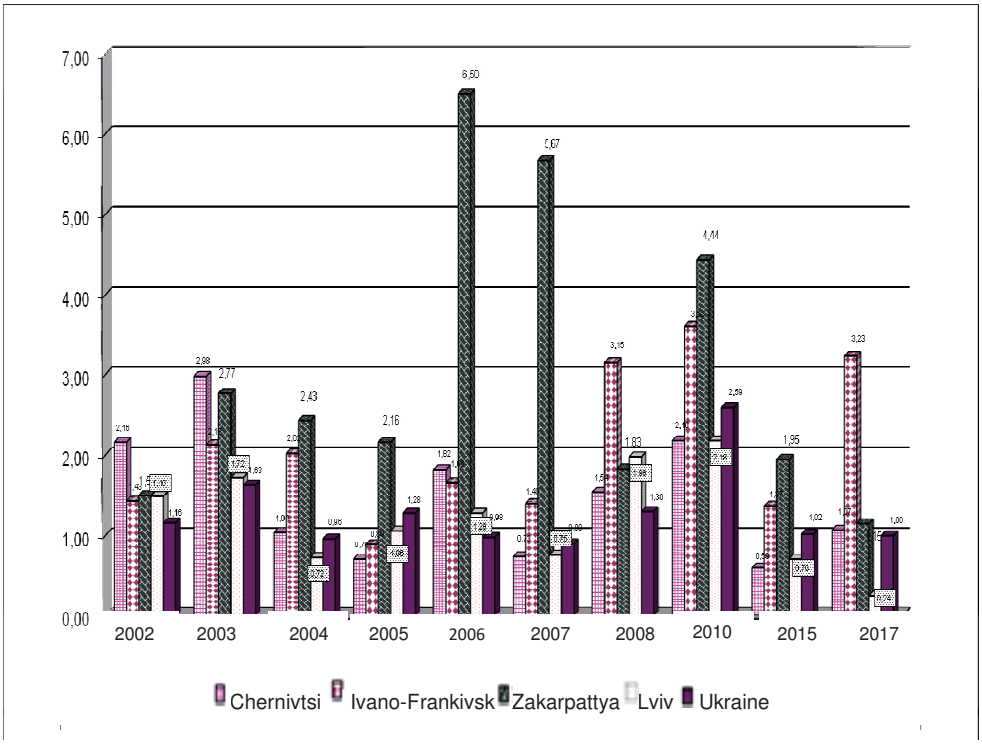
Where, d_{j0}, d_{j1} - shares in accordance with the base and current period;
***m** - the number of constituent elements; j = 1, m.*

We calculate the intensity of structural shifts for the regions of the Carpathian economic region in 2002-2017 and in Ukraine as a whole, and

[29] Krasilnikov, O. Yu. (2008). Structural shifts in the economy of modern Russia, Saratov: Hauchnaia kniga, 59 p.

analyze their impact on the adaptation of economies to the changes that took place during the analyzed period (Formula 5, Figure. 2).

Figure 2. Dynamics of the intensity of structural changes in the regions of the Carpathian economic region, 2002-2017



Source: authors' own calculations.

Adaptation will be understood as an attempt to overcome the consequences of crisis and post-crisis phenomena in the economy due to changes in the structure of the region's production. Similar measures for the implementation of structural changes and structural changes themselves do not guarantee positive results in a short time period, but are possible due to the already existing institutional basis built into the economic system of the region. The ability to adapt explains the rapid growth of the intensity of structural changes, for example in Ivano-Frankivsk and Zakarpattia regions (from 1.37 in 2010 to 3.23 in 2017 and 4.44 and 1.15 respectively). The

obtained results confirm the failure of other regions, in particular, Lviv and Zakarpattia regions, to make rapid structural changes because of the lack of a well-established effective mechanism of adaptation to changes in business activity and market conditions.

The structural analysis of employment in Ukraine has shown an increase in the service sector, which is in line with the trend of global servicization, and the structure of the economies of developed countries. However, we will emphasize the differences in the services of developed countries (medical care, education, science, development and implementation of high technologies), and in Ukraine, where retail and, partly, wholesale trade predominates. The dynamics of the change in the spatial structure of retail and wholesale trade in the studied areas indicates, that trade has not significantly reacted, for example, to the global financial and economic crisis of 2008-2009, and, accordingly, its depreciation function is not confirmed.

One of the strategic priorities of structural and institutional policy in the region is the modernization of the institutional basis for the security of the structural transformation of the regional economy, the directions of the structural policy and the strategy of regional development in the system of ensuring economic security of the region.

The institutional environment includes a set of formal and informal institutions, formed in the process of interaction of new and old, formal and informal rules of economic activity. In the Ukrainian economy, a disproportionate structure of the institutional environment was formed, with the domination of informal relations and institutions over official ones. The institutional environment, on the one hand, is a restriction of economic activity of economic actors, and, on the other hand, a means of coordinating economic activity, reducing risk and uncertainty, and resolving conflicts of interest. The institutional environment defines a general strategic direction of the development of the macrosystem, on the basis of which the formation and selection of the most effective economic and social institutions take place.

The formation of an effective institutional environment is a rather complex and lengthy process, since it consists of a combination of specific

effectiveness of each institutional form, due to the degree of coordination of interaction between them. The effectiveness of the institutional environment is assessed by the ability of society to self-organization, the combination of its structural adjustment with economic feasibility and resource capabilities. The presence of market institutions does not ensure the formation of an effective institutional environment, which requires incentives, means of enforcing compliance with rules and norms.

The institutional analysis of the structural disproportions of the economies of the regions of the Carpathian economic region shows that during 2001-2017 there was an increase in the share of the shadow sector in industry, high crime rates, and unfavourable business conditions due to imperfection of regional management institutions[30]. In these conditions, the important task of regional bodies of public administration is the expansion of opportunities for legalization of economic activity, the improvement of social conditions and quality of life of the population. The priority of regional policy is to facilitate the formation of effective institutions for supporting competition and development of market infrastructure for ensuring property rights protection, countering raiders, maintaining a competitive environment and observing the principles of equality of competition conditions and access to resources, reducing the level of tenization and corruption of the regional economy; counteracting excessive administrative regulation of economic activity; contradictions between formal and informal institutions. This stipulates the need for the influence of regional bodies of state administration on the development and implementation of the concept of development of market infrastructure for the long-term period, with the definition of the main stages of its realization, the main purpose of which is to justify the directions of formation of new and development of existing institutions and the tasks of practical implementation, aimed at increasing the level of economic security in the region, regional competitiveness, creation of a favourable business,

[30] Melnyk, A. (2010). Structural transformation of the national economy of Ukraine as a factor of modernization of the institutional basis for its development, Journal of European Economy, 9 (#1), 39-43.

investment climate, conditions for an effective regional reproductive process. Of particular importance is the development of the information and consulting infrastructure aimed at an innovative type of regional development and economic security in the region[31].

The system analysis of supply of the market infrastructure services to population proves that the level of development of the institutional market infrastructure in the regions of the Carpathian economic region is significantly lower than the average Ukrainian value, and the gap is observed in all indicators and in all segments of the infrastructure. The significant lag is observed in providing services to producers and consumers of social services. The problem is not only in the low quantitative parameters of supply, but also in the lower level of quality of trade and intermediary, credit and financial and informational and consulting services for the objects of the region's economy.

The structural policy of the state covers such areas as: 1) the development of industries that contribute to the overall increase in the efficiency of industrial production; 2) stimulating investment, innovation and entrepreneurial activity, strengthening the competitiveness of export industries; 3) structural transformation of production in depressed branches and sectors of economy and regions of the country; 4) stimulating the development of the tertiary sector of the economy. The general objective of the structural policy is to ensure economic growth in the direction of quantitative growth of production volumes, harmonization of GDP structure with the tendencies of the global economy. It is about increasing the share of durable goods, high-quality products, and modern services, especially financial and informational and technological.

The regional structural policy should be considered as a strategy for maximizing economic growth through the implementation of priority state and regional programs and projects to achieve goals and structural changes. The formation of a regional development strategy in the system of ensuring the

[31] Vlasiuk, O. S., Mokii, A. I. (Eds). (2012). Structural-institutional transformations and economic security of the state, Lviv: Apriori, 105 p.

economic security of the region requires structured-component analysis of the main threats to the economic security of the region. In this context, we propose the use of a modified SWOT analysis matrix, which makes it possible to isolate groups of threats and weaknesses that have different nature, character, and effect on socio-economic development. In its turn this will provide an opportunity to quantify the existing threats and weaknesses of the socio-economic status of the region and can be used as a basis for the development of regional structural policies, strategic planning of structural changes, design of an institutional basis and assessment of the impact of threats to the region's economic security. We propose an assessment of the threats and weaknesses of the regions carried out with an expert method on a scale from 0 to 1. If the value of the threats is in the range from 0 ÷ 0.39, then for the object under study it is "light stroke"; 0,4 ÷ 0,59 – "difficult condition"; 0,6 ÷ 0,75 – "critical state"; 0,75 ÷ 1,00 – "destruction". The threat is dangerous if its value is above 0.75. The factors reflecting the weaknesses characterize the internal features of the object under study: social and institutional potential (high unemployment, low personal incomes, a high level of external migration); economic potential (territorial imbalances in education quality, qualification skills, etc., and a number of labour resources); ecological potential (a number of environmentally hazardous objects, violation of the natural balance due to spatially irrational deforestation, pollution of surface water due to discharge of wastewater into the water reservoirs); tourist and recreational potential (insufficient development and quality of a tourist infrastructure); an international and national position (peripheral location in Ukraine, difficult living conditions and economic activity in the mountainous and rural areas). The impact of these factors is subject to analysis, control and management. The factors that constitute threats are external and are weakly managed by the national economy and the economy of the region and require a collective approach to the solution. In particular, these are threats of a socio-institutional character (demographic crisis, corruption, social immaturity, political instability, population health, international and internal migration mobility); threats of economic nature (resource dependence, underdevelopment of industrial infrastructure, production and consumer

imbalances, deepening of the depression of the territory); threats of an ecological nature (environmental pollution, natural disasters, anthropogenic loading, man-made risks).

For example, for Chernivtsi region, the dangerous weaknesses of the ecological potential are a violation of the natural balance due to the spatially irrational deforestation (0.90); tourist and recreational potential - insufficient development and quality of a tourist structure (0.90); an international and internal state position - peripheral locations in Ukraine (0.80). The dangerous threats of a socio-institutional character are corruption (0.91); political instability (0.85); threats of economic nature are resource dependence (1.00); underdevelopment of the industrial infrastructure (0.81); production and consumer imbalance (1.00); environmental threats are natural disasters (1.00). The weak factors and threats form problem-oriented measures ("problem tree"), which serve the development of appropriate tools for analyzing, controlling and managing the activities of regional entities. Strategies based on weaknesses and threats formulate problem-oriented targets for socio-economic development of the region and ensure its economic security.

Conclusions: Participation of Ukraine in the processes of global economic integration causes changes in the institutional basis of the socio-economic macrosystem of the state, subject to adaptability to global challenges. The state provides an increase in the level of national economic security, indicating the effectiveness of its activities. The structural changes for transition economies and emerging economies provide economic growth based on an institutional basis, and implementation of structural changes should be governed by criteria of economic security.

Economic security is a system of economic relations between business entities and between them and the state in the process of neutralization of threats, minimization of risks and adaptation to uncertain development. Economic security of the national economy is a mechanism of transformation of input factors (risk, danger, uncertainty) in output ones - stability, adaptability, system development. The threat to economic security is increasing as a result of the growing degree of integration of the region into

a global mega-regional economy. At the same time, the regional authorities do not have the means to influence these processes, because even a developed region occupies a small niche in the global division of labour. The region is not able to prevent or influence the fluctuations in the business cycle, but can adapt to cyclical fluctuations, with the help of economic shock absorbers aimed at minimizing the negative effects of the cycle, in particular, global crises and recessions. The regional economic security system is a set of economic entities and institutions of public administration focused on sustainable, efficient, economically safe development which is consolidated by property relations, economic interests, legal and ethical regulators.

The methodological approach to the application of multiplicative model of calculation of integral indicator of economic security of regional development is proposed. The results of the analysis of the changes dynamics of the level of economic security of the Carpathian economic regions show that in Zakarpattia region, internal reserves are used to prevent threats to security. At the same time, investment and food security indices (indicators) worsen as a result of the global financial and economic crisis of 2008 in all regions of the Carpathian economic region. Exceeding the threshold values of indicators of economic, scientific and technical, socio-economic security leads to the formation of crisis and pre-crisis phenomena in the areas of the Carpathian economic region.

The conceptual foundations of the methodology of institutional design of the social and institutional environment are based on the use of fuzzy logic and institutional analysis techniques, which allowed simulating the desired and real state of the social and institutional environment in Ukraine, the regions under study and the value of the indicators that provide it. For example, in Lviv region, indicators of life safety, efficiency and rationality are higher than in other regions under study, which is achieved due to relatively high political consciousness and the influence of religious institutions, with an average value of the efficiency of state power.

Interconnection between the coefficient of intensity of structural shifts and adaptation of the regions in the crisis and after crisis periods of development. It is found that an attempt to implement structural changes and

structural changes themselves do not guarantee an economic improvement or achievement of positive results in a short period of time, but this attempt is possible due to already existing institutional structures, mechanisms, built into the economic system of the region, including state regulation. The ability to quickly adapt explains the rapid increase in the intensity of structural shifts.

The institutional analysis of the structural disproportions of the economic subsystems of the Carpathian economic regions shows that during 2001-2017 there was observed the increase of the shadow sector share in the industry, high crime rate, unfavourable business conditions, as a result of imperfection of the regional administrative institutions. It is established that the level of development of the institutional market infrastructure in the regions of the Carpathian region is significantly lower than the average value in Ukraine and even lower than similar indicators in the USA, and this gap is observed in all indicators and in all segments of infrastructure, which is one of the deterrent factors of effective development and strengthening the security of the Ukrainian regions.

Taking into account the sectoral structure of the economy, the structural policy is defined as a set of measures to ensure economic growth through optimization of the ratio of the proportions of the primary, secondary and tertiary sectors of the economy. In the institutional aspect, the task of implementing the structural component of regional policy is to create an economic mechanism to ensure the redistribution of resources from the outdated and low-technological productions in the production systems of new technological processes, the concentration of resources in key directions, economic modernization, improving its efficiency and competitiveness.

A modified SWOT-analysis matrix for the Carpathian region was proposed and used, which made it possible to quantify the existing threats and weaknesses of the socio-economic status of the region, and could be used as a basis for the elaboration of the structural policy of the region, strategic programming of structural changes, designing the institutional basis and determination of the impact of threats to the region’s economic security.

PART 2.

ENSURING ECONOMIC GROWTH AND MACRO-FINANCIAL STABILIZATION

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EFFECTIVENESS OF STATE REGULATION OF THE MONETARY SPHERE IN THE CONTEXT OF PROVIDING FINANCIAL SECURITY OF UKRAINE

Abstract. Using the method of the main components, the state and dynamics of the integral index of monetary security of Ukraine in 2000, 2005, 2010, 2014-2016 were determined. It is established that the level of monetary security of Ukraine during 2014-2016 is in an unsatisfactory zone due to the negative tendencies of changes in certain indicators of monetary circulation and credit relations. At the same time, the following indicators were the most influential on the integral index of monetary security of Ukraine: the ratio of the volume of the monetary aggregate M3 to GDP (monetization level) (0.224), the ratio of GDP to the volume of the monetary aggregate M2 (0.222), the amount of cash to GDP (0.223).

The process of forming monetary policy in Ukraine has passed five basic steps, which are determined by the creation of the national monetary system and the impact of the Asian financial crisis in 1998, the macroeconomic stabilization in the first half of the 2000s, the negative impact of the global financial crisis in 2008, the post-crisis world economic recession, the destructive influence of hybrid aggression of the Russian Federation. However, in Ukraine, a complete and rational system of state regulation of the monetary sphere has not been formed, as significant deficiencies are characterized by the majority of methods, instruments and means of state regulation of the analyzed sphere used in the practice of 1991-2016.

JEL Classification System: E31, E42, E52, E58

Key words: monetary and credit sphere, financial security, state policy, integral index, indicators, evaluation method, national economy.

Introduction. In the conditions of deepening the imbalances of the socio-economic development of Ukraine, caused by the destabilizing actions of the Russian Federation, crisis phenomena in the economy and unfavourable external conditions, the condition of financial security of the state deteriorated. The domestic financial system has shown a low ability to counter the internal and external threats to sustainable development, which complicates its ability to provide the necessary level of financial and economic stability of the state and its social development. The majority of financial security components have negative trends. This is evidenced by the indicators of a critical increase in external and internal debt, which is dangerous for economic independence, an increase in the share of foreign capital in the banking sector, the spread of devaluation expectations and a rise in the cost of credit resources.

An important role in strengthening the financial security of the state is played by security in the monetary sphere, which creates conditions for the development of the national economy and directly affects the macroeconomic environment in the country, in particular, economic dynamics, the level and rates of inflation, availability of credit resources, ensuring the stability of the monetary unit. Moreover, world experience shows that an efficiently functioning monetary sphere has significant potential in ensuring the financial stability of the state and the formation of a financial and investment resource to stimulate socio-economic development and eliminate its disproportions.

At the same time, for the domestic monetary sphere, there are deficiencies that make it impossible to restore sustainable development of economic development. It is evidenced by the destructive development of monetary circulation and credit relations, in particular, excessive money supply, high cost of credit resources, inflation processes and devaluation of the national currency. As a result, the monetary sphere does not fulfill its tasks and basic functions in order to create conditions for ensuring social and

economic development of the state and to achieve an improvement of conditions and standards of living of the population in Ukraine.

In order to achieve the minimization of the above-mentioned negative factors and imbalances in the development of the monetary sphere that have posed threats to Ukraine's financial security and macroeconomic stability in recent years, the issue of studying the level of monetary security is updated, which allows obtaining objective information on the functional features of monetary development – the credit sector of the economy,identifying threats that have a destructive effect on the level of monetary and financial security and developing active countermeasures to initiate the processes of stabilizing the functioning of the monetary system.

We want to note that assessing the level of monetary security of the state can be carried out through the application of a number of methods that provide an opportunity to obtain objective information about its level and find out the nature, reasons for the origin of certain threats, or to implement certain measures to eliminate them. Among them, it is necessary to allocate such: (1) monitoring of the basic socio-economic indicators and their comparison with the limit values, which should be no less than the average world; (2) expert assessment methods; (3) methods of analysis and processing of scenarios; (4) optimization methods; (5) theoretical game techniques; (6) methods of multidimensional statistical analysis; (7) methods of the theory of artificial neural networks [32]. However, due to the complexity of the mathematical apparatus and the need to process large amounts of data, the application of these methods in assessing and forecasting the level of monetary security is a rather complicated and labour-intensive process that reduces the possibilities for their practical use.

Let us emphasize that financial security of the state is an integral characteristic of the financial system, which includes the characteristics of a number of interconnected structural components, including the monetary

[32] Heyets V. (2006). Modeling economic security: state, region, enterprise: monograph / [V. M. Heyets, M.O. Kizim, T.S. Klebanova, O.I. Chernyak and others; for ed. V. M. Heyets]. - Kh. VD «INZHEK», 2006 - p. 43-45

sphere. It necessitates an integrated assessment of its level in order to respond adequately and timely to internal and external destabilizing factors. Thus, in order to determine the dynamics of the integral monetary security index, an appropriate methodology is needed that can provide a diagnosis of its state with the possibility of comparison with the integral threshold (optimal) values[33].

It is worth noting that to date, in our country, Methodological recommendations for calculating the level of economic security of Ukraine have been developed. However, according to a number of scholars, this technique contains a significant number of deficiencies that relate both to the composition of indicators and directly to the methodology, which leads to obtaining incorrect results in determining the level of economic security of the state and its components[34]. Therefore, it is necessary to apply an advanced methodology that eliminates existing deficiencies and is characterized by an expanded composition of indicators, the use of the multiplicative (nonlinear) form of the integral index and the method of the main components for weighting coefficients determination, normalization of indicators and their threshold values, providing an adequate safety diagnosis, its components the possibility of its comparison with integral threshold (optimal) values.

The dynamics of the actual values of indicators of monetary security in Ukraine with their threshold and normalization values are presented in Table 1. It should be noted that most of these indicators are characterized by negative tendencies and are significantly lower than the threshold values, which confirms the deepening of the crisis in the monetary and credit sphere of Ukraine.At the same time, Ukraine's involvement in a long and tense confrontation in the hybrid warcaused the particularly significant losses to the

[33] Kharazishvili Yu. (2014). Methodological approaches to the estimation of the level of economic security of the country / Yu. Kharazishvili // Science and science of science. – 2014. – № 4. – P. 44-58.

[34] Kharazishvili Yu. On improvement of the methodology of the integrated assessment of the level of economic security of Ukraine. Analytical note / Yu. M. Kharazishvili, A. I. Sukhorukov, T. P. Krupelnitskaya // Available at: http://www.niss.gov.ua/articles/1358.

domestic monetary system, resulting in negative dynamics of monetary and security indicators of the state.

Table 1. Indicators of monetary and security of Ukraine in 2000, 2005, 2010, 2014-2016

Indicators	Actual values over the years						Threshold values	Normative coefficients
	2000	2005	2010	2014	2015	2016		
The ratio of the monetary aggregate M3 to GDP (monetization level), %	19,0	43,9	55,2	61,1	50,2	46,3	D: 125; 100; 75; 50	19,0
The ratio of GDP to the volume of the monetary aggregate M2 (turnover rate), number of revolutions	5,4	2,3	1,9	1,6	1,9	2,2	D: 5; 4; 3; 2	1,6
Volume of cash to GDP, %	7,5	13,6	16,3	18,1	14,3	13,1	D: 20; 15; 10; 4	7,5
Inflation rate (as of December of the previous year), %	125,8	110,3	109,1	124,9	143,3	112,4	D: 120; 115; 110; 107	99,8
Share of long-term loans in total loans granted by commercial banks, %	17,0	21,2	29,3	21,3	21,8	26,2	S: 10; 20; 25; 30	29,3
The level of average interest rates of commercial banks' loans to inflation, %	5,7	5,3	6,9	9,3	15,2	15,4	D: 30; 20; 10; 5	5,3

Source: authors' own calculations

First of all, we are talking about a critically high level of monetization of the national economy. If the ratio of the volume of the monetary aggregate

M3 to GDP should be kept within 50 %, then in 2010-2015, the value of this indicator was in the range from 50.2 % to 61.2 %, which is due to exceeding the growth rate of money supply over the rate of GDP growth. The share of cash in Ukraine's GDP in 2014 was 14.3 %, exceeding the maximum accepTable value of this indicator by more than 3.5 times, while the value of the indicator until 2000 increased by 6.8 percentage points.

The consequence of this situation is the increasing of the risks of exchange rate instability and inflationary processes, which are characteristic of the domestic economy in recent years.During 2014, the hryvnia rate dropped from 7.99 UAH/USD to 15.77UAH/USD and during 2015 – to the mark of 24.00 UAH/USD, which has become one of the factors behind the growth of inflation and a significant increase in public debt. At the same time, in 2015 the inflation rate was 143.3 %, exceeding the accepTable maximum value by 36.3 %.

These processes negatively affected the functioning of the banking system. We are talking about the raising of the average interest rate on commercial bank loans from 9.3 % in 2014 to 15.4 % in 2016, which is almost three times higher than the normatively accepTable value of this indicator – 5.0 %. Such a situation greatly complicates the availability of subjects of the real economy to bank lending and slows business activity within the state.

In addition, due to the massive withdrawal of deposits by individuals from commercial banks, there was a shortage of resources for lending to the real economy, in particular, long-term projects.As a rule, banks mainly lend money for short-term projects related to trade and processing or redistribute temporarily free funds from a loan portfolio to a portfolio of government debt securities. At the same time, the share of long-term loans in the total volume of loans provided by commercial banks remains rather low (26.2 %, which is 3.8 % lower than the generally accepted value).

Although it should be noted that some indicators of monetary security maintain positive trends. For example, within the accepTable values of 2010-2015, the value of «the ratio of GDP to the volume of the monetary aggregate

M2», without exceeding the mark of 2.0, was indicative of the proper rate of its circulation. However, in 2016, the situation has changed.

It should be noted that most of the indicators of monetary security are in critical, dangerous and unsatisfactory areas. At the same time, the results of the calculations illustrate the quantitative measurement of the threats to monetary security, certifying the actual loss of money circulation and credit relations of positive functions of an influence on the socio-economic development of the state. First, it concerns the period of 2014-2016, when the monetary sphere of Ukraine was formed, first of all, under the negative influence of military actions in the east of the country, which threatened the financial and macroeconomic stability of the state.

The next step in the integral assessment of the level of monetary and financial security in Ukraine is the procedure for the valuation of indicators by the formula 1, the need of which is determined by the variability of indicators (stimulators, destimulators) and their different dimensionality. The normalization procedure, firstly, translates the indicators of various dimensions into dimensionless quantities to the range [0, 1], and secondly, enables the comparison of multi-directional indicators [35].

$$z_i = \begin{cases} y_i / y_{\max}, \text{якщо } y_i \in S; \\ y_{\min} / y_i, \text{якщо } y_i \in D. \end{cases} \quad (1)$$

The weighting of factors is an important information basis for exercising a controllable influence on the state of monetary and security of Ukraine.Most scholars use expert estimates (for example, the method of pairwise comparisons) to determine the weighting factors, which are largely subjective, because they are based on a partial intuitive assumption of the development of the issues studied without their specific formalization, which makes it possible to form only approximate quantitative assessments, and therefore

[35] Kharazishvili Yu. (2014). Forecasting of indicators, threshold values and level of economic security of Ukraine in the medium-term perspective. Analytical Report / Yu. Kharazishvili, E. Dron. – K .: NISS, 2014. – p. 25-26.

reduces the scientific and practical value of the results. In addition, the weighting factors calculated expertly are not dynamic and – constant parameters for the entire time period, that is, those that do not change, and do not take into account changes in the internal and external environment.

Therefore, in our opinion, it is expedient to justify weighting coefficients to use the method of the main components, which is devoid of subjectivity and does not involve the construction of a macroeconomic model, which is often a complicated procedure because of the impossibility of a formal description of the indicators of monetary security as endogenous parameters of the macromodel. As a result of the calculations, we will conclude that the following indicators were the most influential on the integral monetary and monetary index of Ukraine in 2000, 2005, 2010, 2014-2016: (1) the ratio of the monetary aggregate M3 to GDP (monetization level) (0.224); (2) the ratio of GDP to the monetary aggregate M2 (0,222); (3) the amount of cash to GDP (0,223).

Using this approach allows taking into account the nonlinearity of economic processes to determine the dynamics of the integral index of monetary security of Ukraine by the formula:

$$I_t = \prod_{i=1}^{n} z_{it}^{a_i}, \ \sum_{i=1}^{n} a_i = 1, \ a_i \geq 0, \tag{2}$$

де z_i – normalized indicator values;

a_i – weight coefficients;

n – number of indicators.

The standardized values of the indicators, weighting factors and the integral index of monetary and monetary security of Ukraine in 2000, 2005, 2014-2016 are presented in Table 2. According to the calculations, the level of monetary and financial security of Ukraine during 2014-2016 is in an unsatisfactory zone due to the negative tendencies of changes in certain indicators of monetary circulation and credit relations.

Table 2. Normalized indicators of values and integral index of monetary and security of Ukraine in 2000, 2005, 2010, 2013-2016.

Indicators	Actual values over the years						Weights
	2000	2005	2010	2014	2015	2016	
The ratio of the monetary aggregate M3 to GDP (monetization level), %	1	0,43	0,34	0,31	0,38	0,45	0,224
The ratio of GDP to the volume of the monetary aggregate M2 (turnover rate), number of revolutions	0,29	0,69	0,84	1	0,84	0,67	0,222
Volume of cash to GDP, %	1	0,55	0,46	0,41	0,52	0,66	0,223
Inflation rate (as of December of the previous year), %	0,79	0,91	0,91	0,79	0,69	0,89	0,073
Share of long-term loans in total loans granted by commercial banks, %	0,58	0,72	1	0,73	0,74	0,89	0,132
The level of average interest rates of commercial banks' loans to inflation, %	0,92	1	0,77	0,57	0,35	0,34	0,127
Integral values of the indicator of monetary security	0,701	0,639	0,613	0,568	0,571	0,498	-

Source: authors' own calculations

It should be noted that the negative impact of the global financial and economic crisis of 2008-2009 on the state of the monetary sphere was significantly influenced by the dynamics of the monetary and security index of Ukraine. In particular, the crisis has led to an increase in the negative trends of macro-financial destabilization and has demonstrated the problems and contradictions of the monetary system, which accumulated over the years. We

are talking about the imbalance of the deposit and foreign exchange markets, reducing the profitability of banking activities.

Given the predominance of recessionary trends in the global economy in 2010-2013 and the decline in demand for domestic exports in foreign markets, macroeconomic conditions for the monetary policy implementation remained unsTable. In this period, monetary policy was mainly aimed at ensuring the stability of the monetary unit of Ukraine. However, the need to fulfill the external debt obligations of the state led to a decrease in the volume of gold and foreign exchange reserves to the critical level – 20.4 billion dollars USA, which became a prerequisite for further aggravation of the situation in the monetary sphere. As a result, the monetary-security index in 2014 dropped to a critical minimum for the entire period under study and amounted to 0.568.

In 2014-2016, the implementation of monetary and credit policy of Ukraine took place under extremely difficult conditions, in particular, the recessionary tendencies of the economy of the previous period deteriorated sharply as a result of the aggravation of the socio-political situation and the military conflict in the eastern part of the country. It was manifested, in particular, in the growth of money supply, the strengthening of devaluation expectations, the reduction of the volume of international reserves, the preservation of crisis phenomena in the banking system. The liberal policy of the floating rate of the NBU has led to devaluation of the national currency, an increase of administrative-regulated prices and tariffs. Despite the NBU's introduction of interest rate instruments, liquidity support mechanisms, the monetary market situation remained volatile, and the level of monetary security was characterized by a downward trend.

Against the background of accelerating inflation, devaluation of the domestic monetary unit, reducing lending volumes, reducing foreign exchange earnings from exports, a comprehensive analysis of the state regulation of the monetary sphere in the context of ensuring the financial security of the stateis required. Since the formation and implementation of an effective monetary policy is directly related to the issues of ensuring macroeconomic stability, economic growth and strengthening the competitiveness of the national

economy. In the context of the formation of systemic characteristics of financial security of the state, it is necessary, firstly, to use effective methods for assessing the level of monetary security, and secondly, to distinguish between indicators that can be used to assess the level of monetary security of Ukraine as a whole, and to focus on those indicators whose values exceed the thresholds and carry out a destructive influence on the monetary sphere.

The importance of the stage of assessing the effectiveness of state regulation of the monetary sphere is that it allows us to formulate conclusions as to whether the main principles of monetary policy correspond to the criteria and structural elements of the system of ensuring financial security of the state, which are the causes of imbalances in the development of monetary circulation and credit relations, as well as the achievements and miscalculations of the reform of the monetary sphere, to what extent the instruments of monetary regulation are being implemented in order to stabilize the financial situation and improve the state financial stability.

On the other hand, the analysis of the effectiveness of state regulation of these processes is an important starting point for its further improvement. It allows analyzing the existing legal and regulatory framework of the monetary sphere, the organizational structure of public administration, the effectiveness of the state strategic planning of monetary policy in the short, medium and long term, as well as determining the directions by which the measures of the state administration were implemented, and what was their effectiveness and what institutional, organizational or economic effect they brought.

It should be noted that the effectiveness of the state monetary and credit policy ensuring the financial, and through it, economic security of the state is based on the following main criterias: the stability of the monetary sphere, that is, its ability to perform its tasks and functions fully in the conditions of existence and influence of external and internal threats; the independence of the state policy in the monetary sphere, that is, the ability to independently determine and ensure the achievement of the strategic and tactical objectives of monetary regulation; the ability of the monetary and

credit system to develop in order to ensure sustainable economic growth of the state [36].

In general, in the context of ensuring the country's financial security and the ability to maintain resilience to fundamentally new external and internal threats, the effectiveness of state regulation of the monetary sphere should be assessed on the basis of the functioning of the main elements of the monetary system, including monetary policy, interest rate policy, monetary policy, the NBU policy on refinancing of banks, management of mandatory reserves of banks, the NBU policy on the purchase of government bonds.

In order to carry out a thorough analysis of the effectiveness of the state regulation of the domestic monetary sphere, it is necessary to consider the stages of the establishment of monetary and credit policy in Ukraine. In our opinion, the process of monetary policy formation in Ukraine has undergone five main stages, which are determined, firstly, by the creation of the national monetary system and the impact of the Asian financial crisis in 1998, and secondly, by the macroeconomic stabilization in the first half in 2000, by the negative influence of the world financial and economic crisis in 2008, the fourth, by the post-crisis recession of the world economy, and, fifth, by the destructive influence of the hybrid aggression of the Russian Federation against Ukraine.

It should be noted that during 1991-2000 the period was characterized by the creation of the national monetary system by introducing into circulation the national currency, the formation of the banking system and the stock market of government securities, the creation of the institutional and legal basis for the regulation of monetary circulation and credit relations, as well as the organizational structure of definition of the functions and powers of each public administration in the monetary sphere.The positive features of this period include the gradual departure from the policy of fiscal dominance, the termination by the National Bank of Ukraine of direct issuing loans to the Government and the domestic economy, the introduction of a tighter

[36] Avramenko O. (2014). Monetary and Public Policy: Threats and Challenges to Ukraine's Economic Security // Strategic Priorities. – 2014. – № 4. – P. 47.

monetary policy, the reduction of inflation and the introduction of the currency corridor. In general, the consistent monetary policy of the NBU contributed to economic stability and was one of the factors behind the containment of inflationary dynamics. As a result, in 1999 it was the beginning of macroeconomic stabilization in Ukraine.

In the conditions of the destabilizing effect of the financial crisis in South-East Asia the controllability and stability in the monetary market and the maintenance of the hryvnia exchange rate within the currency corridor was the confirmation of the effectiveness of the NBU monetary policy by introducing a number of effective instruments: the limiting of the hryvnia supply, due to the increase in accounting and lombard rates and the requirements for obligatory reservation of borrowed funds, which was carried out simultaneously with restrictions on speculative transactions of non-residents through loroaccounts; the prohibition of authorized banks to buy currency at the expense of the open currency position; the strengthening of control over the compliance of commercial banks with the requirements of normative documents regarding the order of operations with foreign currency; the implementation of the NBU interventions from the official currency reserve to ensure a balance between high demand and low supply of currency; the increasing of yield on T-bills by the Ministry of Finance of Ukraine [37].

The second stage of the formation of monetary policy in Ukraine was characterized by a gradual improvement of the macroeconomic environment in the country, an improvement of monetary policy instruments. At the same time, the NBU's policy was aimed at further liberalization of the foreign exchange market by maintaining a floating exchange rate regime for hryvnia against foreign currencies and the active use of the NBU's monetary stimulus for cheapening loans through a systematic reduction in the discount rate. It led to a balance between supply and demand for currency, the stabilization of

[37] Stelmakh V. (2009). Monetary policy of the National Bank of Ukraine: current state and prospects for change: monograph / ed. V. Stelmakh; Center of Sciences. researches of the NBU. – K.: UBS NBU, 2009. – 404 p

the hryvnia exchange rate, the development of foreign economic activity and the revitalization of commercial banks' lending activity.

At the same time, since 2005 negative trends in the development of the domestic economy began – the deterioration of trade conditions, the reduction of the trade surplus, the slowdown of GDP growth, and the increase of socially-oriented expenditures. Under such conditions, the NBU implemented measures to ensure the price and exchange rate stability of the national currency, in particular, it carried out foreign exchange interventions on the sale of foreign currency in the interbank market and applied restrictive measures (in terms of liabilities of banks subject to mandatory reserve funds were introduced, attracted by banks from nonresident banks and non-resident financial institutions). In addition, the interest rates on active operations of the NBU were maintained at a positive level relative to the level of inflation. The NBU also intensified its work on attracting bank funds (including deposit certificates) [38].

Since October in 2008, the financial and economic crisis has developed in Ukraine, which has triggered the implementation of internal imbalances of the domestic monetary and credit system. Crisis has led to a decline in the profitability of banking activities, the formation of a shortage of long-term and short-term financial resources in national and foreign currencies, a deterioration in the structure of the bank loan portfolio, an increase in the share of problem loans, a decrease in the inflow of foreign exchange resources, and a decrease in the hryvnia exchange rate.

Against the backdrop of growing destabilization trends in the monetary sphere, the NBU has taken active measures against the crisis. In particular, in the area of banking regulation, the measures were takento curb the growth rates of consumer lending in foreign currency and intensify the process of capitalization of banks. In the field of an anti-inflationary policy, the NBU's main measures were to raise interest rates, limit the growth rates of the monetary base and increase the exchange rate of the national currency. In the

[38] Annual report of the National Bank of Ukraine for 2007. - K .: National Bank of Ukraine. – 2008. – 199 p.

development of the currency sphere, the measures were takento curb the inflow of foreign currency to the country, a decrease in the short-term and speculative component of the movement of capital, and the limitation of the rates of issuance of foreign currency loans. It should be noted that the abovementioned monetary crisis measures of the NBU were fundamentally sound, but were implemented with some delay, which weakened their effectiveness [39]. In addition, the interaction and coherence of the actions of all branches of government in order to achieve price stability and sustainable economic growth were rather formal and in fact lost the features of partnership.

Thus, in 2009, after the introduction of a requirement for the NBU to compulsory redemption of government bonds at their nominal value, within three days from the date of receipt of offers from banks, the features of fiscal dominance in the monetary regime were clearly revealed. Moreover, the NBU refinancing policy was to be consistent with the Cabinet of Ministers of Ukraine, which threatened to exacerbate political pressure on the NBU and the loss of independence of its activities.

The implementation of the domestic monetary policy in the period 2011-2017 took place in the post-crisis recession of the world economy and the hybrid war of the Russian Federation against Ukraine, which led to the formation of fundamentally new challenges for the financial security of the state. We are talking not only about military aggression, but also the aggression in the financial system, which was aimed at disbalancing domestic monetary and banking systems.

In 2011-2013 under conditions of increasing recessionary trends, the NBU pursued a tight monetary policy. In particular, in 2011, the requirements for the formation of mandatory reserves by banks were changed several times, and the norms of mandatory reserves were optimized in the direction of creating more preferential conditions for the attraction of long-term funds

[39] Zhalilo Ya. (2009). The economic crisis in Ukraine: dimensions, risks, prospects. - Zhalilo Ya., Babanin O., Belinska Ya. and others. / for community Ed. Ya. Zhalila. - K .: NISS, 2009. - 142 p.

by banks. It led to stabilization of the situation in the foreign exchange market, an increase of the domestic cost of hryvnia and a reduction of inflation [40].

In 2012, the tools of the NBU's influence on the money market were expandedby introducing amendments to the law. It is about introducing requirements for the mandatory sale of foreign exchange earnings by residents from the sale of goods under foreign economic agreements in the amount of 50 % and the change in terms of payments for export and import transactions [41]; establishment of the requirement for sales on the interbank foreign exchange market of proceeds from outside Ukraine in foreign currency in favour of individuals [42]. It led to a decrease in net average daily foreign demand for non-cash transactions by 3.4 times, and in cash – by 6.9 times.

A steady downward trend of inflation allowed using interest rate instruments to stimulate economic growth. Thus, in 2013 the NBU reduced the discount rate twice (up to 6.5 %) and improved the policy of conducting interest rate policy by increasing the efficiency of the overnight interest rate corridor, which helped to reduce the entire range of interest rates. However, in real terms interest rates on loans have remained at a rather high level – about 15.0 %, which, in turn, held back the demand for loans [43].

Moreover, in 2013 the role of the NBU in forming the revenue base of the budget increased. In particular, the structure of the money supply was largely shaped by the active redemption of the NBU of government securities, which constituted a hidden internal emission to finance the budget deficit. The high activity of the NBU in filling the state budget partially secured the support

[40] Annual report of the National Bank of Ukraine for 2011. – K : National Bank of Ukraine. – 2012. – 185 p.
[41] Resolution of the Board of the National Bank of Ukraine on 16 November 2012 № 475 «On changing the terms of payment transactions for export and import of goods and the introduction of mandatory sale of income in foreign currency». Available at: http://zakon3.rada.gov.ua/laws/show/z1921-12.
[42] Resolution of the Board of the National Bank of Ukraine on 16 November 2012 № 476 «On the Procedure for Payment Transfers from Abroad to Individuals». Available at: http://zakon3.rada.gov.ua/laws/show/z1922-12.
[43] Formation of the model of economic development of Ukraine in the post-crisis world. – K.: NISS, 2013. – p. 13

of social standards, but at the same time, created significant currency and inflationary risks for the state, since it did not contribute to the intensification of economic activity and did not stimulate investment in fixed assets.

Thus, at the beginning of the expansion of the hybrid war in Ukraine, an unreformed monetary system was maintained which was very vulnerable to any external influences. In particular, in spite of the stability of the hryvnia exchange rate, negative tendencies have been observed in Ukraine that exerted inflationary pressure on the hryvnia, in particular, the chronically negative trade balance, the reduction of the NBU's international reserves as a result of the necessity to fulfill the external debt obligations of the state, the outflow of capital in the form of growth balances from foreign trade operations in foreign correspondent accounts of banks.

The recessionary trends in 2011-2013 have intensified as a result of the destabilization of the political and financial-economic situation, the annexation of the Autonomous Republic of Crimea and the deployment of hostilities in eastern Ukraine. In particular, during this period, the National Bank of Ukraine introduced a transition to a flexible exchange rate system, resulting in a sharp decline in the hryvnia exchange rate against the dollar of USA on the interbank market. We should agree with the opinion O. Vlasyuk, that the policy of a «floating» course is unaccepTable for Ukraine because of the absence of powerful foreign currency players in the domestic market, except for the NBU[44]. Moreover, if the state refuses to control the exchange rate dynamics of the national currency, then foreign exchange markets are exposed by currency speculators[45].

It should be noted that the transition from a fixed exchange rate regime to a floating exchange rate regime of the national currency should be accompanied by systemic monetary policy reforms to increase its ability to optimize bank liquidity management through the interest rate policy and to support currency stability through market mechanisms. However, such

[44] Vlasyuk O. (2014). Actual problems of financial security of Ukraine in the conditions of post-crisis transformation: monograph / O. Vlasyuk – K.: NISS, 2014 –p. 171
[45] Glazyev S. (2015). Targeting Inflation. – Economics. – 2015 – № 9. - p. 1-12.

reforms were not carried out by the NBU, and liquidity management of the banking system was conducted without reference to its optimal level and optimal state of the interbank market. As a result, the liberal policy of the floating rate led to the devaluation of the hryvnia, an increase in administrative-regulated prices and tariffs, and a reduction in lending to the real sector of the economy.

The tremendous demand for currency from individuals and legal entities has been an additional factor in the increase of volatility in the money market.In 2015 the NBU introduced a number of stringent restrictions for importing companies (in particular, the requirements for the absence of tax debts from enterprises in the course of their purchase of currency, limiting the maximum amount of payments, significantly extending the timing of foreign currency payments abroad, additional analysis of import contracts, regular submission by banks to the NBU, standardized consolidated registers of foreign currency payments abroad, etc.), which did not provide the expected balance in the money market.

This is explained by the fact that, despite the officially declared flexible exchange rate regime, strict currency restrictions, in particular the purchase of foreign currency in the official interbank market, have been introduced. As a result, volumes of transactions in the official interbank foreign exchange market decreased by 6-7 times compared to the beginning of 2014. At the same time, a significant number of foreign exchange transactions were carried out by business entities in the shadow market or abroad, which leads to further aggravation of the situation in the domestic currency the market.

At the same time, the abandonment of the fixed rate regime has led to an increase in the negative impact of interest rates on the domestic monetary sphere due to the non-systemicity of the NBU interest rate policy. In conditions of accelerating inflation, the NBU rate on overnight loans remained the lowest among all refinancing rates, which contradicted the principles of optimal management of liquidity of the banking system. High rates on deposit certificates of the NBU are another important drawback of interest rate policy

of the NBU, which further restrain lending to the real sector of the economy and deepen the imbalances of the interbank market.

In addition, monetary disproportions increased as a result of the increase in the NBU operations with deposit certificates, which led to a sharp reduction in the volume of interbank lending and the takeover of the NBU on the functions of the interbank lending market. It shows the ineffectiveness of the NBU's monetary policy in the context of its main operational function – optimal regulation of the banking system's liquidity.

In 2014, the NBU significantly increased the volume of refinancing of banks through the introduction of temporary mechanisms for maintaining liquidity, as well as mitigating the conditions to access resources for banks. At the same time, short-term overnight operations, which could not be used to compensate for the outflow of deposits, but on the contrary led to additional speculative demand in the foreign exchange market began to dominate in the structure of refinancing of banks.Such a monetary instrument, as the withdrawal of the bonds by the National Bank of Ukraine, is also not used effectively enough – mainly to cover the public sector deficit, and not to manage the liquidity of the banking system.

The positive feature of the monetary policy in 2015-2016 is the application of the inflation-targeting regime, to which the NBU switched in early 2016. The prerequisite was the creation of technical conditions (building a macroeconomic model, developing a quarterly forecast cycle) and an institutional basis (increasing the NBU's independence in using tools to achieve its goal, eliminating fiscal dominance, and changing monetary policy decisions). Let us add that the stabilization of inflationary expectations is a key element in increasing the efficiency of other macroeconomic measures of the NBU aimed at restoring Ukraine's economic potential.

In order to maintain the viability of the monetary system of the country, the NBU has begun the process of withdrawal from the market of the most unprofiTable, undercapitalized banks with a problem loan portfolio, which did not adhere to the regulator's norms. In particular, during 2014-2016 the NBU gradually withdrew 84 banks from the market. Despite the positive effects of

the reorganization of the domestic banking system, consisting in increasing capitalization, increasing transparency and financial stability of the banking system, this process poses significant threats to Ukraine's financial security. This is manifested in increasing the hidden budget deficit and the volume of public debt, increasing social tensions as a result of the loss of part of the population by households and businesses, and reducing confidence in the banking system as a whole. In the conditions of the banking system's reorganization, the forced step to minimize the impact of the risks of deteriorating financial status of PJSC «Privatbank» on the financial security of the state was due to its nationalization, which made it impossible for its further bankruptcy. The implemented measures have greatly contributed to strengthening of the monetary security as a key element in ensuring macroeconomic stability in Ukraine.

In general, such a sequence of stages of development of the monetary policy in Ukraine should be considered as logical, since these stages reflect the influence of the main factors that had a significant impact on the establishment of monetary and credit relations in the country. Nevertheless, in our opinion, there are grounds to state that throughout the investigated period in Ukraine, a complete and rational system of state regulation of the monetary sphere was not formed, as significant deficiencies are characterized by the majority of used methods, instruments and means of state regulation of the analyzed sphere in the practice in 1991-2016.

Let us add that the presence of positive aspects of the system of state regulation of the monetary sphere is not evidence of a well-considered state policy in this area. On the contrary, these shortcomings are more decisive and create obstacles to the effective development of Ukraine's monetary policy in order to ensure financial security of the state.

They are largely due to institutional obstacles, which are primarily due to the imperfection of the institutional and legal basis for the provision of monetary security, the uncoordinated activities of the NBU and the Cabinet of Ministers of Ukraine with regard to the development and implementation of the state monetary policy, the ineffectiveness of the state strategic planning

and forecasting of the development of monetary circulation and credit the relationship that increases the information uncertainty, raises inflationary expectations and reduces the effectiveness of the monetary policy.

It should be noted that state regulation of the monetary activity is ensured by legislative, structural and functional institutions, which establish and ensure compliance with norms, rules, requirements in the monetary sphere and effective interaction of all subsystems of the monetary system. In addition, the key elements that form the integral institutional basis of monetary security of the state include not only regulatory, organizational and economic, but also informal support for the development of monetary circulation and credit relations.

A key subject of the monetary policy is the state, which through the representative bodies regulates this sphere. In the development of the monetary policy, in addition to the National Bank of Ukraine, there are other central bodies of legislative and executive power, in particular, the President of Ukraine, the Verkhovna Rada of Ukraine, the Cabinet of Ministers of Ukraine, the Ministry of Finance of Ukraine, the National Commission, which carries out state regulation in the markets of financial ambassadors, National Commission on Securities and Stock Market, etc. At the same time, the decisive role in regulating the monetary sphere belongs to the National Bank of Ukraine. At the same time, due to the large number of decision-making centers in the monetary sphere and the dispersion of responsibility between them, the efficiency of the NBU's actions and the functions of the regulator is significantly reduced.

At the same time, throughout the investigated period, the monetary policy of the NBU and the Government repeatedly demonstrated the lack of mutually agreed goals and the appropriate level of coordination of actions to determine the basic principles for the formation and implementation of a balanced state policy on issues of ensuring the development of monetary and credit activities. It is a question of the imbalance between fiscal and monetary policy, in particular, monetary signs clearly show fiscal dominance, as well as a systemic confrontation between the NBU and the Government on

the refinancing of commercial banks. Obviously, the failure to reconcile the NBU's actions with other participants in the state regulation of the monetary sphere creates preconditions for unwarranted government intervention in the NBU's monetary policy and reduces the degree of its independence.

The main legal and regulatory framework for the development and implementation of the monetary policy in Ukraine is determined by the Law of Ukraine «On the National Bank of Ukraine», the Constitution of Ukraine, the Regulation "On Approval of the Procedure for the Development of the Fundamentals of Monetary Policy and Monitoring of its Implementation". The monetary policy is implemented in accordance with the Fundamental Principles of Monetary Policy, which are elaborated annually by the Council of the National Bank of Ukraine, whose functions include monitoring its implementation and making adjustments to the Basic Principles of Monetary Policy in the event of a change in the basic parameters of economic and social development of Ukraine.

Let us add that the principles of the monetary policy are developed on the basis of forecasts of macroeconomic indicators of economic and social development, indicators of consolidated and state budgets of Ukraine and analysis of the expected results of the monetary policy. By 2011, the main objective of the monetary policy was to ensure the stability of the national monetary unit and prevent its sharp fluctuations, which caused contradictions, as the legislation did not define the very concept of "monetary stability". In 2011, the main objective of the monetary policy was to achieve price stability, which indicated a gradual transition to the inflation-targeting regime, a characteristic feature of which is not the uniqueness of the inflation target, but its priority in relation to other goals, the achievement of which should have a secondary importance relative to the planned inflation.

Practical results of realization of the basic principles of the monetary policy show the presence of shortcomings of the state regulation of the monetary sphere. It is a question of the actual non-fulfillment of the target tasks determined through the value of the target indicators during all periods of the establishment of the monetary and credit policy of Ukraine, as a result

of which the NBU makes adjustments to the projected values during the year. This is primarily due to economic factors, in particular, the instability of the macroeconomic environment, which makes it impossible to account for them at the stage of formation of the document, and necessitates adjustment of monetary parameters in line with changes in the dynamics of indicators of socio-economic development.

In addition, the negative impact on the formation and implementation of the main principles of the monetary and credit policy of Ukraine is an insufficient level of efficiency of the state strategic planning of the development of the monetary and credit sphere due to the imperfection of the procedure for the formation of forecast and program documents due to ineffective coordination of the participants in the process of developing these documents, in terms of timing of their development, the exchange of information, as well as the imperfection of the mechanisms of coordination of monetary and fiscal policies. At the same time, the program document is based on a hierarchical system of monetary policy objectives and a set of target indicators of the monetary sphere, the simultaneous implementation and achievement of which in most cases are impossible.

A retrospective analysis of the planned and actual values of the target indicators characterizing the implementation of the basic principles of the monetary and credit policy of Ukraine in 2001-2016 allows us to conclude that the actual value of most of the indicators taken as target benchmarks for achieving the monetary policy objectives of the NBU, has a deviation from the forecasted values, indicating the inadequate quality of the NBU's projections, the underestimation of existing risks, and the ineffective use of the available monetary policy instruments at the disposal of the NBU. It should be added that the NBU does not have the authority to develop and use its own forecast of the inflation target and other macroeconomic indicators for the purpose of implementing an effective monetary policy, instead, it uses the inflation forecast developed by the Ministry of Economic Development and Trade of Ukraine.

Due to the high dependence of the domestic monetary and credit system on the external economic situation, it should dwell separately on external factors, which at the present stage increase the destructive influence on the monetary policy of the NBU. It refers to the dynamics of the current account of the balance of payments, the high degree of dependence on imported energy and foreign capital, including Russia, the strengthening of artificial trade and transit restrictions on the part of the Russian Federation, projected volumes of attraction of external financial resources and their efficiency of use, the dynamics of world financial and commodity markets.

At the same time, the determining risks to achieve the goals and guidelines of the monetary policy in the short-term perspective are concentrated around the development of events in the east of Ukraine, which increased the burden on the budget of the country due to the urgent need for financial support for defense and national security, social protection of citizens who suffered as a result of military actions. In addition, the banking system suffered considerable losses as a result of impossibility of servicing and repayment of loans by borrowers located in the territory uncontrolled by the Government, which, in turn, substantially weakened the condition of the monetary system of the state during the period of 2014-2016.

In the context of ensuring balanced socio-economic development, there is a task to determine the strategic directions of increasing the efficiency of the state policy of the development of the monetary and credit sector in the system of ensuring financial security of the Ukrainian economy, which should be based on the use of world experience takeing into account existing threats to economic security in the monetary sphere.A retrospective analysis of the monetary policy development in 2001-2016, carried out on the basis of a comprehensive assessment of its effectiveness, will allow developing mechanisms and means for improving the functioning of the financial and credit sector, curbing inflation and ensuring the stability of the monetary unit, which is the subject of the next section of the research.

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ASSESSMENT OF THE INNOVATIVE DEVELOPMENT LEVEL OF THE REGIONS IN UKRAINE

Abstract. The task of modernizing the main vectors of Ukraine's social and economic development inevitably leads to the need for additional definition of the mechanisms and instruments of a positive influence on the economic components of this process, the use of innovative approaches that can fundamentally change the situation and indicate ways to achieve the updated positive dynamics. Last years the most recognized and effective organizational form of developing a competitive business in the innovation sphere is the integration of subjects of innovation into regional innovation clusters. The purpose of this study is to group the regions of Ukraine with the help of cluster analysis of key indicators of innovation development in accordance with the chosen algorithm. The article developed a system of key indicators for assessing the innovative development of the regions, which consists of four main blocks (scientific, personnel, financial, innovation), which in turn contain a set of indicators that most closely reflect the level of innovative development of the region. Using cluster analysis, the regions of Ukraine were divided into four clusters (with the highest, high, medium and low levels of innovation development) with the agglomerate hierarchical method of clustering Ward using the Euclidean distance metric and revealed their main characteristics. Similar calculations were carried out also over the previous five years, which allowed us to investigate the dynamics of clusterization according to the level of innovative development of Ukrainian enterprises in the regional context. Using the results of the dynamics of the distribution of regions across clusters, one region was chosen from each cluster, which is its bright representative and is characterized by a sTable tendency towards a certain level of innovative development. Foreign experience of creation and functioning of different types of innovative infrastructure and the state of innovation infrastructure in Ukraine is considered. However, a significant number of organizations that are supposed to promote science and technology or innovation activities do not provide the functions assigned to them. In order to further assess the innovation infrastructure of the regions, its main subsystems, namely, technical, technological, scientific, educational, information and communication, financial and legal, and the main characteristics of the selected subsystems. The content of the main laws of Ukraine that determine the procedure for the creation and operation of individual elements of the innovation infrastructure of the regions is considered. The recommendations for construction and development of effective innovation infrastructure of the regions are given.

JEL Classification System: C38, O31, R11**,** O32
Key words: cluster analysis, Ward method, Euclidean distance, level of innovative development, regional grouping, innovative infrastructure

Introduction. The growth of negative trends in the regions, reinforced by the crisis situation of the economy of Eastern Ukraine, forms a number of threats to further destabilization of innovative development. Among such threats the following are the most acute:

1) A further reduction of industrial production and deterioration of the performance of industrial enterprises.
2) A decrease in investment viability of regions, a decrease in the volume of investment capital, the deepening of imbalances in socio-economic development of the regions through the unattractiveness of traditional industries and territories for investment.
3) A reduction of income of the population and further limitation of its purchasing power, which will endanger the activities of small and medium-sized enterprises, individual entrepreneurship, focused on domestic demand.
4) Complication of the situation with the payment of wages to employees in the regions.
5) The deterioration of payment discipline and an increase in debt on budget payments[46].

Therefore, the task of modernization of the main directions of social and economic development of the regions of Ukraine inevitably leads to the need for additional identification of mechanisms and tools of a positive impact on the economic components of this process, the use of innovative approaches that can radically change the situation and indicate ways to achieve renewed positive dynamics.

In Ukraine, there are objective conditions for positive changes in the development of the economy. The application of the cluster approach in the

[46] Regions' Economics in 2015: New Realities and Opportunities in the Conditions of Initiated Reforms – K.: NISS, 2015. - 92 p.

country is a necessary basis for the revival of domestic production, increasing the efficiency of innovative development of the regions, achieving a high level of competitiveness of the economy[47].

The study of clustering processes, the evaluation of the effectiveness of the creation, development and promotion of clusters are revealed in the works of foreign scientists: B. Durand, D. Lance, A. Marshall, M. Porter, I. Tolenado, R.Tryon. W. Williams and others. Such scientists as O. I. Amosha, V. P. Antonyuk, A. I. Zemlyanikin, A. A. Migranyan and others were engaged in problems of the formation of competitive regional clusters, activation of innovative activity and regional development in general.

However, some questions about the features of the cluster regional policy and the role of clusters in the development of Ukraine remain unresolved. The relevance of the topic determines the presence of unsolved scientific problems, which are associated with the need to attract the potential of clusters to the processes of innovative development at various levels of the economic system of the country.

The most recognized in recent years and effective organizational form of the development of competitive business in the innovative sphere is an association of subjects of innovation in regional innovation clusters (industrial companies, research centres, scientific institutions, bodies of public administration, etc.) on the basis of territorial concentration of networks of specialised suppliers, main producers and consumers related technological chain[48].

It refers primarily to an innovation cluster, which through the interaction of its participants and the development of competition contributes to the dynamic socio-economic development of the territory or group of territories in which it is located, and increases their viability. In such an interpretation of the

[47] Pushkar T.A. World experience of formation and development of network and cluster associations / T.A. Pushkar, VG Fedorova // Economical magazine-XXI. - 2011. - No. 11-12. - P.68-71.

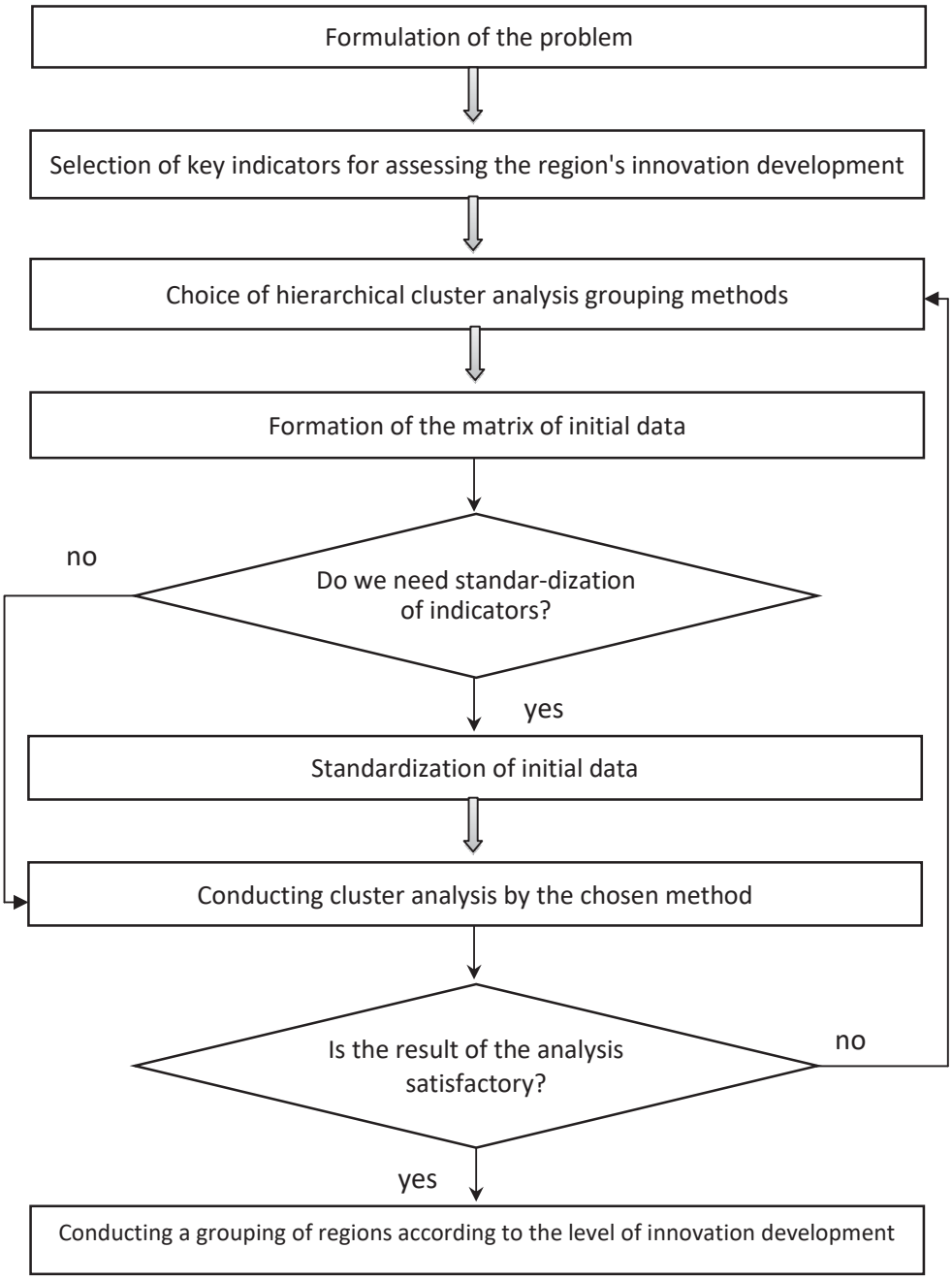
[48] Amosha O.I. Activation of innovation activity: organizational and legal and socio-economic support: Monograph / O.I. Amosha, V.P. Antonyuk, A.I. Zemlyankin and others. - Donetsk: Institute of Economics of the National Academy of Science of Ukraine, 2007. - 328 p.

cluster, the fair idea is that it is the center of the most efficient and interrelated types of economic activities, a set of interrelated groups of enterprises that successfully operate and form the golden section of the entire economic system of the state and provide a competitive position in the national and global markets. In turn, regions can also be clustered if they are grouped based on the cluster analysis performed. The main interest of this study is the mechanism of the regional clusters formation in terms of the possibilities of assessing the innovative development of territories. At the same time, agreeing with the opinion of academician A. I. Amosha[3], it is important to emphasize that the organization of clusters should not be viewed in a narrow sectoral context, but more broadly - as an association of enterprises belonging to different industries, but working together to create and implement innovations.

The English word “cluster” means a group, a bundle, that is, the union of any homogeneous phenomena. The term “cluster analysis” was first used by the English scientist G. Tryon in 1939, it includes a set of different classification algorithms. I. Chubukova’s[49] cluster analysis (Data clustering) is the task of distributing a given sample of objects (situations) into subsets called clusters, so that each cluster consists of similar objects, and the objects of different clusters differ significantly; this is a multidimensional statistical procedure that collects data that contain information about a selection of objects and then organizes the objects into relatively homogeneous groups (clusters).Based on the study of scientific sources, the author has developed an algorithm for grouping regions by the level of innovation technology (LID) based on cluster analysis (Figure 1).

[49] Chubukova, I.A. Data Mining: A Study Guide / I.A. Chubukova. - M.: Internet University of Information Technologies: BINOM: Knowledge Lab, 2006.

Figure 1. An algorithm for grouping regions according to the level of innovation development on the basis of cluster analysis



Source: developed by the author

According to the developed algorithm and the purpose of this study, it is advisable to form a comprehensive assessment of the components of economic systems based on indicators of innovative development. The author identifies a system of indicators, which consists of four main blocks, which in turn contain a set of indicators that most comprehensively reflect the LID of the region (Table 1).

Table 1. The system of key indicators for assessing the innovation development of Ukrainian regions

Assessment block	Symbol	Measure Unit	Indicator
Scientific block	x_1	units	Number of patents granted
	x_2	units	Number of scientific and technical works performed
Personnel block	x_3	persons	Number of employees of scientific organizations engaged in research
	x_4	persons	Number of performers of scientific and technical works
Financial block	x_5	thousand UAH	Total cost of innovation
	x_6	thousand UAH	Internal current expenses for scientific and scientific-technical works
Innovation block	x_7	units	Number of industrial enterprises engaged in innovative activities
	x_8	units	Number of industrial enterprises that have introduced innovations
	x_9	units	Number of new technical processes implemented at industrial enterprises
	x_{10}	thousand UAH	Volume of sold innovative products

Source: developed by the author

Information on the selected indicators for the regions of Ukraine should be presented in the form of a two-dimensional matrix of parameters $x_{ij,}$ size m × n, where m is the number of regions, n is the number of selected indicators (in our case, the matrix will be 25 × 10) (Table 2).

Table 2. Output data for the cluster analysis of Ukrainian regions by the level of innovation development in 2015

No.	Regions	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
1	Vinnytsya	25	308	288	398	575261,6	33222,3	170	22	38	192387
2	Volyn	4	169	120	171	65280,3	17732,7	104	11	17	383598,6
3	Dnipropetrovsk	161	2015	4498	7933	7568879	1400840	484	43	76	1145528,3
4	Donetsk	71	451	1714	2006	827653,4	168079,8	239	17	11	4591841,2
5	Zhytomyr	13	143	136	221	32626,8	19080,8	181	27	23	372263,7
6	Zakarpattya	33	129	289	480	22530,6	38943	138	11	3	583169,7
7	Zaporizhzhya	42	869	1116	3635	321051,3	479470	234	45	212	3162297,1
8	Ivano-Frankivsk	24	400	285	347	92189	40954,4	125	23	20	241973,4
9	Kyiv	38	630	1129	1676	144771,6	214430,8	330	43	38	618814,9
10	Kirovograd	9	1949	287	414	127719,1	56936,4	101	22	11	354667,9
11	Luhansk	23	345	117	234	24254,1	28743,9	80	7	8	373174,1
12	Lviv	71	2046	2643	3517	277796,2	299780,5	331	61	60	1193855,9
13	Mykolayiv	31	519	592	1981	291578,5	308543	93	22	35	71192,7
14	Odesa	98	1896	1713	2513	49670,7	250216,3	186	32	30	544420,2
15	Poltava	13	792	627	841	128525,6	55802,8	185	27	29	1938551,4
16	Rivne	4	94	118	159	6865,9	11232,7	123	12	8	67324,7
17	Sumy	13	1199	647	1572	162349,5	124443	116	22	134	1751880,2
18	Ternopil	6	169	131	174	14557,7	11116	92	16	139	249303,3
19	Kharkiv	210	7410	9230	14106	667008,1	2007665,3	409	97	273	2742424,4
20	Kherson	12	186	331	482	70130,5	35052,1	92	19	181	175410,2
21	Khmelnytsky	4	90	104	125	66659,4	15644,3	146	18	11	127076,3
22	Cherkasy	9	232	350	672	53539	100660,7	145	25	22	289705,7
23	Chernivtsi	7	252	316	474	18756,8	45671,3	53	9	8	99981,9
24	Chernihiv	4	817	248	611	34997,3	51448,9	113	14	14	95927,5
25	The City of Kyiv	569	17960	26806	38179	2169022,4	6068345,6	497	78	342	1683322,6

Source: developed by the author on the materials[50]

[50]Statistical collection "Scientific and innovative activity in Ukraine" in 2015 / Responsible for the issue of O.O. Karmazin - Kyiv .: State Statistics Service of Ukraine, 2016 - 257 pp.

Figure 2. Distance matrix, obtained using the Euclidean metric

$d(z_i, z_j) =$

,5	0,060	0,452	0,346	0,021	0,056	0,308	0,028	0,144	0,057	0,086	0,214	0,049	0,067	0,126	0,052	0,152	0,112	0,549	0,150	0,028	0,021	0,098	0,050	0,936
0,060	**0,000**	0,514	0,346	0,071	0,020	0,340	0,034	0,212	0,038	0,010	0,279	0,045	0,115	0,138	0,011	0,156	0,114	0,605	0,161	0,029	0,047	0,029	0,010	0,981
0,452	0,514	**0,000**	0,488	0,465	0,496	0,459	0,491	0,390	0,502	0,530	0,377	0,495	0,440	0,457	0,511	0,488	0,519	0,480	0,521	0,492	0,408	0,546	0,051	0,763
0,346	0,346	0,488	**0,000**	0,334	0,321	0,255	0,350	0,331	0,349	0,354	0,325	0,370	0,322	0,211	0,366	0,271	0,383	0,524	0,405	0,356	0,344	0,382	0,365	0,930
0,021	0,071	0,465	0,334	**0,000**	0,060	0,301	0,031	0,125	0,059	0,098	0,195	0,066	0,058	0,108	0,063	0,156	0,132	0,542	0,170	0,032	0,012	0,111	0,062	0,941
0,056	0,020	0,496	0,321	0,060	**0,000**	0,331	0,040	0,190	0,050	0,034	0,259	0,063	0,097	0,118	0,027	0,159	0,136	0,591	0,182	0,031	0,047	0,062	0,033	0,967
0,308	0,340	0,459	0,255	0,301	0,331	**0,000**	0,323	0,272	0,331	0,358	0,234	0,330	0,281	0,221	0,357	0,179	0,285	0,345	0,276	0,339	0,313	0,377	0,349	0,817
0,028	0,034	0,491	0,350	0,031	0,040	0,323	**0,000**	0,173	0,020	0,056	0,235	0,022	0,074	0,128	0,030	0,155	0,115	0,569	0,157	0,013	0,001	0,065	0,023	0,954
0,144	0,212	0,390	0,331	0,125	0,190	0,272	0,173	**0,000**	0,194	0,238	0,081	0,199	0,116	0,155	0,202	0,221	0,234	0,448	0,253	0,173	0,154	0,254	0,202	0,868
0,057	0,038	0,502	0,349	0,059	0,050	0,331	0,020	0,194	**0,000**	0,052	0,250	0,033	0,087	0,130	0,043	0,156	0,126	0,575	0,168	0,038	0,033	0,057	0,026	0,956
0,086	0,010	0,530	0,354	0,098	0,034	0,358	0,056	0,238	0,052	**0,000**	0,303	0,058	0,132	0,156	0,029	0,171	0,127	0,624	0,174	0,054	0,073	0,014	0,028	0,990
0,214	0,279	0,377	0,325	0,195	0,259	0,234	0,235	0,081	0,250	0,303	**0,000**	0,255	0,161	0,186	0,275	0,241	0,283	0,361	0,292	0,246	0,219	0,318	0,271	0,808
0,049	0,045	0,495	0,370	0,066	0,063	0,330	0,022	0,199	0,033	0,058	0,255	**0,000**	0,090	0,152	0,046	0,156	0,101	0,570	0,141	0,043	0,036	0,055	0,032	0,943
0,067	0,115	0,440	0,322	0,058	0,097	0,281	0,074	0,116	0,087	0,132	0,161	0,090	**0,000**	0,111	0,113	0,156	0,155	0,489	0,184	0,090	0,067	0,148	0,105	0,876
0,126	0,138	0,457	0,211	0,108	0,118	0,221	0,128	0,155	0,130	0,156	0,186	0,152	0,111	**0,000**	0,154	0,110	0,183	0,500	0,214	0,137	0,118	0,180	0,150	0,921
0,052	0,011	0,511	0,366	0,063	0,027	0,357	0,030	0,202	0,043	0,029	0,275	0,046	0,113	0,154	**0,000**	0,179	0,125	0,610	0,171	0,011	0,041	0,039	0,000	0,982
0,152	0,156	0,488	0,271	0,156	0,159	0,179	0,155	0,221	0,156	0,171	0,241	0,156	0,156	0,110	0,179	**0,000**	0,109	0,487	0,121	0,172	0,153	0,186	0,170	0,901
0,112	0,114	0,519	0,383	0,132	0,136	0,285	0,115	0,234	0,126	0,127	0,283	0,101	0,155	0,183	0,125	0,109	**0,000**	0,554	0,027	0,126	0,119	0,128	0,118	0,941
0,549	0,605	0,480	0,524	0,542	0,591	0,345	0,569	0,448	0,575	0,624	0,361	0,570	0,489	0,500	0,610	0,487	0,554	**0,000**	0,537	0,586	0,557	0,637	0,600	0,532
0,150	0,161	0,521	0,405	0,170	0,182	0,276	0,157	0,253	0,168	0,174	0,292	0,141	0,184	0,214	0,171	0,121	0,027	0,537	**0,000**	0,169	0,159	0,174	0,163	0,925
0,028	0,029	0,492	0,356	0,032	0,031	0,339	0,013	0,173	0,038	0,054	0,246	0,043	0,090	0,137	0,011	0,172	0,126	0,586	0,169	**0,000**	0,014	0,065	0,015	0,968
0,021	0,047	0,481	0,344	0,012	0,047	0,313	0,001	0,154	0,033	0,073	0,219	0,036	0,067	0,118	0,041	0,153	0,119	0,557	0,159	0,014	**0,000**	0,082	0,036	0,948
0,098	0,029	0,546	0,382	0,111	0,062	0,377	0,065	0,254	0,057	0,014	0,318	0,055	0,148	0,180	0,039	0,186	0,128	0,637	0,174	0,065	0,082	**0,000**	0,035	1,000
0,050	0,010	0,510	0,365	0,062	0,033	0,349	0,023	0,202	0,026	0,028	0,271	0,032	0,105	0,150	0,000	0,170	0,118	0,600	0,163	0,015	0,036	0,035	**0,000**	0,971
0,936	0,981	0,763	0,930	0,941	0,967	0,817	0,954	0,868	0,956	0,990	0,808	0,943	0,876	0,921	0,982	0,901	0,941	0,532	0,925	0,968	0,948	1,000	0,971	**0,000**

Source: developed by the author using IBM SPSS Statistics

However, the indicators that have been selected as the main indicators of the LID of the regions have different dimensions and different units of measurement, so in order to make it possible to compare the indicators, they need to be standardized, that is, to move from the values of $x_{ij}$to the values of z_{ij}, using the formula (1)[51]:

$$z_{ij} = \frac{x_{ij} - \bar{x}_i}{\sigma_i}, \quad (1)$$

where**,** ***xij*** is the value of the I-th attribute for the j aggregate;
$\bar{x}_i$is the average level of the i characteristic;
σ_i is the standard deviation of the i characteristic.

To classify the regions of Ukraine the agglomerative hierarchical Ward clustering method was used with the Euclidean distance[6], which is one of the most used metrics in cluster analysis, because it corresponds to the intuitive concepts of proximity and its quadratic form corresponds to the classical statistical constructions. Geometrically, this metric is used for combining features in clusters that are typical of weakly correlated sets. The formula for calculating the Euclidean distance d (z_i, z_j) has the following form (2):

$$d(z_i, z_j) = \sqrt{\sum_{k=1}^{p}(z_{ij} - z_{jk})^2}, \quad (2)$$

Where, ***zij*** - the standardized value of the j object by the i indicator;
zjk - the standardized value of the k object by the j indicator.

Using the Euclidean distance metric, we obtain a symmetric distance matrix, which is the basis for cluster analysis (Figure 2).

So, according to the results of cluster analysis, four groups have been obtained: the first cluster includes the regions with the highest LID (HB); the second cluster is formed of the regions with a high LID (B); the third cluster

[51] Tryon R.C. Cluster analysis / R.C. Tryon, D.E. Bailey. – N-Y.: McGraw-Hill Inc.,US – 1970.

includes regions with an average LID (C); the fourth cluster has regions with a low LID (H) (Table 3).

Table 3. Grouping of Ukrainian regions depending on the level of innovation development

Group of regions (clusters)	Regions	Characteristic
Cluster HB	The city of Kyiv	Regions with innovative self-sufficiency, ensuring the most effective investment of public investment resources in innovative development
Cluster B	Dnipropetrovsk, Kharkiv	Regions that require certain financial resources and the development of a set of measures of state support for innovation in the current and short-term periods
Cluster C	Donetsk, Zaporizhzhya, Kyiv, Lviv, Poltava, Sumy, Odesa	Regions that require large expenditures of financial resources and the development of special measures of state support for the near future
Cluster H	Vinnytsya, Volyn, Zhytomyr, Zakarpattya, Ivano-Frankivsk, Kirovograd, Luhansk, Mykolayiv, Rivne, Ternopil, Kherson, Khmelnytsky, Cherkasy, Chernivtski, Chernihiv	Regions that require very high costs of financial resources and the development of special measures of state support for the phased organization and development of innovation activity

Source: developed by the author based on materials[52,]

[52] Yermak, S.O. Cluster analysis of regions of Ukraine on key indicators of innovation development / S.O. Yermak // Scientific journal "Development Economics". - Kharkiv: KhNEU them. S.Kuznets - 2017 - No. 3 (83). - P. 34-44.; Yashin, S.N., Murashova, N.A. 2010. Some aspects of the development of the technology of innovation activity management of

Thus, the city of Kyiv, which refers to the first cluster, according to almost all indicators is ranked first. Dnipropetrovsk and Kharkiv regions are referred to the second cluster. The first region is in the second place in the number of industrial enterprises engaged in innovation activities in Ukraine (484 units), according to all other indicators the leading position in the cluster is occupied by Kharkiv region.

Regional differentiation is due to the presence of spatial disparities, the difference in the level of social development, the difference in climatic conditions and natural resources, which affect the territorial location of enterprises and the welfare of citizens. For example, in Donetsk and Dnipropetrovsk regions there is a concentration of the main mineral deposits of Ukraine. Kiev is marked by research potential, developed production, social and transport infrastructure[53].

Similar calculations have been also carried out for 2010-2014, which allowed us to study the dynamics of clustering of enterprises in Ukraine by LID in the regional context; the results of the grouping are shown in Table 4.

On the basis of the cluster analysis it is possible to draw conclusions about the prospects of the implementation of innovative projects, identify factors that have a negative impact on the innovative activity of the enterprise, diagnostics of weaknesses of entrepreneurship, the elimination of which will contribute to the innovative development of the regions.

One of the necessary conditions for innovative development is the existence of an effective innovation infrastructure that will ensure the transformation of the results of scientific research into the market of products and services. Innovation infrastructure is a specific complex, which is a set of interrelated and complementary systems and their corresponding

enterprises // Proceedings of the Nizhniy Novgorod State Technical University. RE. Alekseeva, No. 2 (81).

[53] Kulinich H.V. The problem of disproportionate tax burden in the regions of Ukraine and ways to overcome it / Kh.V. Kulinich // Innovative economic technologies for the development of enterprises, regions, countries: materials of the International Scientific and Practical Conference. - in 2 parts. - Dnipropetrovsk: "Perspective", 2014 - Part 2. - p.108-111.

organizational elements with a multi-level structure and covering the entire cycle of scientific, technological and innovative activities.

Table 4. Dynamics of clustering of innovation development of Ukrainian enterprises in the regional section for 2010-2015

No.	Regions	Years					
		2010	2011	2012	2013	2014	2015
1	Vinnytsya	H	H	H	H	C	H
2	Volyn	H	H	H	H	H	H
3	Dnipropetrovsk	B	B	B	C	B	B
4	Donetsk	B	B	B	C	C	C
5	Zhytomyr	H	C	C	H	H	H
6	Zakarpattya	H	H	H	H	H	H
7	Zaporizhzhya	H	B	C	C	C	C
8	Ivano-Frankivsk	H	C	C	C	C	H
9	Kyiv	H	C	C	H	C	C
10	Kirovograd	H	H	H	H	H	H
11	Luhansk	C	C	C	H	H	H
12	Lviv	B	B	B	C	C	C
13	Mykolayiv	H	C	C	H	C	H
14	Odesa	H	C	B	H	C	H
15	Poltava	C	C	C	H	B	C
16	Rivne	H	H	H	H	H	H
17	Sumy	H	H	H	H	C	C
18	Ternopil	H	H	H	H	C	H
19	Kharkiv	B	B	HB	B	HB	B
20	Kherson	H	H	H	H	H	H
21	Khmelnytsky	H	C	C	H	H	H
22	Cherkasy	H	H	C	H	H	H
23	Chernivtsi	H	H	H	H	H	H
24	Chernihiv	H	C	H	H	H	H
25	The City of Kyiv	HB	HB	HB	HB	HB	HB

Source: developed by the author based on data[54]

[54] Statistical collection "Scientific and innovation activity in Ukraine" in 2014 / Responsible for the issue O.O. Karmazina. - Kyiv .: State Statistics Service of Ukraine, 2015. - 255 p. Statistical collection "Scientific and innovative activity in Ukraine" in 2013 / Responsible for the issue of

In the developed countries of the world, various types of innovation infrastructure have been created and they are functioning now. These types take into account national peculiarities of activities in the scientific, technological and innovation spheres.

A significant component of the innovation infrastructure of foreign countries is research and innovation parks, where companies conduct research and development, organize startups, place their research facilities and create an innovative product. Today there are about 400 science parks in the world (Brazil, India, Malaysia, Eastern Europe, China) and more than 700 operating technology parks (the UK – 46 units, France – more than 50 units, Sweden – 16 units, Finland – 17 units). One of the largest research parks in the world operates in North Carolina, the USA. It is called Research Triangle Park. It operates at three universities, which are located in three cities: Duke University in Durham, North Carolina State University in Raleigh and the University of North Carolina in Chapel Hill. The Park is also one of the oldest; it was created by state and municipal authorities for the benefit of universities and local businesses. The Research Triangle covers 2,800 hectares and employs more than 200 companies with 50,000 employees, including IBM with an office of 14,000 people and Cisco Systems with 5,000 employees.

In addition to scientific and innovative parks abroad, the network of business incubators is popular. The purpose of business incubators is to provide business services necessary for startups and companies in the early stages of development. The main idea of business incubators is to help start-up entrepreneurs in the implementation of startups at all stages of business formation - from the development of the idea to its commercialization. For example, in Sweden, in the science Park Ideon (megalopolis Lund), there is an organization called Technopol, where specialists work in various fields. The Innovation Bridge organization is engaged in the promotion and

O.O. Karmazina. - Kyiv .: StateStatistics Service of Ukraine, 2014. - 314 p. Statistical collection "Scientific and innovative activity in Ukraine" in 2012 / Responsible for the issue of O.O. Karmazin - Kyiv .: State Statistics Service of Ukraine, 2013. - 314 p.; Statistical collection "Scientific and innovative activity in Ukraine" in 2011 / Responsible for the issue IV. Kalachova - Kyiv .: State Statistics Service of Ukraine, 2012. - 304 p.

commercialization of research and development. In Stockholm, Kista Science City, there is a business incubator in the field of information technology called Sting (Stockholm Innovation and Growth). This business incubator supports the creation of modern firms, attracting the best innovators and entrepreneurs, offering them effective assistance in business development.

The draft of the Concept of the State target economic program for the development of innovative infrastructure for 2017-2021[55] provides information that certain types of innovative structures have been created and are functioning in Ukraine. In particular, 12 technoparks, 28 innovative business incubators and 28 innovation centers have been created. Higher education institutions have established departments on intellectual property, the Ukrainian Institute of scientific and technical information and 9 regional centres of science, innovation and informational support are working. In addition, innovative enterprises use consulting firms and non-bank financial institutions but they cannot fully meet their needs. A significant number of organisations that are to contribute to scientific, technological or innovation activities do not fulfill their functions.

In recent years, a significant research interest is aimed at the study of the innovative infrastructure of the regions. Theoretical and methodological approaches to the study of innovation infrastructure at the level of the region and the country are the same; only for the regional level of research the specificity of the innovation process in each region is indicated.

The group authors Ye.V. Yoda, V. V. Podkolzyn, I. A. Kuteyev define a regional innovation infrastructure as a set of interrelated and complementary systems and corresponding organizational and management subsystems, providing access to investment and other resources to the

[55] On Approval of the Concept of the State Target Economic Program for the Development of Innovation Infrastructure for 2017-2021: Draft Order of the Cabinet of Ministers of Ukraine. - [Electronic resource]. Available at: http://webcache.googleusercontent.com/search?q=cache:INjd_VENjV8J:cg.gov.ua/web_docs/1/2015/10/docs/

subjects of innovation, ultimately aimed at the effective implementation of innovation activities in regional economy[56].

According to V. Nezhyborts[57], the formation of innovation infrastructure should be based on the following principles: the adequacy of the infrastructure to the level of development of the region, compliance with real needs, rational territorial location, functional concentration on the acute problems of innovation, the availability of services for entrepreneurs, the involvement of state and non-state resources.

For a more detailed assessment of the innovation infrastructure of the region it is advisable to divide it into subsystems. The analysis of literature sources[58], shows that there are many variations of its components, however, in our opinion, the most optimal, functional and informative is the following composition: technical and technological, scientific and educational, information and communication, financial and legal subsystems of innovative infrastructure of the region (Figure 4).

The legal subsystem is represented by a number of laws of Ukraine, which determine the order of creation and activity of individual elements of innovation infrastructure ("On innovation activity", "On priority directions of innovation activity in Ukraine", "On a special regime of innovation activity of technology parks", "On science parks", "On local government in Ukraine", "On state regulation in the field of technology transfer", "On protection of rights to inventions and utility models", "On protection of industrial relations", "On financial leasing", "On the scientific Park "Kyivska Polytechnika") and other

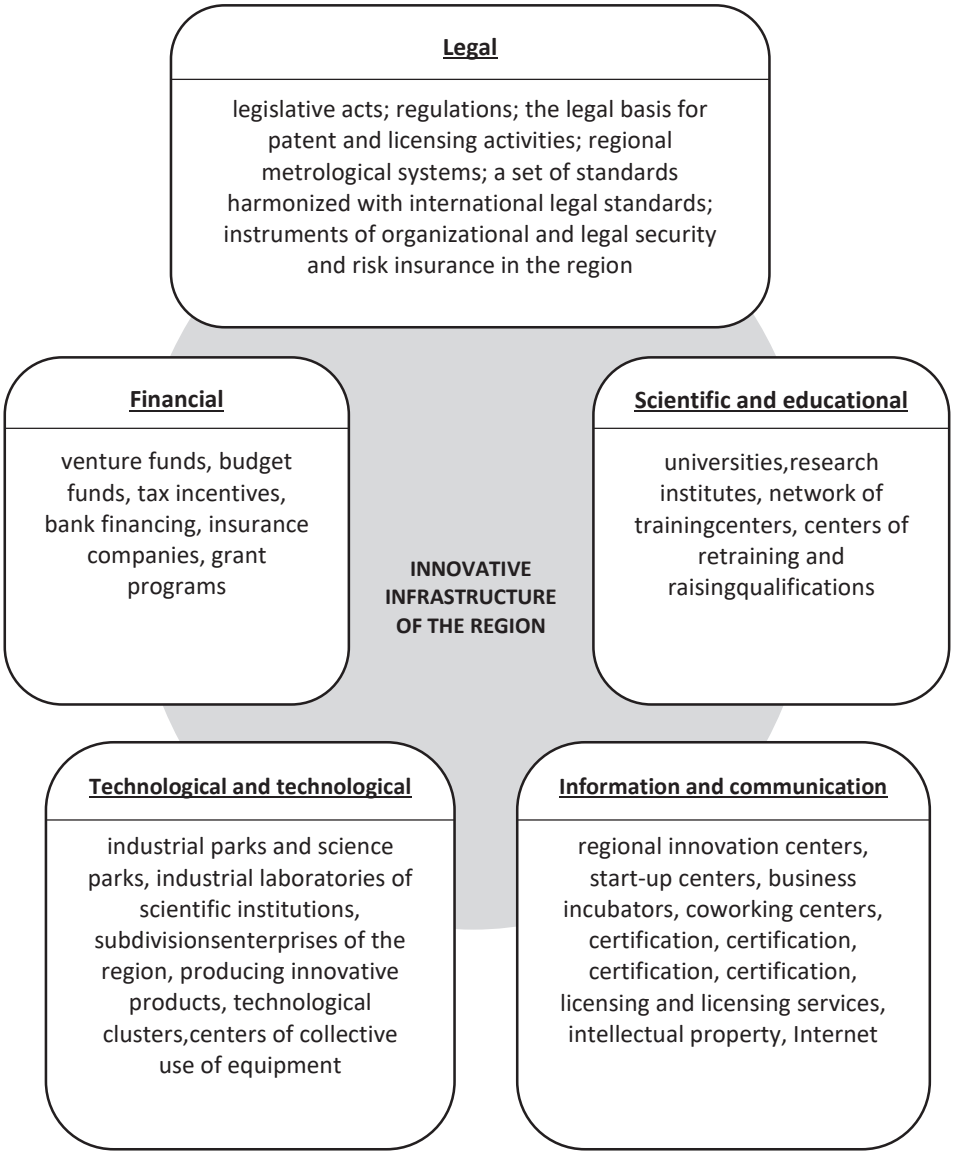
[56] Loda E.V. The Role of Financial Infrastructure in the Development of a Regional Innovation System / Ioda E.V., V.V. Podkolzin, IA Kuteev // The Bulletin of Tambov University. - 2008. - No. 5. - P. 166 - 174.

[57] Nezhiborets V. Innovative Infrastructure: Problems, Prospects, Solutions / V. Nezhyborets // Theory and Practice of Intellectual Property. - 2007. - No. 5. - P. 60-69.

[58] Uzdenov I.Sh. Characteristics of Subsystems of Innovation Infrastructure in the Regions / I.Sh. Uzdenov // Bulletin of Tambov University. - 2014 - No. 9 (137). - P. 66-70.; Ismagilov N. Innovative infrastructure and its elements: the experience of systematization / N. Ismailov, A. Mukhamedyanov, Yu. Habibrachmanova // Bashkir Academy of Civil Service and Administration under the Head of the Republic of Bashkortostan. [Electronic resource]. – Available at: - http://www.bagsurb.ru/about/journal/Part%205_articles.pdf

legislative and regulatory acts. The main content of the laws is given in the Table 5.

Figure 4. Subsystems of the innovation infrastructure of the region



Source: developed by the author

A significant drawback of the system of the state regulation of innovation development is that, in contrast to the legislation of most countries, it not only does not contribute to the expansion of sources of financing for innovation development, but also counteracts the attraction of non-budgetary funds and makes it impossible to form special, including departmental, funds for financing of innovations. This has had a significant impact on the corporate sector in financing research and development.

Figure 4. Subsystems of the innovation infrastructure of the region

Table 5. Content of the basic laws of Ukraine, determining the order of creation and activity of individual elements of innovative infrastructure of the regions

Laws of Ukraine	Content
"On innovation activity"	presents the terminology and the main aspects of state regulation in the sphere of innovative activity, the legal regime of innovative projects, products, innovative enterprises and the methodology of their state registration, as well as the features of financial support and international cooperation in the field of innovation
"On scientific and technical activities"	determines organizational, legal and financial basis of functioning and development of the scientific and technological sphere
"On the priority directions of innovative activity in Ukraine"	creates a legal basis for the concentration of state resources in the leading areas of scientific and technological renewal of production, providing the domestic market with competitive, science-intensive products and entering the world market with it
"On special regime of innovation activity of technological parks"	determines legal and economic bases of introduction and functioning of the special regime of innovation activity of technological parks
"On state regulation in the sphere of technology transfer"	defines legal, economic, organizational and financial principles of the state regulation in the sphere of technology transfer and is aimed at providing an effective use of scientific and technical and intellectual potential of Ukraine, technological production, protection of property

	rights on domestic technology and/or their components on the territories of the states where their use, expansion of international scientific and technical cooperation in this field are planned or carried out
"On science parks"	regulates legal, economic, organizational relations related to the establishment and functioning of scientific parks, and is aimed at the intensification of development processes, introduction, production of innovative products and innovative products in the domestic and foreign markets.
"On the local self-government in Ukraine"	defines the system and guarantees the local self-government in Ukraine, the principles of organization and activity, the legal status and responsibility of bodies and officials of the local self-government
"On the scientific Park Kyivska Polytechnika"	it regulates legal, economic, organizational relations connected to the creation and functioning of the scientific Park "Kyivska Polytechnika", and is aimed at intensifying the processes of development, production, introduction of high-tech products in the domestic and foreign markets, increasing revenues to the state and local budgets through a combination of education, science and production to accelerate the innovative development of the economy of Ukraine

Source: compiled by the authorson the basis of the research

Financial subsystem of the innovation infrastructure of the region includes the main sources of financial resources for R&D in various organizations: regional authorities (in the form of direct financing of budget research and educational institutions, providing guarantees and subsidies for research and development, the allocation of grants from the regional R&D fund, specialized government programs to support small and medium business in the sphere of innovation, financial mechanisms, on the basis of divided risks, guarantee funds and so on.), scientific and educational centres,

enterprises and organizations that carry out the development and implementation of innovations[59,]

The technical and technological subsystem is formed primarily on the basis of large research and technological installations and complexes, therefore, the presence of large enterprises of the real economy in the region is predetermined. This subsystem should provide research and development for the whole range of fundamental and applied problems of development of the leading innovative sectors of the region's economy. First of all, the modern economy requires the development of computer, bio-and nanotechnologies, experimental design and technological works in these areas, as well as the creation of their metrological support. Due to the fact that "breakthrough" production is implemented by small venture companies, they need a system of access to the latest equipment in the form of centers of collective use, which can be created at large enterprises, which will provide optimal conditions for achieving a synergetic effect from the interaction of small and large enterprises, inter-industry exchange of the results of research and their transfer to the production.

The main objectives of the information and communication subsystem is to concentrate the maximum amount of information on the existing trends in the development of innovative business, to ensure communication between start-ups with foreign and domestic colleagues, coaches and mentors in this area, potential investors and venture funds. In addition, the organizations of this subsystem provide a wide range of consulting services, including the development of business plans for start-up entrepreneurs, support of the innovative project at the initial stage of implementation, search for investors for a start-up, seminars, conferences and other events. The importance of the functioning of these structures is due to the fact that innovation has many specific features, knowledge of which is acquired only with practical experience. The creation of innovative enterprises by "non-professional"

[59]Tabachnikova M.B. Investments in Innovation / M. B. Tabachnikova, Yu. I. Treschevsky. - Voronezh: Voronezh State University, 2013. - 83 p.; Nebava M.I. Innovative-investment aspects of increasing the competitiveness of the regional economy / M. I. Nebava, Yu. Yu. Burennikov, D. M. Bershov // Bulletin of the Vinnytsia Polytechnic Institute. - 2010. - №5. - PP. 37-42.

managers leads to the fact that the probability of bankruptcy of such enterprises is extremely high. Therefore, providing access to professional advice is one of the means to improve the efficiency of resources invested in innovative projects[17]. The information and communication subsystem of the region's innovation infrastructure should be based on a more complete usage of the opportunities and resources of the state system of scientific and technical information.

Another important element of the region's innovation infrastructure is the scientific and educational subsystem. This subsystem, along with the production and technological role has a decisive part in the ability of the regional economy to produce and replicate innovations. The scientific and educational subsystem includes a network of universities, research institutions, training centers, other institutions engaged in the creation of new knowledge, conduct research, training and retraining, while ensuring the improvement of the quality of human capital. In addition to the creation of new knowledge, an important task of this subsystem is to ensure the adaptation of knowledge, technology, research, produced in other countries and regions of the country for further use in the regional economy[60].

International experience shows that the competitiveness of regions and industrial complexes is improved through the implementation of cluster policy. In particular, there are clusters of innovation orientation in France (77 units), Denmark (29 units), Austria (16 units), Germany (15 units).

The number of applications for patents and the number of patents granted have a direct impact on the level of development of the innovation infrastructure of the regions among other characteristics.

The most active among the applicants-legal entities were organizations that work in the fields of “Science” and “Education”. During 2016, they filed more than 6,6 thousand applications for inventions and utility models (88,3%). The list of the most active applicants in clusters is given in the Tables 6-7.

[60]Nebava M.I. The Coherence of the Criteria of Managers' Training with the Requirements of the Labor Market / M. I. Nebava, I. V. Zayukov // Modernization of the structure and content of the training of specialists in the management of organizations and administration: Materials of the International Scientific and Methodical Internet Conference. Vinnitsa: VNTU, 2013, April 24, 2013. - pp. 87-92.

Table 6. Distribution of scientific organizations of the branch "Science" with the highest inventive activity (number of applications for inventions and utility models) according to regional clusters

Scientific organization	Years					
	2012	2013	2014	2015	2016	Total for 2012 – 2016
Cluster HB "Regions with the highest level of innovative development"	**293**	**319**	**264**	**218**	**281**	**1444**
Institute of Cemistry of High-molecular Compounds of Ukraine	22	30	29	21	34	136
Institute of Technical Thermophysics, NAS, Ukraine	31	29	31	30	31	152
Institute of Neurosurgery named after academician A.P. Romodanov of the National Academy Sciences of Ukraine	28	18	25	19	28	118
State Institution "Institute of Pediatrics, Obstetrics and Gynecology of the National Academy Medical Sciences of Ukraine"	30	26	24	33	28	141
National Cancer Institute	13	46	30	11	25	125
Institute of Bioorganic Chemistry and Petrochemistry, NAS, Ukraine	29	28	9	12	24	102
Institute of Physical Chemistry named after L. V. Pisarzhevsky, NAS, Ukraine	6	18	23	9	20	76
Institute of Superhard Materials named after V. M. Bakool, NAS of Ukraine	26	30	16	13	19	104
Institute of Electric Welding named after Ye.O. Paton, NAS of Ukraine	49	19	31	20	18	137
Institute of Cybernetics named after V. M. Glushkov, NAS of Ukraine	26	46	13	13	18	116
Institute of Molecular Biology and Genetics, NAS of Ukraine	8	6	4	11	18	116
Institute of Semiconductor physics named after B.Ye. Lashkaryov, NAS of	25	23	29	26	18	121

Ukraine						
Cluster B "Regions with a high level of innovative development"	**58**	**84**	**54**	**70**	**104**	**370**
Institute of Geotechnical Mechanics named after M. S. Polyakov, National Academy of Sciences of Ukraine	27	40	31	24	35	157
Ukrainian State Scientific and Technical Centre of Technology and Equipment and Usage of Secondary Resources "Energostal"	15	24	8	24	31	102
State Enterprise "State Design Bureau "Pivdenne" named after M. K. Yangel"	12	16	8	15	21	72
Institute of Medical Radiology named after S.P. Grigoriev, National Academy of Medical Sciences of Ukraine	4	4	7	7	17	39
Cluster C "Regions with an average level of innovative development"	**116**	**168**	**108**	**140**	**208**	**740**
National Research Centre "Institute of Mechanisation and Electrification of Rural Economy" of the National Academy of Agricultural Sciences of Ukraine	30	34	32	22	20	138
Institute of Pig Breeding named after O.V. Kvasnitsky, National Academy of Agricultural Sciences of Ukraine	11	18	13	13	19	74
Zaporizhzhya Medical Academy of Postgraduate Education	17	23	17	9	18	84
Cluster H "Regions with a low level of innovative development"	**129**	**153**	**523**	**267**	**1082**	**2154**
Ukrainian State Scientific Research Institute of Rehabilitation of Disabled Persons	74	112	484	228	1038	1936
Institute of Thermoelectricity of NAS of Ukraine and MES of Ukraine	28	13	18	20	27	106
Institute of Impulse Processes and Technologies of NAS of Ukraine	27	28	21	19	17	112

Source: compiled by the authors on the basis of the research

Table 7. Distribution of institutions in the sphere "Education" with the highest inventive activity (number of applications for inventions and utility models) according to regional clusters

Higher educational institution	Years					
	2012	2013	2014	2015	2016	Total for 2012 – 2016
Cluster HB "Regions with the highest level of innovative development"	**877**	**869**	**882**	**898**	**791**	**4317**
National University of Food Technology	292	485	446	354	294	1871
National University of Biological Resources and Nature Management of Ukraine	256	212	232	261	278	1239
National Technical University of Ukraine "Kyiv Polytechnic Institute"	190	196	234	208	222	1050
Kyiv National University of Technology and Design	122	102	119	121	117	581
National Aviation University	83	81	75	68	60	367
National Medical Academy of Postgraduate Education named after P.L. Shupyk	28	53	41	35	59	216
National Medical University named after O.O. Bogomolets	198	225	181	205	55	864
Cluster B "Regions with a high level of innovative development"	**547**	**481**	**534**	**526**	**593**	**2681**
National Aerospace University named after M.Ye. Zhukovsky "Kharkiv Aviation Institute"	97	68	138	135	122	560
Kharkiv National Medical University	99	78	77	67	104	425
National Technical University "Kharkiv Polytechnic Institute"	74	76	103	80	91	424
Kharkiv Medical Academy of Postgraduate education	61	62	61	72	76	332
Kharkiv National Automobile and Road University	54	62	56	45	70	287

National Mining University	83	58	53	57	67	318
Ukrainian Engineering and Pedagogical Academy	79	77	46	70	63	335
Cluster C "Regions with an average level of innovative development"	**530**	**572**	**685**	**603**	**653**	**3043**
Lviv National Medical University named after Danylo Galytsky	43	31	47	83	95	299
Taurida State Agrotechnological University	49	61	76	100	86	372
Ukrainian Medical Dental Academy	6	3	50	57	78	194
National University "Lviv Politekhnika"	102	100	102	78	75	457
Sumy State University	45	55	57	35	63	255
Priazovsky State Technical University	61	59	50	45	58	273
Odesa National Academy of Food Technologies	117	98	122	82	83	502
Odesa State Medical University	68	104	101	71	60	404
Zaporizhzhya State Medical University	39	61	80	52	55	287
Cluster H "Regions with a low level of innovative development"	**509**	**404**	**474**	**415**	**534**	**2336**
Bukovina State Medical University	98	80	123	63	129	493
Vinnytsya National Technical University	187	137	132	127	116	699
Ternopil State Medical Academy named after M.I. Gorbachevsky	46	37	48	65	95	291
National University of Water and Nature Management	60	34	51	64	76	285
Vinnytsya National Medical University named after M. I. Pirogov	84	79	9473	61	391	391
Khmelnytsky National University	34	37	26	23	57	177

Source: compiled by the authors on the basis of the research

In 2016, more than 10.2 thousand patents for inventions and utility models were registered in the name of national applicants, including more than 8.9 thousand for utility models (87.5% of the total number of the registered). The number of registered patents increased by 6.9% compared to the previous year. The share of patents granted in the name of legal entities was 67.1 %

Conclusions. On the basis of a cluster analysis, it is possible to draw conclusions about the promising implementation of innovative projects, the

identification of factors that have a negative impact on the innovation activity of the enterprise, the diagnosis of weaknesses in entrepreneurship, the elimination of which will contribute to the innovative development of the regions.

Innovative infrastructure of the regions of Ukraine is not sufficiently developed, today only some of its elements are formed. The activity of scientists, inventors, innovators does not find proper state support. The educational and scientific potential, especially of higher education institutions, has also not been sufficiently realized. The analysis of the total number of applications for inventions and utility models in the regional context indicates that 81.2% of the total number were submitted by the applicants from such regions: Kharkiv region – 1577 applications; Vinnytsya – 1 341; Dnipropetrovsk – 819; Odesa – 502; Lviv – 494; Zaporizhzhya – 418; Ternopil – 347; Poltava region – 304; Donetsk – 302 and the City of Kyiv – 3 388 applications.

During the period of 2012-2016 the largest number of applications for inventions and utility models among the scientific organizations of the sphere "Science" were submitted by the applicants from the cluster H "Regions with a low level of innovative development" (2154 applications), but at the expense of only one institution - the Ukrainian State Research Institute for Rehabilitation of Disabled People (1936 applications). Among the institutions of the industry "Education" the customers of the cluster HB "Regions with the highest level of innovative development" are ahead by the number of applications (4317 applications).

The general principle approach to the formation of the strategy of innovative development of the region should be the construction of regional innovation infrastructure using the following main provisions: the openness of the system, the use of interregional and international cooperation in the development of innovative infrastructure; the combination of market mechanisms with state support for innovation; maximum reliance on existing viable enterprises and regional structures; the use of regional order for training for innovation; monitoring and managing the effectiveness of regional innovation infrastructure.

The investigation of the trends of innovative development of each cluster and their in-depth and detailed analysis taking into account branch characteristics through correlation-regression analysis and other analytical methods on the example of the selected areas can be the subject of further research.

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ENSURING THE COMPETITIVENESS OF INNOVATIVE PRODUCTS

Abstract. In the article, theoretical and methodical principles of ensuring the competitiveness of innovative products are considered and the influence of the external and internal environment on the competitiveness of innovative products of industrial enterprises is researched. The factors that determine the level of the competitiveness of innovative products are defined. Scientific and methodical approaches to the formation of a mechanism for providing the competitiveness are analysed. The competitive advantages, characteristics and properties of products, which will create a certain advantage for an enterprise over competitors, are determined. The venture educational and scientific and production cluster is proposed taking into account the preferences of all the members of an association. Theoretical and methodical principles of the formation of the mechanism for ensuring the competitiveness of innovative products are developed and its structural elements for electro-technical enterprises are defined.

JEL Classification System: O 018, O 330
Keywords: the mechanism for ensuring competitiveness, innovative products, electro-technical enterprises, the venture educational and research and production cluster.

Introduction. The change of the paradigm of economic development from industrial to innovation and information one requires directing the activity of industrial enterprises towards developing conceptually new approaches to providing the competitiveness of products and their effective reproduction on an innovative basis in order to ensure economic growth in the

conditions of active development of science and technology and implement an innovation and investment strategy in a proactive mode. The leading role in this case in highly developed countries is played by the enterprises of basic industries, where electro-technical ones constitute a large share. They reflect the level of scientific and technological progress, an innovation orientation of other sectors of the national economy; stimulate the increase in the production of innovative products and deeper economic engagement of industrial enterprises with other actors of the innovation process. However, in the structure of Ukrainian industry, the production and sale of innovative products by electro-technical enterprises, the orientation towards raising its level of knowledge intensity and innovation, have their own peculiarities and the problems of exogenous and endogenous nature associated with those peculiarities. They complicate the search and substantiation of decisions regarding taking into account the formation of mechanisms for strengthening the innovation activity of electro-technical enterprises and ensuring the competitiveness of their products on an innovative basis, considering the dynamics of the market environment.

Theoretical principles of ensuring the competitiveness of Ukrainian enterprises, the identification of the reasons for the negative state and the formation of possible ways to increase the competitiveness of industrial enterprises of the national economy, the issue of the electro-technical enterprises state, the peculiarities, factors and conditions for increasing the competitiveness of their products on the basis of the activation of the innovation component, the reasons for low dynamics of production and sale of innovation products are reflected in the works of a large number of domestic scientists.

At the same time, a number of issues related to the essential features of ensuring the competitiveness of innovative products of electro-technical enterprises remain unresolved. Among the main points one should single out the following: defining the main factors that ensure the competitiveness of innovative products; improving scientific and methodological approaches to ensuring the competitiveness of innovative products in conditions of growing

competition on the domestic and foreign markets; analysing and improving the mechanisms for ensuring the competitiveness of production of innovative products through the formation of sTable economic relations when realising the innovation process, substantiation of the directions of its dynamic and strategic course. This has determined the choice of the topic of our research, its relevance, theoretical and practical significance[61].

The purpose of the research is to deepen theoretical and methodological, scientific and practical principles of forming the mechanism for ensuring the competitiveness of innovative products of electro-technical enterprises.

In order to achieve the set purpose it is necessary to carry out the following tasks:

- to identify factors and determine their impact on ensuring the competitiveness of innovative products;
- to study the approaches to the formation of the mechanism for ensuring the competitiveness of innovative products;
- to develop theoretical and methodical principles of forming the mechanism for ensuring the competitiveness of innovative products and identify its structural elements for electro-technical enterprises.

Competitiveness is a universal requirement for any product of innovation activity. Based on the phrase, we can state that competitiveness is the ability to compete, the capability to successfully exist in a competitive environment. Competition is an integral part of a market economy, one of the most important factors that increases the efficiency of the economic system, which arises and is supported by freedom of choice of economic behaviour.

[61] Lobodzinska, T. (2013): The formation of a mechanism for ensuring the competitiveness of innovative products (through the example of enterprises of the electro-technical industry), dissertation abstract., Kyiv, Ukraine, National Technical University of Ukraine “Kyiv Polytechnic Institute”, p. 20.

Nowadays, the country's economic success, that is, its competitiveness, is determined by the presence of its competitive sectors, industries and scientific organisations conducting research and development.

Competition in the business environment performs a number of functions that help to equalise the individual product costs and allocate profits, depending on the management system.

Competitive products are products that satisfy more user values and are manufactured at a higher level. This is exactly the kind of innovative product that can provide the highest beneficial effect in relation to the total costs of a consumer.

Today there is a need to analyse innovation products in terms of their competitiveness. To do this, we make a comparison between them and:

- a similar kind of innovative products of competitors;
- products of competitors that are not innovative but partly or completely satisfy the same need that the innovative product offered by an enterprise must satisfy;
- a conditional standard, which is formed by combining the best values of the parameters of a particular type of product offered by different manufacturers that are present on the market.

Thus, innovation is the basis of competitiveness; it is innovation that creates competitive advantages of products. Moreover, competitiveness, in its turn, serves as a characteristic feature of innovative products. As it should be noted that not all created innovative products, which are not yet available on the market, become competitive; they become competitive if the market really needs them.

The study of the essence of competitiveness has made it possible to argue that this is a truly "universal benchmark" that defines the directions of actions for all participants in the production process:

- at state level (a general effect, designation of tax privileges and incentives, transfer, help in overcoming all kinds of barriers);

- at the level of a manufacturer (using the operating leverage, determining the optimal ratio between the time spent and risks, staffing support for production, high technology, the quality of products);
- at the level of a consumer (determination of product properties, the cost of purchase and consumption of products, warranty service);
- at the level of financial institutions, (they prefer the producers of competitive products)

The process of making innovative products available on the market for the purpose of obtaining economic benefits is called commercialisation of innovations. The success of innovative products of industrial enterprises on the market and the ability of their sale and purchase by consumers depend heavily on the proper implementation of the commercialisation process. A characteristic feature of innovative products is their competitiveness.

Consequently, with regard to the relationship of essence between competitive and innovative products, it is necessary to note that, despite some semantic synonymity of these concepts, they differ somewhat. Competitive products are products that satisfy more user values and are manufactured at a higher level. This is exactly the kind of innovative product that can provide the highest beneficial effect in relation to the total costs of a consumer. Thus, the study of the theoretical achievement regarding the definition of the essence of innovative products provides an opportunity to generalise that innovative products are products that can function in market conditions of the economy, maximally satisfying the needs of consumers and, at the same time, creating profits and an image of an enterprise. That is, competitive products can be innovative, but innovative products are not always competitive. Under these conditions, we put greater emphasis on the combination of these two definitions: "innovation" and "competitiveness" as being interdependent, but not mutually exclusive.

There are a number of factors that ensure the competitiveness of innovative products, and according to which competitiveness is analysed. We suggest focusing on the following: technical and economic, commercial, regulatory ones (Table 1).

Table 1. The factors to ensure the competitiveness of innovative products

Technical and economic	Commercial	Regulatory
- improvement of design, technical and technological base; - application of the latest technologies; - productivity and labour intensity; - product designation; - production costs; - consumption of material; - energy consumption; - quality; - the volume of production; - the price of consumption; - operating costs; - durability, reliability, safety, robustness; - environmental friendliness; - terms and conditions of the guarantee	- market conditions; - product promotion; - image and business reputation of an enterprise; - the price of sale; - contract conditions (discounts, system of payment and delivery); - service (dealer and distribution points of a manufacturer); - control and maintenance;	- technical security; - technical specifications; - ecological safety; - patent certification and patent protection; - compliance with current norms and standards; - products' resource; - legislation on sales regulation (customs duties, taxes, legal protection)

Source: compiled by the authorson the basis of the research

It should be noted that the approach to evaluating and ensuring competitiveness, in contrast to the assessment of a technical level and the quality of products, considers the characteristics (parameters) of products that significantly affect the needs of a buyer and making a decision on the purchase. The price of consumption is not included in the indicators when assessing competitiveness according to technical parameters, but it is

considered when comparing products by economic parameters, as one of the main stages of the overall assessment of competitiveness.

At present, there is a need to evaluate the products that are being developed and produced as to their competitiveness. Products must meet market requirements, consumer needs and be accepTable in terms of price and quality, that is, to be competitive.

Competitiveness is an indicator that interests both a manufacturer and a consumer of products. The manufacturer is interested in selling their products; for this, products should be of high quality. The consumer is interested in purchasing products that fully meet their needs in terms of quality and price.

That is, competitiveness in the general sense is the possession of properties that create some advantages for the subject of economic competition in order to defeat competitors. The achievement of these competitive advantages is ensured by the well-established mechanism for ensuring the competitiveness of products.

Modern approaches to ensuring the competitiveness of innovative products should take into account not only the specifics of the activity of the electro-technical industry enterprises, but also the conditions in which they operate, and they should mitigate the existing contradictions in understanding such definitions as "technical level", "quality", "competitiveness" that allow outlining the elements of the mechanism for ensuring competitiveness more accurately[62].

In many enterprises, the study of products' competitiveness is usually limited to the consideration of a technical level and the quality of products. One of the reasons for this is some contradiction in understanding the terms "technical level", "quality", "competitiveness". Quality and a technical level of products are indicators of product evaluation. The determination of the technical level of a product allows us to assess the technical perfection of the

[62] Lobodzinska, T. (2012): Modern approaches to the formation of a mechanism for ensuring the competitiveness of innovative products. «Problems and prospects of innovation development of the Ukrainian economy»: Materials of the International research and practical conference 31.05-02.06.2012: Collection of abstracts - Vol.1. – Dnipropetrovsk, Ukraine, National Mining University, pp. 59-61.

estimated product with the corresponding basic values, based on the comparison of the values of indicators. The technical level of products is a relative characteristic of their quality[63].

A strategic approach to ensuring competitiveness states that the factors for raising its level must be reconciled with the strategic importance, which consists in the ability of one or another factor to influence the competitiveness of products, as compared with competitors. The choice of a strategic factor that affects the competitiveness of products is based on the benefits of products perceived by a consumer, and when the consumer properties of products are equal, then the consumption prices are analysed in comparison with competitors' ones.

In our opinion, certain factors that are typical of each particular branch are crucial. That is, among the factors of the competitiveness of innovative electro-technical products, it is necessary to identify those components that directly affect its ensuring (Table 2).

Competitiveness of products is also influenced by the resource, production and innovation potential etc. Competitiveness of an enterprise's potential is its ability to use the totality of resources more efficiently than other market entities, to direct them towards the full satisfaction of the consumers' needs, the reduction of costs and optimisation of its own economic benefits.

For example, new ideas and advanced technologies help products to be better, have high quality, possess wide operational capabilities, have a more affordable price compared with competitors' one.

An assessment of the competitiveness of products, including innovative ones, is one of the main elements of the economic and production activity of enterprises in market conditions. The importance of such an assessment is due

[63] Lobodzinska, T. (2010): Improving product quality as a factor for ensuring competitiveness. «Modern trends in the development of technologies in infocommunications and education»: Materials of the VII scientific conference 25-26.11.2010. : Collection of abstracts - Kharkiv, Ukraine, pp. 308-309.

to the necessity of developing measures to ensure the competitiveness of products[64].

Table 2. The factors that influence the competitiveness of innovative electro-technical products

External	Internal
Activities of state power structures (legislation, fiscal and control authorities, monetary policy); *Economic conditions* (conditions of raw material markets and markets of material, financial, labour resources, means of production); *Related and supporting enterprises and industries* (high technology, resource conservation, new materials, sources of energy); *Parameters of demand* (growing demand, stability, a market position)	*Management activities* (organisational and manufacturing structures of management, a professional and qualification level of managers); *The system of technological equipment (*updating of technologies for equipment, flexibility of production); *The production process* (the quality of raw materials, component parts and semi-finished products, the comprehensiveness of processing, volumes of waste); *The sales policy* (volumes and costs of sales, an effective price policy, stimulating sales volumes, access to new markets)

Source: compiled by the authors on the basis of the research

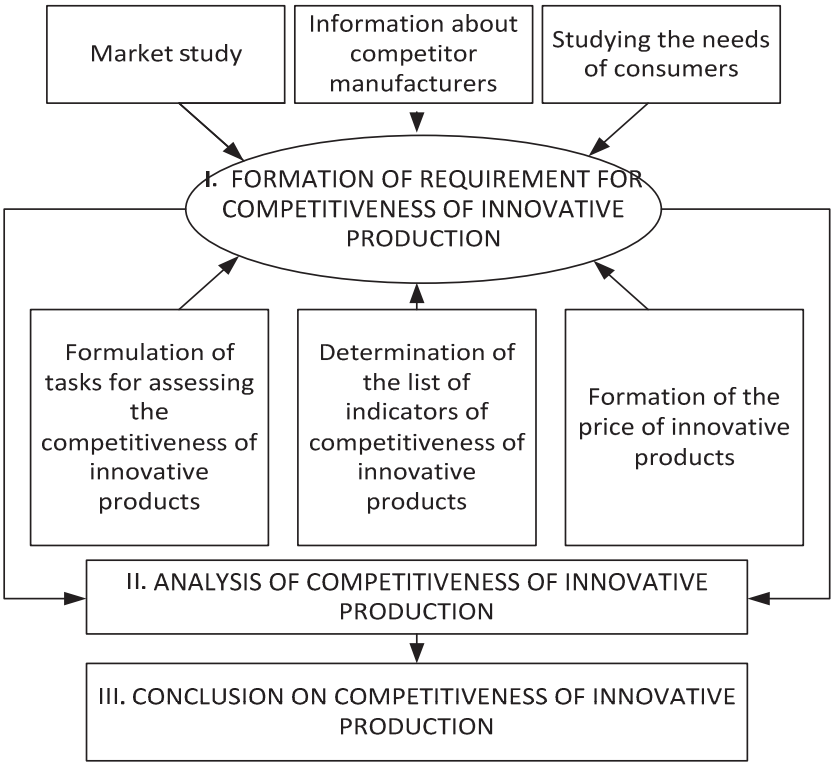
We offer a sequence of stages for determining the level of thecompetitiveness of innovative products (Figure 1).

At the first stage, it is necessary to determine the objectives of the analysis and evaluation of the competitiveness of innovative products. The assessment is carried out at all stages of the product life cycle; therefore, it is essential to begin with marketing research, which includes studying the market potential and its segmentation, researching the structure of the

[64] Lobodzinska, T. (2010): The formation of a system of criteria for assessing the competitiveness of products, «Economics. Management. Business». Collection of research papers, 2, Kyiv, Ukraine, State University of Information and Communication Technologies, pp. 49-53.

market, the positions of competitors and the needs of consumers. The obtained research results make it possible to formulate requirements for innovative products, the main criteria of which are: the technical level of products and their uniqueness; the level of product quality; consumers' needs and requirements regarding products; production costs; consumption and exploitation costs.

Figure 1. The stages of determining the competitiveness of innovative products



Source: compiled by the authorson the basis of the research

On the basis of the formulated requirements, it has become necessary to determine the list of indicators characterising the competitiveness of innovative products (Table 3).

The competitiveness of innovative products means its ability to meet market requirements and to be profitably sold provided there are

competitors. Therefore, it is vital to determine competitive advantages, that is, the characteristics and properties of products, which will create for a company a certain advantage over competitors.

Competitive advantages are divided into external and internal. The external ones are based on the excellent properties and qualities of products that create value for a consumer, and the internal competitive advantages are based on the ability of an enterprise to develop, produce and sell products at minimum expense.

The benefits of the investigated innovative products can be measured by technical, economic, regulatory and other indicators.

Technical (technological) competitive advantages are determined by a high level of development of applied science and technology; technological features of raw materials and materials; special technical characteristics and product parameters.

Table 3. The indicators characterising the competitiveness of innovative products

Indicators	Characteristics of indicators
Designation	characterise the main value of the beneficial effect of using products, properties as to performing these functions (power, productivity, durability)
Reliability	characterise products in terms of reliability of operation i.e. the ability to perform the necessary functions in conditions of application, maintenance, storage, transportation (faultlessness, a technical resource, a maximum possible period of use and failure-free operation, maintainability)
Producibility	characterise the product's properties in terms of the effectiveness of design and technological solutions to ensure high productivity, rational use of raw materials and tools, labour and time (labour intensity, material intensity, energy intensity)
Security	characterise the degree of safe exploitation and storage of products

Standardisation and unification	characterise the saturation of products with standard, unified and original elements (a high percentage of such elements is equally favourable for both a manufacturer and a consumer)
Ecological	characterise the degree of harmful effects on human health and the environment
Normative	characterise the suitability of products for the established norms, standards, requirements, technical specifications; patent protection and patent certification of products

Source: compiled by the authors on the basis of the research

The competitiveness of innovative products means its ability to meet market requirements and to be profitably sold provided there are competitors. Therefore, it is vital to determine competitive advantages, that is, the characteristics and properties of products, which will create for a company a certain advantage over competitors.

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The benefits of the investigated innovative products can be measured by technical, economic, regulatory and other indicators.

Technical (technological) competitive advantages are determined by a high level of development of applied science and technology; technological features of raw materials and materials; special technical characteristics and product parameters.

Economic competitive advantages of innovative products are determined by a high rate of profit; favourable dynamics of prices; higher profitability of products; short payback periods of investments; increasing market capacity; a lack of substitutes.

The competitive advantages based on regulatory acts include exclusive rights to intellectual property, preferences or other privileges; intellectual

property rights; a possibility of importing or exporting products without any obstacles.

Thus, competitive advantages are the basis for ensuring the competitiveness of innovative products in a market economy.

When developing the process of forming the mechanism, we considered preferences at the level of "producer-consumer", which provides an opportunity to imagine the complexity of the process of ensuring the competitiveness of innovative products in modern economic conditions. The factors that ensure the competitiveness of innovative products from the point of view of a producer, include production costs, which, in addition to basic production costs, also include: market research and analysis, the development of advertising and technical information at high quality and organisational levels, the promotion of the closest possible links between sellers and buyers, which affect the reduction of the circulation expenses (the price level), delivery of goods to the places of consumption, regardless of their volume. For a consumer, the main factor is the purchase price, which is formed taking into account consumer preferences and the degree of satisfying the needs.

Summarising the conducted research, it is worth noting that there is now a need to evaluate new innovative products in terms of their competitiveness.

Thus, the above-mentioned approaches to ensuring the competitiveness of products open up an opportunity to take into consideration significant aspects at the current stage that should be used when forming the mechanism for ensuring the competitiveness of innovative products.

To ensure the competitiveness of innovative products, based on the theoretical basis and the conducted analysis, we have developed a mechanism that takes into account the peculiarities of innovative products of the electro-technical industry enterprises, and which will enable domestic enterprises to reach a new level of development (Figure 2).

In developing the mechanism for ensuring the competitiveness of innovative products (MECIP), we have consolidated the components of

forming the mechanism, which can be conditionally divided into principles, functions, methods, levers, sources [65].

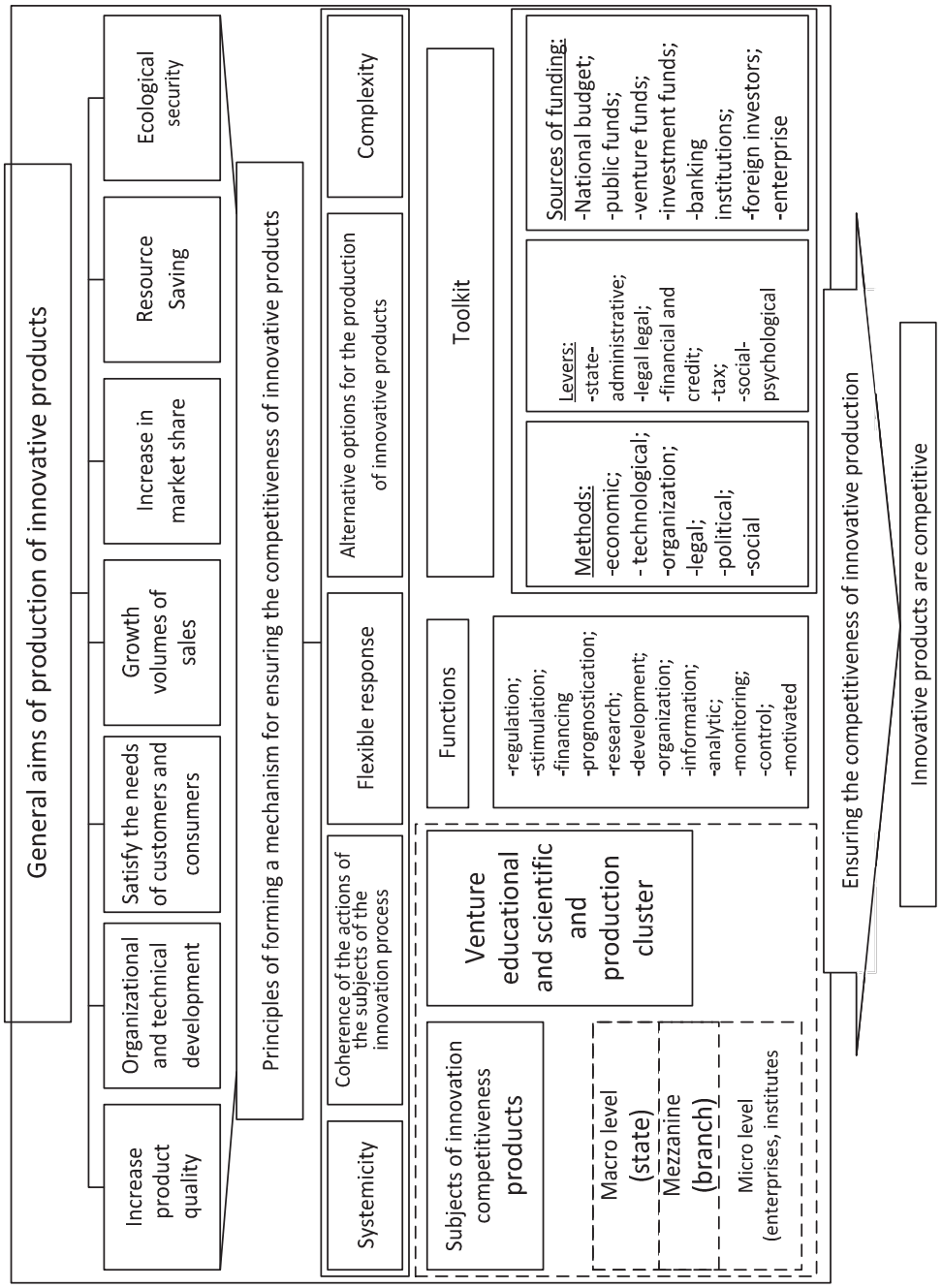
The formation of the MECIP is based on the following principles:

- The principle of consistency – is understood as a set of certain elements that are interrelated and interdependent, and create a certain integrity;
- The principle of comprehensiveness – is understood as a mutually determined and coordinated single system that provides the connection of all elements;
- The principle of a flexible response - the ability of an enterprise to react promptly to the change of market threats and possibilities, depending on their direction, rebuild its actions, choose development options that will respond to the situation on the market;
- The principle of alternatives to development options - the need to develop several variants of production development (optimistic, most likely and pessimistic strategies) for the possibility of responding to instability, constant changes in the political, economic, environmental situation;
- The principle of the balance of interests of the innovation process subjects suggests that the development, production and sale of innovative products will bring benefits to all participants in the innovation process.

In addition, when forming the MECIP, we have defined the general objectives of the production of innovative cable and wire products.

[65] Lobodzinska, T. (2014): Theoretical and methodical principles of mechanism for providing innovative products competitiveness formation, Formation of market relations in Ukraine, Collection of research papers, 9(160), Research Institute of Economics, Kyiv, Ukraine, pp. 57-59.

Figure 2. The mechanism for ensuring the competitiveness of innovative products of electro-technical enterprises



Source: compiled by the authors on the basis of the research

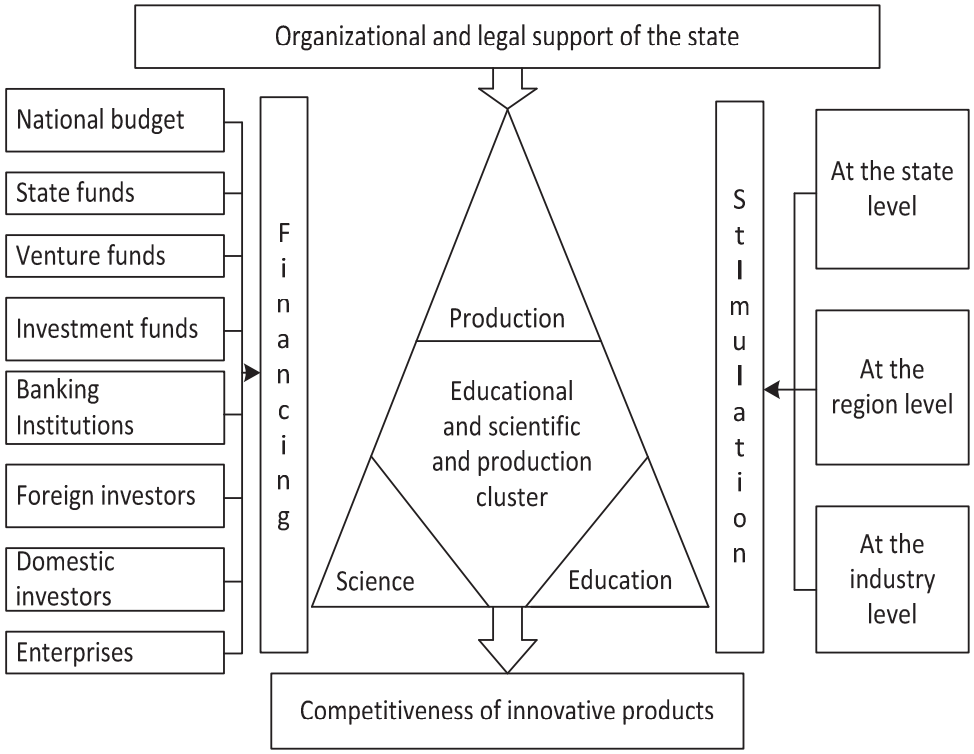
The objectives are as follows: an improvement of the products' quality; organisational and technical development of production; the satisfaction of customers and consumers' needs; an increase in a market share; the growth of sales volumes; resource conservation; environmental safety, guaranteed by the subjects of ensuring the competitiveness of innovative products at the macro level (state authorities), at the meso-level (electrical engineering industry), at the micro level (enterprises producing CWP, scientific and educational organisations) through the functions of regulation, stimulation, financing, forecasting, research, development, organisation, information, analytics, monitoring, control, motivation and tools for their implementation: methods (economic, techno-technological, legal, organisational, political, social); levers (state and administrative, normative and legal, financial and credit, tax, socio-psychological); sources of funding (state budget, state funds, venture funds, investment funds, banking institutions, foreign and domestic investors, enterprises).

In our opinion, it is necessary to emphasise separately the importance of such functions as financing and stimulation. Of all others, they are given close attention at the present stage of the development of economic relations (Figure 3).

In our view, a fundamentally new element of the mechanism of ensuring the competitiveness of innovative products is a cluster based on the principle of coherence and interest of each subject of the innovation process. We have suggested a venture educational and scientific and production cluster (Figure 4). It is because of the principle of coherence and interest that a full-fledged mechanism for ensuring the competitiveness of innovative products is being created and this process acquires both economic and technological feasibility and orientation. Hence, it gives the mechanism capacity to operate and makes it really functioning.[66]

[66] Lobodzinska, T. (2014): Structural and functional component of the innovative products competitiveness ensuring mechanism, Bulletin of the Kyiv National University of Technologies and Design, 5(79), Kyiv, Ukraine, pp.149-155.

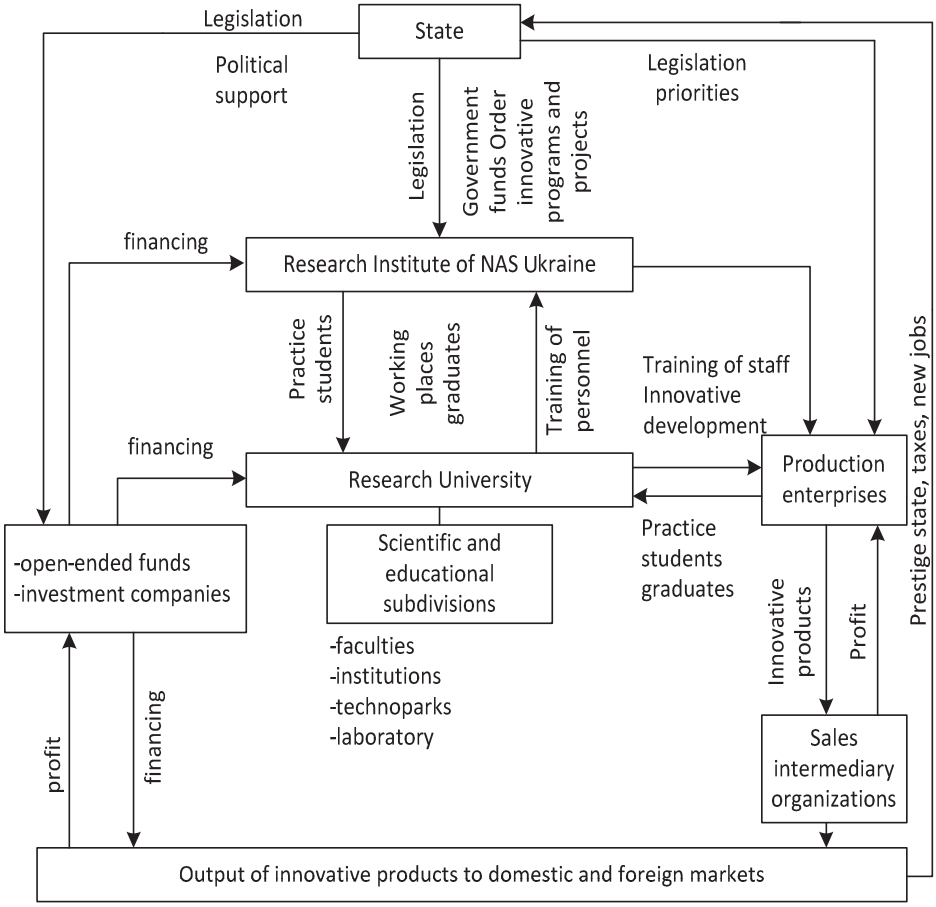
Figure 3. Organisational and economic principles of forming a venture educational and scientific and production cluster



Source: compiled by the authors on the basis of the research

In today's conditions of rapid development of scientific and technological progress, it is important for any enterprise to possess not only tactical competitiveness, that is to be competitive today and tomorrow, but also strategic competitiveness, that is, to think in advance about its future competitiveness. In our opinion, clusters of united enterprises and organisations will enable them to achieve the goal, simplify the process, make it take less time and ensure the competitiveness of innovative products, and also take into account and balance the interests of each subject of the innovation process.

Figure 4. A venture educational and scientific and production cluster



Source: compiled by the authors on the basis of the research

These characteristic features present an opportunity to take the mechanism to another perfect level, which will allow manipulating the indicators considering reverse causality.[67]

[67] Lobodzinska, T. (2013): The formation of a mechanism for ensuring the competitiveness of innovative products (through the example of enterprises of the electro-technical industry) / Thesis for a Candidate Degree in Economics. Kyiv, Ukraine, National Technical University of Ukraine "Kyiv Polytechnic Institute", 243 p.

Such an innovative cluster infrastructure is a kind of «nutrient medium», which provides a favourable background for the interaction of all subjects of innovation activity. The state contributes to the development of science and training of scientific and engineering staff (the main source of innovative ideas), accumulates funds for innovation, places a state order for conducting R&D, provides an initial demand for innovation, organises the promotion of scientific and technological advances, moral encouragement of developers (State Prizes), provides them with social protection (scientific pensions), stimulates international scientific and technical and innovation cooperation, regulates the international transfer of innovations, supports business (venture capital funds, investment companies) through legislation and encourages them to invest in innovation.

The introduction of innovations in order to produce competitive products is connected with the duration of the research and production cycle, significant costs and the uncertainty of the final result; therefore, to solve the problem of long-term risk investments, it is necessary to get assistance from venture capital investors and venture funds that give their money to scientists from research universities and theoretical research institutes for the development of innovations, and after commercialising innovative products in the domestic and foreign markets, they make a profit.

A research university provides training of scientific and engineering staff for theoretical research institutes and manufacturing enterprises; also, it conducts scientific researches of innovations through its institutes, laboratories, technoparks and, in cooperation with manufacturing enterprises, it brings innovative products on the market.

One of the essential elements of the cluster is manufacturing enterprises, the purpose of which is the production of innovative products. Manufacturing companies receive innovative developments from theoretical research institutes and research universities and produce new products, as well as allow university students to do practice there and provide graduates with jobs. An overview of the innovation activity of the electro-technical industry enterprises that produce innovative products makes it possible to

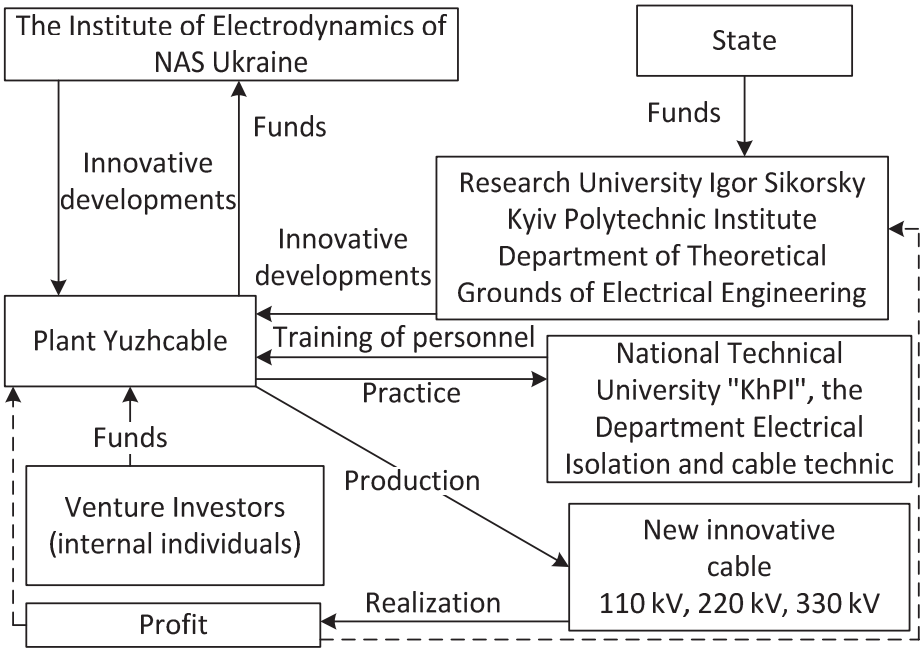
note that among the enterprises that are being analysed, only the investigated Plant "Yuzhcable" has introduced innovations on the market. Given the methodological component of competitiveness, these products are innovative.

In addition, it is obligatory to include in the cluster marketing intermediary organisations, which will undertake the task of selling innovative cable and wire products. If manufacturers of CWP are engaged in the sale on their own, then in the long run, this will reduce financial stability and deteriorate their market position.

The proposed venture educational and scientific and production cluster opens up an opportunity to ensure the competitiveness of innovative products, which corresponds with the purpose of this research.

An example of a functioning venture educational and scientific and production cluster is shown in Figure 5.

Figure 5. A functioning venture educational and scientific and production cluster



Source: compiled by the authors on the basis of the research

Thus, the problem of mastering industrial production of self-supporting insulated and protected wires of a world-class level in Ukraine is solved by the joint efforts of the venture educational and scientific and production cluster, which unites Plant “Yuzhcable”, the Institute of Electrodynamics of the National Academy of Sciences of Ukraine, the National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute» and the National Technical University "Kharkiv Polytechnic Institute", and the proposed mechanism, which includes this cluster, provides an opportunity to ensure the competitiveness of innovative products of enterprises of electro-technical industry[68].

Conclusions. In the article, theoretical and methodical principles of ensuring the competitiveness of innovative products are considered, the influence of the external and internal environment on ensuring the competitiveness of innovative products of industrial enterprises is investigated, and scientific and methodical approaches to the formation of the mechanism for ensuring their competitiveness are analysed.

It is proposed to add techno-economic, commercial and regulatory factors to the factors determining the level of the competitiveness of innovative products, taking into account the leading role of quality and price. Under the influence of these factors, an innovative type of enterprise behaviour is formed through the creation and use of exclusive competitive advantages in the conditions of growing competition.

The research of modern approaches to forming a mechanism for ensuring competitiveness has made it possible to argue that today there is no single theoretical approach to ensuring the competitiveness of innovative products; there is a lack of comprehensive works on the formation of such a mechanism with considering all factors that influence competitiveness, the specifics of industry affiliation of enterprises, the market structure, the objective need for deeper economic engagement of industrial enterprises with

[68] Lobodzinskyi, V., Tsyban, Y. (2017): The investigation of a wave process during propagation of plate voltage pulse on three-phase performance cable line, IEEE 1st Ukraine Conference on Electrical and Computer Engineering, Kyiv, Ukraine, pp. 448-451. DOI: 10.1109/UKRCON.2017.8100526.

other actors of the innovation process, etc. That is why in the process of forming the mechanism of ensuring the competitiveness of innovative products, we have suggested taking into account the identified components, as well as defining preferences at the level of "producer-consumer", which will present an opportunity to theoretically and practically comprehend the complexity of the process of ensuring the competitiveness of innovative products. Given the theoretical basis and the conducted analysis, we have developed the mechanism of ensuring the competitiveness of innovative products, which takes into consideration the peculiarities of newly created products of the electro-technical industry enterprises and enables domestic enterprises to reach a new level of development[69].

Under modern conditions of scientific and technological progress, an enterprise must provide not only tactical, but also strategic competitiveness, adapt quickly to business changes. That is why, in the context of constant economic changes, enterprises and organisations can carry out the set task through clustering. The peculiarity of the defined cluster is that it is based on the principle of balancing the interests of the innovation process subjects, which provides an opportunity to ensure the competitiveness of innovative products of the electro-technical industry enterprises and increase their adaptive reaction to market changes. The proposed venture educational and scientific and production cluster allows ensuring the competitiveness of innovative products, which corresponds with the purpose of this research. The result of creating this cluster is the possibility to ensure the competitiveness of innovative products, taking into account preferences of all the members of the association. That is what takes the mechanism to another perfect level and allows manipulating indicators considering reverse causality. The singled out in it venture educational and scientific and production cluster can become a real infrastructure element of activating the entire innovation process in the activities of electro-technical enterprises.

[69] Lobodzinska, T. (2013): *The formation of a mechanism for ensuring the competitiveness of innovative products (through the example of enterprises of the electro-technical industry)* / Thesis for a Candidate Degree in Economics. Kyiv, Ukraine: National Technical University of Ukraine “Kyiv Polytechnic Institute”, 243 p.

PART 3.

STRATEGIES AND PRIORITIES OF DEVELOPMENT OF THE REAL SECTOR OF THE ECONOMY

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ANALYSIS OF INNOVATION SECURITY THREATS TO THE MACHINE-BUILDING INDUSTRY

Abstract. The authors determine innovation threats in mechanical engineering as the combination of real or potential phenomena or destabilizing factors, which complicate or make impossible the implementation of innovation and investment development model of national mechanical engineering. They have analyzed and classified threats to development of mechanical engineering; and set out the key factors for ensuring economic security of the state. The research shows that the main problem for the reliable evaluation of the level of economic security of the state restructuring mechanical engineering in Ukraine on innovative basis is the correct determination of threats for distinguishing the most topical economic problems and developing the adequate development strategy for mechanical engineering. The article provides the analysis of the top priority directions of innovation activity in mechanical engineering. The results have proved that the innovation status determines the output of high-technology production being the pre-condition for new cycles of high-technology and high-science machine-based production and provides additional competitive edges for international trade policy. The authors have shown the dynamics of export and import of mechanical engineering production by different sectors. The research has enabled the conclusion that mechanical engineering playing the leading role in industrial economic sector of Ukraine becomes the key lever for transition of our country from the lower technological patterns to higher ones.

JEL Classification System: D24, F52, L64, O14, O32, O33

Key words: innovation threat, threshold values, machine-building complex, innovative restructuring of mechanical engineering, world ranks, mechanical engineering, export, import, innovation activity.

Introduction. The purpose of the article is the analysis of innovativeness determining the level of high-tech output and being the prerequisite for financing new cycles of knowledge-based and technology-intensive production. The objective is also to disclose the dynamics of the main production indicators of mechanical engineering by sub-sectors and to analyze the machine building as the key lever for country shifting from a lower technological basis to higher one. We intend to define the term "innovation threat" and reveal the impact of innovation security threats measured by specific indicators on social and economic development. We also strive for identifying innovation threats to the machine-building industry, classifying them, and disclosing factors hindering the implementation of innovations. Our task is to highlight the key factors for strengthening the economic security of the state.

In spite of the ample literature on economic security of the state, the problem of timely detection and elimination of threats to economic security is still a topical one due to the lack of a unified approach to their classification and systematization. The most commonly used typology of threats to the economic security of the state is the distinguishing external and internal ones, where external threats appear in the external environment, while internal ones result from the state of the object.

Komelina, Onishchenko, Matkovsky, and Pugach[70] recognize the following set of threats to the economic security of the state:

- low technological level of most industries, high production costs, low quality of products and, consequently, low competitiveness of the national economy;

[70]Economic security of the state: evaluation and strategic guidelines for providing [monograph] / O.V. Komelina, S.V. Onishchenko, A.V. Matkovsky, O.A. Pugachl. - Poltava: PoltNTU, 2013. - 202 p.

- loss of a significant part of scientific and technical potential, positions in important areas of scientific and technological progress;
- deformed production structure;
- destruction of the reproduction system of production potential;
- energy crisis;
- inefficiency of public administration of social and economic processes;
- imperfection of national legislation;
- the growth of the shadow economy;
- high level of monopolization of the economy, strengthening of raw material orientation;
- low investment activity and capital investments mainly in intermediary and financial activity at the expense of production;
- reduction of production sphere;
- low solvent consumer demand of the population;
- strengthening the property stratification of the population;
- criminalization of the economy, the growth of corruption and organized crime, its penetration into the basic branches of the Ukrainian economy as a result of the weakening of the state control system;
- the weakness of the institutions combined with the imperfect legislative framework leads to low legal, financial, contractual discipline, mass concealment of income and tax evasion;
- lack of adequate legislation and imperfection of judicial system, and delays in the creation most important institutions of a market economy.

There is a constant attention in the scientific publication paid to the study of external threats to the economic security of the state within the framework of globalization of the world economy. The aggregate of external threats to the economic security of the state is as follows[71]:

- import dependence of Ukraine on many types of products, including strategic goods,

[71] Martynenko VV Threats to Ukraine's Economic Security in the Context of the Challenges of Globalization / VV Martynenko // Economic Journal - XXI. - 2011. - No. 7-8. - pp. 40-43.

- energy carriers, component parts for mechanical engineering, foodstuffs;
- irrational structure of export;
- staying in the infancy of the financial, organizational and information infrastructure
- supporting the competitiveness of Ukrainian exports;
- uncontrolled departure abroad of intellectual and labor resources;
- insufficient export and currency controls and imperfect customs policy;
- poor development of the transport infrastructure of foreign economic relations, etc.

According to modern concepts, recognizing real and potential threats plays the most important role in ensuring the economic security of the state[72]. There are also controlled, manageable and unmanageable threats depending on ability to influence them and their sources. Considering the time of the manifestation of the destructive impact, we recognize actual and perspective threats to the economic security of the state.

In general, there are nine system-building components of the economic security of the state, namely[73]: macroeconomic, industrial, financial, investment and innovation, energy, social, demographic, food and foreign economic ones.

It is worth mentioning, that the detection and elimination of threats to the economic security of the state relies on a comprehensive multi-criteria in-depth threat analysis ensuring their systematization and selection of the of most effective means and mechanisms for countering these threats.

Nowadays, there is a clear trend of decline in production of Ukrainian machine-building enterprises and industry as a whole. Therefore, determining

[72] Varnalia Z.S. Economic Security of Ukraine: Problems and Priorities for Strengthening: Monograph / Z.S. Varnal, DD Burkaltseva, O.S. Saenko - K .: Knowledge of Ukraine, 2011. – 299 p.

[73] The Official Site of IAS Consultant: Information and Analytical System on Legislature of Ukraine (2018), "The Order of Ministry of Economy of Ukraine # 150 of 29 October 2013 "On Approval of Methodic Recommedations for Calculating the Level of Economic Security of Ukraine", available at: http://consultant.parus.ua/?doc=08U1H409F0 (Accessed 10 May 2018).

the reasons for such situation and searching for mechanisms of state regulation and market self-regulation of machine-building enterprises (including ecological, economic and social tools) to overcome this tendency is a topical issue.

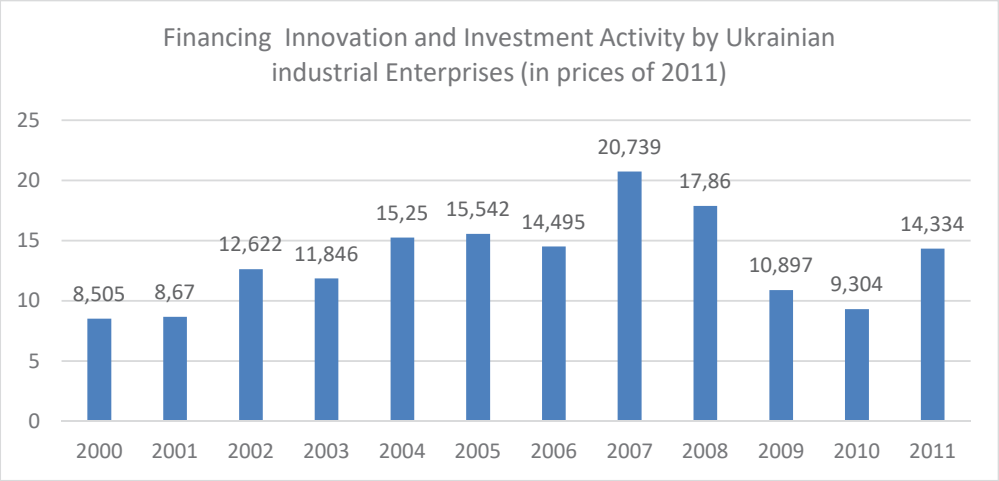
The economic security of the machine-building complex is the key component of the national security. The machine building forms the basis of the modern national economy playing the leading role in the sustainable development. It also affects the transformation, improvement of scientific and technical equipment. By producing means of production for various branches of the national economy, machine building provides comprehensive mechanization and automation of production. In economically developed countries, the share of machine building equals from 30 to 50% of the total output of industrial production (Germany – 53.6%, Japan – 51.5%, the UK – 39.6%, Italy – 36.4%, the PRC – 35.2%).

Consequently, machine building is a system-building industry among interconnected sectors of the economy. The technological and economic independence of the country depends on the development of this industry.

Domestic enterprises operate in a dynamic environment featured by unsTable economic situation, growing competition, low profitability, etc. The priority task for the majority of business entities is the pure survival depending on the effectiveness of economic security management.

The aggregate financing of innovation and investment activity by Ukrainian industrial enterprises in hryvnas reached the peak of 14.334 bln hryvnas (1.293 bln euro) in 2011, but this figure distorts the fact of the actual R&D decline. Graph 1 indicates that the highest level of the aggregate financing of enterprise innovation and investment activity in Ukraine was reached in 2007, and the record high equaled 20.739 bln hryvnas (1.870 bln euros) in 2011 hryvnas. The conducted calculations are based on GDP deflator. The tendency stays unchanged up to 2018 due to geopolitical challenges causing territorial and economic potential losses.

Figure 1. Aggregate Financing of Innovation and Investment Activity by Ukrainian Industrial Enterprises in 2000-2011 (prices of 2011), bln hryvnas



Source: calculated by the authors on the basis[74]

Thus, raising capital is extremely relevant for Ukrainian enterprises. The further development innovative enterprises and increase in their amount require:

- improving conditions for investing in Ukraine;
- creating the unified legislative framework for domestic and foreign investors;
- direct budget financing;
- partial compensating production costs;
- reimbursing interest rates on bank loans;
- granting loans at the expense of the state budget;
- loans and grants of international financial institutions attracted by the state or under state guarantees;
- subventions from the state budget to local budgets;
- provision of tax, customs and currency preferences.

[74] Frolova T.O., TokarV.V. The European Union TNCs' Investment Strategies of Innovation Development // Economic Annals-XXI. – 2014. – № 5-6. – PP. 13-16.

Renewing and reforming the real sector of economy call for forming the effective mechanical engineering adequate to requirements of the modern global environment. The experience of developed countries proves that the mechanical engineering is the basis of a high level of economic development of any country and its competitiveness ensuring the appropriate level of economic security of the state.

The key factor of competitiveness of national mechanical engineering is the utilization of own scientific and innovation resources for realizing competitive advantages via development of modern directions of fundamental science and scientific schools in different spheres.

However, the problem of competitiveness of the machine-building complex of Ukraine at international markets is complex and complicated one. In general, mechanical engineering remains technologically depressed, institutionally underdeveloped, vulnerable to conjuncture changes in the world market. Ukraine needs the complex formation and systematic implementation of the national strategy for development of mechanical engineering and ensuring its adequate level of competitiveness at international markets.

It is in this context that the high priority for Ukraine is the solving the problem of creating effective mechanisms for enhancing international competitiveness of the machine-building complex of Ukraine, which should become the fundamentals for effective international economic integration.

According to experts, 15 percent of the economic growth of production effectiveness in developed countries is determined by changes in utilizing labour, 20 percent – by investment, and 60 percent by new science-based technologies. According to other researchers (from 67 to 97 percent), competitive advantages are obtained thanks to knowledge, skills and creative decisions[75].

The level of financing research and development in Ukraine essentially falls behind the ones in other countries. According to the Ministry of Finance

[75] Hoikhman, M.I. (2014), "Modern Development Tendencies of a National Economy",*Visnyk Universytetu Bankivskoi Spravy Natsionalnoho Banku Ukrainy*, vol. 1 (19), pp. 31-35.

of Ukraine, budget expenses on scientific and technical activity plummeted from 2.3 percent of GDP in 1990 to 0.34 in 2008 during crisis with a slight increase to 0.41 percent in 2011 and a new decrease to 0.24 in 2017 (Table 1).

On 22 February 2017, the expanded meeting of the Committee on Science and Education of Verkhovna Rada of Ukraine was devoted to "Financing Science and Education in 2017". The budget financing of science in 2017 equaled 6.3 bln hryvnias or 0.24 percent of GDP, including 4.76 bln hryvnias or 0.18 percent of GDP allocated from the General Fund[76].

Table 1. Budget expenses on scientific and technical activity

Budget Expenses	1990	2011	2012	2013	2014	2015	2016	2017
Scientific and technical activity	2,30	0,41	0,31	0,28	0,27	0,28	0,27	0,24

Source: authors' own calculations based on the State Fiscal Service of Ukraine data

The development of mechanical engineering in Ukraine is restrained by low innovation activity of machine-building enterprises. Negative tendencies in innovation development of mechanical engineering can be explained by low competitiveness ranking of Ukraine, for instance, Ukraine was 73 out of 144 countries in 2015[77]. The main factors of its low level are low ranking by other indicators (Table 2).

[76] Bludova, T.V. and Ostrovska, M.S. (2017), "Impact of Innovations on Economic Security of the State from the Perspective of Mechanical Engineering Branch", *Formuvannia Rynkovykh Vidnosyn v Ukraini,* vol. 11 (198), pp. 48-55.

[77] Kalna, T.A. (2016), "Competitiveness of the Products of Machine-building Complex of Ukraine in Export and Import Operations", *EkonomichnyiAnaliz*, vol. 25, issue 1, pp. 29-36.

Table 2. World ranks of Ukraine

Dimension of ranking	Ranking of Ukraine		Number of participating countries
	2015	2016	
Human Development Index	69	76	187
Information Technology Development	90	90	167
Economic Freedom (Heritage Foundation and the Wall Street Journal)	162	164	179
Economic Corruption (Transparency International)	142	144	176
Business Environment Quality (World Bank, IFC)	83	81	190
Innovation and Competitiveness Index (World Economic Forum)	79	85	140
Financial System Development (World Economic Forum)	121	130	190
State Bonds Ranking (Moody's)	B2	B3	-
Supremacy of Law Index	85	87	97

Source: compiled on the basis of [78]

It is worth mentioning, that in 1990s the EU member-states according to Lisbon Strategy were obliged to allocate not less than 2 percent of GDP on science with the further increase to 3 percent of GDP. In spite of the financial crisis, these obligations are being fulfilled. Terms "scientific and technical progress", "knowledge-intensive production", "high technologies", "science backing of production" are met not only in special texts, but in legal acts of governments and presidents of the vast majority of countries. The leading countries allocate more and more budget funds on science. Besides, companies and corporations invest in research and development[79].

Research in the US was always the top priority for state support. National expenses on science in 2008 grew by 32.2 percent compared with

[78] The Official Site of the State Statistics Service of Ukraine, available at: http://www.ukrstat.gov.ua (Accessed 10 May 2018)

[79] Bludova, T.V. and Ostrovska, M.S. (2017), "Analysis of threats to economic security of the state implementing innovation development", *Formuvannia Rynkovykh Vidnosyn v Ukraini,* vol. 12 (199), pp. 45-51.

2000 (from 42.7 to 56.6 bln US dollars) due to financing by the government, a private sector, universities and non-for-profit organizations.

Ukraine lost 29 places in the UN Human Development Index Ranking. This fact derives directly from the UN Report on Development of Human Potential in 2016. The key indicators are life expectancy, duration of education and GDP per capita. In addition, the data on social safety, health and cultural development, crime level, environment protection, and participation in decision-making were taken into consideration.

The UN experts argue that in 1990-2015 in all world regions the average indicators of human development enhanced, but one third of population of the Earth still lives below the minimum poverty line.

The World Bank published the Analytical Report "Doing Business in 2017" – the 14th edition in the series within the Project "Doing Business", jointly issued by the World Bank and International Finance Corporation. The new report sheds light on 190 countries through the lenses of creating favourable conditions for doing business. Ranks of Ukraine are as following: staring a business – 20 (24 in 2016); dealing with construction permits – 140 (137 in 2016); getting electricity – 130 (140 in 2016); registering property – 63 (62 in 2016); getting credit– 20 (19 in 2016); protecting minority investors – 70 (101 in 2016); paying taxes – 84 (83 in 2016); trading across borders – 115 (110 in 2016); enforcing contracts – 81 (93 in 2016); resolving insolvency – 150 (148 in 2016). The biggest pressure on competitiveness ranking is made by factors determining the corruption of economy. Therefore, Ukraine took only 26 points out of 100 ranking 144 out 176 participating countries[80]. The key factor of the growing corruption, according to experts of Transparency International, are inactivity of National Anti-Corruption Committee supervised by the President of Ukraine and failure to implement tasks of the State Program Aimed at Counter-Acting Corruption.

[80] The official site of the Economic Discussion Club (2018), "Ranking of Ukraine in Global Competitiveness Index 2016-2017", available at: http://edclub.com.ua/analityka/pozyciya-ukrayiny-v-reytyngu-krayin-svitu-za-indeksom-globalnoyi-konkurentospromozhnosti-1 (Accessed 10 May 2018).

There are no common approaches to evaluating threats to economic security implementing innovation development. The evaluation of threats to innovation security enables their determination and neutralization via utilizing different methodologies aimed at enhancement of the level of satisfaction of needs of the society guaranteeing the development of national enterprises and amendment of their level of competitiveness.

The threats to security of innovation development are the low level of financing R&D and innovation infrastructure, the growth of level of risks of innovation activity, ineffective using of financial resources, slow development of innovation activity, and a low level of security of innovative products. That is why the development of new methodologies for neutralizing threats to innovation security, especially in mechanical engineering, is the topical problem.

O. Vlasiuk[81] considers the first level threats to innovation security to be insufficient financing scientific and technical works and connected with them derivative threats (the loss of scientific personnel and intellectual property; an irrational structure of scientific and technical potential; decreasing innovation activity).

V. Senchagov[82] argues that threats to economic security implementing innovation development is inability to self-preservation and weakness of an innovative component, underestimation in the system of human capital, ineffectiveness of the system for implementing scientific and technical products in mechanical engineering.

We highlight that threats to innovation activity of enterprises are the combination of factors creating danger to the vitally important interests of economy, state and society.

The experts of the National Institute for Strategic Research offer the best articulated determination of “innovation threat” as the continuation of using

[81] Vlasiuk, O.S. (2011), Economic Security of Ukraine under Market Transformations and Anti-crisis Regulation, DNNU “Academy of financial management”, Kyiv, Ukraine.
[82] Senchagov, V.K. (2002), Economic Security: Geopolitics, Globalization, Self-Preservation and Development (BookFour), The Institute of economics RAN, ZAO «Finstatinform», Moscow, Russia.

money-losing economic model, the lack of incentives to innovation processes and dynamic development of new technological patterns conditioning low competitiveness of Ukrainian economy, making impossible the cardinal enhancement of the life level and quality, provoke social tension and spreading protest mood[83]. According to these experts, the main threats preserving the low scientific and technological level of development are: underdevelopment of the national innovation system; shrinking the scientific and technological potential; brain-drain of scientific personnel; losing scientific schools in key directions of economic development; the growth of scientific and technological dependence on other countries.

There are other approaches in economic literatures suggesting other variants of the roster of innovation threats. The quantity of threats is increased without any basis making the problem of ensuring economic security more complicated, while it is not possible to determine the key threats.

The Law of Ukraine "On Basics of National Security of Ukraine" provides the exhaustive list of threats and states that threats to national security are actual and potential phenomena and factors creating danger to vitally important interests of Ukraine.

B. Gubskyi[84] considers that threats in innovation sphere of Ukraine are an insufficient level of state financing R&D, which directly or in prospects makes impossible or complicates the realization of national economic interests, creating hazards on the way of normal development of economy.

A. Kachynskyi[85] argues that the innovation threat is the economic phenomenon with the forecast, but uncontrolled events, which may lead to material and financial losses.

[83] Varnalii, Z.S. Melnyk, P.V. Taranhul, L.L. andothers (2009), Economic Security, Znannia, Kyiv, Ukraine.
[84] Hubskyi, B.V. (2001), Economic Security: Methodology of Measuring, State and Strategy for Ensuring, DP "Ukrarkhbudinform", Kyiv, Ukraine.
[85] Kachynskyi, A.B. (2004), Security, Threatsand Risk: Scientific Concepts and Mathematical Methods, In-te of problem nat. security, Kyiv, Ukraine.

We think that innovation threats in mechanical engineering being the components of economic threats are the factors, which complicate self-regulation of economic systems, create hazards to implementing innovations in industrial enterprises, decrease the inventing activity and do not favour realizing national economic interests. In other words, it is the combination of real or potential phenomena and destabilizing factors, which complicate or make impossible realization of the innovation and investment development model of national mechanical engineering.

The influence of threats on social and economic development is determined by the system of indicators of innovation security. The indicators of innovation security characterize the state and development tendencies of mechanical engineering – they are the indicators of the state of mechanical engineering, which have the sensitivity and signalizing ability to warn the state and market subjects about potential threats connected with the change of macroeconomic situation and crises. The deviation of indicators from the normal values leads to occurrence of threats and negative tendencies.

Optimal values of indicators is the interval of indicators, which enables the most successful functioning of the national economy in general and mechanical engineering in particular.

The threshold values of indicators are qualitative measurements, which, while overpassed, create unfavourable tendencies in mechanical engineering, threaten by crises and decreases in its development. Not keeping up with threshold values makes impossible the functioning of mechanical engineering in modernization mode, preservation of export potential of production in normal and extreme conditions, the amendment of scientific potential and implementing innovation and investment policy.

The comparison of actual and threshold values reflects the state of innovation security in mechanical engineering and enables the management of modernization considering deviations. The threshold values should be reviewed depending on the state of economy and task to be solved at the certain stage of its development. They should be determined and approved at the state level and their utilization should be the element of the governmental

economic programs. In particular, the Ministry of Economy of Ukraine[86] approved the list of indicators and their threshold values for innovation, scientific and technological security.

The monitoring of indicators of innovation security in mechanical engineering is the system of constant observation of the most important current results of functioning of mechanical engineering within the framework of constant changes of conjuncture at external markets aimed at on-time detection of deviations of actual output of knowledge-intensive output from the forecast level, finding out the reasons for such deviations, development of suggestions for adequate corrections[87]. The monitoring is fulfilled by the constant commission, which forecasts the emergence and dissemination of threats, prepares information and recommendations on directions of modernization of mechanical engineering.

The detailed research and analysis of threats to development of mechanical engineering are improved by the following classification, which is the division of set of threats into combinations formed in parallel groups used for further investigation.

The key problem of the realistic evaluation of the level of economic security of the state conducting innovative restructuring of mechanical engineering in Ukraine is the correct and thorough determination of threats aimed at pointing out the most topical economic problems and developing the adequate development strategy for mechanical engineering.

We classify threats to innovation development of mechanical engineering by dividing them into four groups. The risks and potential threats caused by the insufficient level of innovative activity of national machine-building enterprises are threat to economic sovereignty of the country;

[86] The Official Site of IAS Consultant: Information and Analytical System on Legislature of Ukraine (2018), "The Order of Ministry of Economy of Ukraine # 150 of 29 October 2013 "On Approval of Methodic Recommedations for Calculating the Level of Economic Security of Ukraine", available at: http://consultant.parus.ua/?doc=08U1H409F0 (Accessed 10 May 2018).

[87] Vlasiuk, O.S. (2011), Economic Security of Ukraine under Market Transformations and Anti-crisis Regulation, DNNU "Academy of fin. management", Kyiv, Ukraine.

growing sensitivity of the national economy to world economic and political crises. Insufficient quantity of implemented innovations, a low level of investment, inventions and rationalizing in mechanical engineering may weaken positions of mechanical engineering in internal and external markets.

The general for all sectors of mechanical engineering threats are results of the low level of development of the national economy and underdeveloped financial system in general, besides, the crucial drawbacks are insufficient share of mechanical engineering in industrial production, the great quantity of company-losers, a low share of labour in general cost, limited volumes of sales etc.

Threats connected with investment are the great level of depreciation of assets in mechanical engineering, a low level of investments and their irrational structure. Threats causing the low level of innovation security are an insufficient share of budget expenses on science in mechanical engineering, the low share of innovative products in sales at internal and external markets.The fourth group of threats consists of a low level of inventing and rationalizing activity, and an insufficient share of creators of intellectual property.The abovementioned threats systematically affect the economic security of the state, but have their own specific influence mechanisms. That is why the security of mechanical engineering should be viewed in two aspects: financial consequences and the national economy in general.

Table 4 represents the dynamics of Ukrainian enterprises-losers; the data from 2014 exclude results of banks, public organization in temporally occupied territories of the Crimean Autonomous Republic, Sevastopol and anti-terrorist operation zone. The machine-building complex suffered a lot from the economic crisis. Due to the world economic recession there was the decrease in export of machine-building production, output and the increase of stocks, worsening of financial results and the high numbers of losers among enterprisers.

Table 4. Ukrainian enterprises facing losses, a share of the general amount of enterprises in percent

Period	2010	2011	2012	2013	2014	2015	2016
Ukrainian enterprises	42,7	36,5	37,0	35,0	34,5	26,7	27,0

Source: authors' own calculations based on the State Fiscal Service of Ukraine data

Table 5 illustrates the dynamics of big, medium, small and micro-enterprises facing losses as a share of their general amount in 2010-2016.

Table 5. Big, medium, small and micro-enterprises facing losses as a share of their general amount in 2010-2016, in percent.

Period	2010	2011	2012	2013	2014	2015	2016
Big enterprises	35,0	31,9	31,3	32,3	50,6	43,8	34,2
Medium enterprises	38,4	35,9	35,7	36,3	38,6	29,4	24,5
Small enterprises	43,0	36,5	37,0	35,0	34,3	26,5	27,2
Micro-enterprises	43,1	36,3	37,1	34,8	33,9	26,7	28,1

Source: authors' own calculations based on the State Fiscal Service of Ukraine data

In 2010-2014, the amount of industrial enterprises facing losses equaled on average to 35 percent of their general amount, and machine-building ones – around 40 percent. The state strategy for mechanical engineering was developed based on optimistic scenarios of the growth of production in post-crisis period up to 2013 and presumption of the driving role of machine-building enterprises in the general increase of industrial production up to 2016. Nevertheless, due to the shrinking world demand on machine-building production the negative tendencies in mechanical engineering took place creating essential threats to development of the national economy as a whole. The key problem preventing the implementation of innovation development is

the lack of funds, their ineffective usage, and the absence of effective mechanisms for doing business in indeterminate conditions[88].

Table 6 shows the dynamics of losses of enterprises by types of industrial sector in 2010-2016.

Table 6. Dynamics of losses of enterprises by types of industrial sector in 2010-2016.

Period	2010	2011	2012	2013	2014	2015	2016
Industry	42,3	44,1	39,3	37,7	37,6	27,4	27,5
Extractive industries and quarrying	44,7	49,9	52,3	47,2	48,6	38,9	41,9
Processing industry	41	41,9	37,5	35,8	35,6	25,2	25,1
Machine-building	41,2	37,4	34,8	35,8	36,3	26	23,1

Source: authors' own calculations based on the State Fiscal Service of Ukraine data

The main threat to mechanical engineering is the growth of payables and receivables. The low capacity to pay of Ukrainian machine-building enterprises is proved by the fact that 21 percent of payables are overdue. Payables and receivables played the key role in increasing the number of Ukrainian enterprises facing losses.

Thus, there was the increase of receivables (plus 14.6 bln hryvnias) and payables (plus 22.7 bln hryvnias) in 2008-2009. The growth of receivables (15.1 bln hryvnias) and payables (24.6 bln hryvnias) also took place in 2009-2012. The ratio of short-term receivables to short-term payables equaled to 0.17 in 2015[89].

[88] Mandzinovska, Kh.O. (2016), "Internal Threats to Finacial Security of an Enterprise", *Skhidna Yevropa: ekonomika, biznes ta upravlinnia*, vol. 4 (04), pp. 167–171.
[89] Orlyk, O.V. (2015), "The Mechanism of Financial and Economic Security Management of an Enerprise and Its Main Components", *Finansovo-kredytnadiialnist: problem teorii ta praktyky*, vol. 2 (19), pp. 222–232.

The other essential threat of the first group is the gradual losing competitive advantages by mechanical engineering resulted in a decrease of its share in the industrial complex from 30 percent in 1991 to 12-13 nowadays. In its turn, it negatively affected the volumes of sales of machine-building production. The tempos of growth of sales in 2012-2015 fell in 9 times compared with 2008-2011. The negative tendency of falling production continued in 2016.

The main threats to innovation security in the investment segment of mechanical engineering is the high level of depreciation of assets, obsolete equipment and low investment in fixed capital.

The analysis of technical state of fixed capital showed the high depreciation rates increased from 30 to 84.3 percent in 1991-2016. 86 percent of equipment are in use more than 19 years without technical renovation being the evidence of a threatening decrease of a technological level of the national mechanical engineering.

The shrinking investments in fixed capital in 2010-2016 (almost fifty percent decrease) stopped the renewal of production capacity causing the decrease in labour productivity, disqualification of personnel working on technologically obsolete equipment and worsened competitiveness of mechanical engineering.

Tables 7 and 8 indicate the volume of sales of industrial production by economic activity in 2010-2016. The data exclude results in temporally occupied territories of the Crimean Autonomous Republic, Sevastopol and anti-terrorist operation zone in 2014-2016.

Table 7. The volume of sales of industrial production in 2010-2016, mln hryvnias

Period	2010	2011	2012	2013	2014	2015	2016
Industry	1043110,8	1305308,0	1367925,5	1322408,4	1428839,1	1776603,7	2158030,0

Source: authors' own calculations based on the State Fiscal Service of Ukraine data

Table 8. The volume of sales of industrial production (goods, services) by types of economic activity in 2010-2016 as percent to total

Period	2010	2011	2012	2013	2014	2015	2016
Extractive industries and quarrying	10,0	11,0	10,5	11,5	10,8	10,8	11,1
Processing industry	67,4	65,3	63,7	61,8	63,3	64,1	60,8
Machine-building	9,3	10,1	10,3	8,6	7,1	6,5	6,1

Source: authors' own calculations based on the State Fiscal Service of Ukraine data

Table 9 shows the dynamics of capital investments in 2010-2016. There was a decrease in capital investments after 2013 due to the general slow-down of investment activity in machine-building and constructing equipment, as well as in production of electric, electronic and optical equipment.

Table 9. Dynamics of capital investments (thousands of hryvnias)

Period	2010	2011	2012	2013	2014	2015	2016
Total	3544673	5080976	5824093	6109514	5674572	7372954	8301879
Industry	1034652	1291064	1936373	2651256	2328804	2333565	1875316
Extractive industries and quarrying	53312	76086	100612	94401	69867	143193	34115
Processing industry	753093	1012243	1595810	2248666	2026555	1971308	1524987

Source: authors' own calculations based on the State Fiscal Service of Ukraine data

We must mention that the world experience proves that the sTable economic growth in post-crisis periods calls for annual investment in fixed capital equaled to 25 percent. It is necessary to underline that the key threat to innovation security is the low innovation activity of machine-building enterprises as the key feature of the innovation development of the national economy. The analysis of the financial state of investment in innovation activity demonstrates its decrease shaping the derivative threats: low effectiveness of research, underdevelopment of the infrastructure for

scientific and technical potential, slow renewal of machine-building production.

The structure of utilizing scientific and technical potential in mechanical engineering: in 1991-2017, only 7-10 percent were oriented at renewal, and more than 90 percent – at replication of production causing the worsening state of mechanical engineering[90].

The indicator of innovation activity of machine-building enterprises is calculated as the ration of innovative enterprises to the general amount enterprises in certain periods. According to Eurostat, the average value of this indicator in the EU member-states equaled to 53 percent in 2012, while for Ukrainian enterprises – 24.4 (33 percent in the USA). In 2015, 87.7 percent of innovative enterprises implemented innovations (or 15.2 percent of the total sample). They implemented 3136 innovative types of production, including 548 – new for this market, 2588 – new only for this enterprise. There were only 966 new types of machinery, equipment, apparatuses etc.

In 2012-2014, the share of innovative enterprises equaled to 14.6 percent, including those implementing technological innovations – 9.5 percent (5.2 – innovative products and 7.2 – innovative processes), non-technological – 8.6 percent (4.7 percent – organizational and 6.4 percent – marketing)[91].

The key threats of the fourth group is the low level of inventing and rationalizing activity, an insufficient number of implemented inventions in mechanical engineering, useful models and industrial samples. The insufficient share of creators of intellectual property in mechanical engineering to their general amount in economy decreases the tempos of renewal of production and its competitiveness at internal and external markets.

The negative tendency of brain draining of high quality experts from science and a decrease of the quantity of specialized organization conducting

[90] Mandzinovska, Kh.O. (2016), "Internal Threats to Finacial Security of an Enterprise", *Skhidna Yevropa: ekonomika, biznes ta upravlinnia*, vol. 4 (04), pp. 167–171.
[91] Orlyk, O.V. (2015), "Analysis of Impact Factors on Economic Security of Enterprises and Methods of Protectionagainst Threats and Neutralization of Their Consequences", *Trendy ta innovatsii v suchasnij ekonomitsi: kol. Monohrafiia*, KhNUBA, Kharkiv, Ukraine, pp. 154–165.

research caused the losses in staff capacity of scientists. For example, the number of experts conducting R&D decreased by 11 percent in 2012-2016.

However, research institutes of academic and educational sectors of science create their own implementing centers. For instance, there are innovation centers and a center for intellectual property and technology transfer in the National Academy of Sciences of Ukraine, which conduct project based on contracts with industrial enterprises.

The essential factor for enhancing competitiveness of mechanical engineering is the state. The state should create the mechanism of state innovation policy for increasing incentives for machine-building enterprises in the results of their activity. Nowadays, the most competitive Ukrainian sectors of mechanical engineering at the world level are space and aviation sector, new generation of electric and electronic devices, nuclear reactors, energy effective equipment. The space production, for example, designing launch vehicles for programs “Cyclone” and “Zenith”, participation in the international program “Sea Launch” focused on launching spaceships from the sea platforms in equator and creating the national communication satellite find the growing demand in the world.

The learning of Polish experience of enhancing its national economic competitiveness via active creating of innovative industrial clusters in different regions of the country is very topical for Ukraine. Even though the transition from the socialist-planning model to market capitalist one in Poland is still in the process, the efforts of the most populated and industrialized country of the “New Europe” are worth special attention.

There are big outputs of transport, agricultural, industrial and constructing equipment in Poland. Poland is one of the European leader in production of fishing boats, constructing and works vehicles. The average annual value of production of mechanical engineering is more than 70 billion US dollars. The automotive industry shows the growth in Poland. Famous car-producers have their daughter companies in Poland and annually produce over 700 thousand of cars and trucks. Positive economic changes in Poland during last decades are connected with the shifting focus on exporting

industrial goods. No wonder that all branches of the Polish industry develop very quickly. As a result, Poland is considered one of the most promising European country by economic potential[92].

It is worth mentioning that Polish investments in Ukraine are concentrated in processing industry (more than 60 percent), financial sector (around 20 percent), wholesale and retail (12 percent). These investments are concentrated in Western oblasts of Ukraine and Kyiv. Ukrainian and Polish economic relations will be more oriented at achieving the synergy effect from cooperation between Ukrainian and Polish clusters, and from creating common trans-border cluster. Polish experience can become the very important example for Ukraine. However, Ukraine should take into consideration all mistakes made by Poland in transformation. In particular, additional attention should be paid to the liquidation process, which could be more effective if there was some developed strategy.

Thus, the strategic priorities of innovation activity in mechanical engineering in 2018-2021 must be:

- New technologies of development of transport system, rocket and space industry, airplane and ship building, weapons and military machinery;
- New technologies of transporting energy, implementing energy effective, resource preserving technologies, alternative energy resources;
- New technologies of production of materials, their processing and combination, creation of industry of nano-material and nano-technologies;
- Technological renewal and development of the agriculture;
- New technologies and equipment in medicine and pharmaceuticals;
- Development of modern information and communication technologies, robots.

[92] Babets, I.H. (2013) “Conceptual Grounds of Economic Security Strategy of Interregional Cooperation of Ukraine with the EU”, *Naukovyi visnyk Lvivskoho derzhavnoho universytetu vnutrishnikh* sprav, vol 1, pp. 3-13.

The state implements the following measures for realization of the abovementioned priorities[93]:

1) Development of innovation infrastructure (innovation centers, technological parks, scientific parks, technopolises, innovation business-incubators, centers for technology transfer, innovation clusters, venture funds etc.);
2) support for inventions within the medium-term priorities of the state level;
3) direct budget financing and co-financing;
4) compensating interest rates for credits received by business entities in commercial banks;
5) partial compensation of the cost of production;
6) credits on behalf of state budget, credits (loans) and grants from international financial organizations guaranteed by the state;
7) subventions from the state budget to local budgets;
8) tax, custom and monetary preferences.

Science plays a significant role in ensuring the competitiveness of machine-building complex. The Law of Ukraine "On Changes in the Law of Ukraine "On Priorities of Development of Science and Technics" determines the top priority task for fundamental research: ensuring the competitiveness of Ukraine in the world and sustainable development of the state and society[94]. It is well known, that export potential is the important factor of competitiveness of the country. This problem is connected with the analysis of the modern international tendencies of industrial policy, optimizing the regulation of the open economy of Ukraine, research of current conditions of international cooperation and trade, investment activity. Besides, ensuring

[93] Bludova, T.V. and Ostrovska, M.S. (2017), "Analysis of Threats to Economic Security of the State Implementing Innovation Development", *Formuvannia Rynkovykh Vidnosyn v Ukraini,* vol. 12 (199), pp. 45-51.
[94] The Verkhovna Rada of Ukraine (2010), The Law of Ukraine "On Amendments to the Law on the Priority Areas for Scientific and Technical Development", Available at: http://zakon5.rada.gov.ua/laws/show/2519-17 (Accessed 8 May 2018).

such economic segments as mechanical engineering in modern conditions requires consideration of numerous tasks of innovation development. The innovation state determines the level of high-technology production, financing new cycles of technology and knowledge-intensive machine-technological production and provides international sales policy with additional competitive advantages.

Table 10 shows the indices of volume of industrial and machine-building production in Ukraine, export and import of machine-building production (millions US dollars), and their share in general Ukraine exports and imports (excluding occupied territories of Ukraine) (in percent to previous years).

Table 10. Dynamics of industrial and machine-building production in Ukraine

Period	2010	2011	2012	2013	2014	2015
Index of volumes of machine-building production	136,1	115,4	97,3	86,8	79,4	85,9
Index of volumes of industrial production	111,2	108	99,5	96,6	89,9	87
Export of machine-building production (mln US dollars)	8932,9	11615,8	13286,6	6975	5657,2	3940,9
Share of export of machine-building production in general Ukrainian exports	17,3	17,4	19,3	11	10,5	10,3
Import of machine-building production (mln US dollars)	11831,3	20278,6	22464,6	12470	8720,8	6273,4
Share of import of machine-building production in general Ukrainian imports	19,4	24,3	27	16,2	16	16,7

Source: authors' own calculations based on the State Fiscal Service of Ukraine data

Dynamics of exports of machine-building production by sectors (excluding occupied territories of Ukraine) (mln US dollars) shows the prevalence of machines, equipment and mechanisms, electro-technic equipment (the peak was reached in 2012) (Table 11).

Thus, we can conclude that the enhancement of competitiveness of mechanical engineering depends on development of its knowledge-intensive production.

Dynamics of imports of machine-building production by sectors (excluding occupied territories of Ukraine) (mln US dollars) also indicates the prevalence of machines and electro-technic equipment.

Table 11. Dynamics of export of machine-building production by sectors (mln US dollars)

Period	2010	2011	2012	2013	2014	2015
XVI. Machines, equipment and mechanisms, electro-technic equipment	5670,4	6760,8	7026,7	6975	5657,2	3940,9
XVII. Vehicles, airplanes, ships	3262,5	4855,1	5963,5	3344	1472,1	679,2
XVIII. Devices and optical apparatuses	252,3	281,5	296,5	296,3	232	158,6

Source: authors' own calculations based on the State Fiscal Service of Ukraine data

The peak for import was also reached in 2012 (Table 12) with the decline in 2012-2015, which negatively influences the competitiveness of national mechanical engineering.

Experts connect the current crisis in mechanical engineering with the loss of production capacities in the East due to the anti-terrorist operation, and the decline of production of partner business entities in other regions of Ukraine. Additional factors are problems of export to the Russian Federation and devaluation of hryvnia.

Table 12. Dynamics of import of machine-building production by sectors (mln US dollars)

Period	2010	2011	2012	2013	2014	2015
XVI. Machines, equipment and mechanisms, electro-technic equipment	8166,9	12794,8	13178,7	12470,1	8720,8	6273,4
XVII. Vehicles, airplanes, ships	3664,3	6204,2	8067,1	5901,5	2648,2	1743,6
XVIII. Devices and optical apparatuses	886,4	1047	1218,9	1094,3	672,9	463,8

Source: authors' own calculations based on the State Fiscal Service of Ukraine data

The significant potential of enhancing the mechanical engineering is in the national automotive production. The automotive production quickly reacts to innovations, has a short technological cycle and easiness in launching mass production, ability to attract financing from consumers creating a multiplying effect. The automotive production in the EU member-states is the priority innovative sector, as well as biotechnology, electronics, IT-technology, pharmaceuticals, medical equipment[95]. One workplace in the automotive production means 7-10 workplaces in other sectors (metallurgy, mechanical engineering, electro-technical industry etc.).

However, the national automotive production and export decline in recent years (buses: production in 3.3 times, export – in 1.8 times; cars: production in 3.3 times, export – in 3.0 times) threatening to destroy the Ukrainian automotive production as a phenomenon[96].

One of the strategic directions of enhancing the economic security and ensuring competitiveness of machine-building production at the world market is creating reliable and effective protection for intellectual rights created by

[95] Pronoza, P.V. (2015), "World Automobile Production: Modern Trends and Development Prospects", *BiznesInform*, vol. 8, pp. 118-125.
[96] Bodrova, N.E. and Bulatov, K.P. (2012), "Analysis of the World Development Tendences of Automobile Industry", *BiznesInform*, vol. 1, pp. 78-83.

mechanical engineering. It will ease up the process of effective implementation of inventions in production and increase the profitability of selling goods and services based on such rights.

However, the level of protection of intellectual property rights in Ukraine is low. Ukraine has one of the lowest ranks in the Global Competitiveness Index of the World Economic Forum, for instance, the indicator "Innovations" with sub-indicator "Protection of Intellectual Property": 108 out of 133 in 2012/2013; 113 out of 139 in 2014/2015; and 117 out of 142 in 2016/2015.

Another strategic direction of enhancing the export potential is the development of information technologies. Ukraine has all opportunities and conditions for creating the competitive IT-market with 20 universities preparing the excellent experts in this sphere[97].

Ukraine is the fourth world leader in exporting software – 1 bln US dollar falling behind India (34 bln US dollars), China (28 bln US dollars) and the Russian Federation (2.7 bln US dollars). The main consumer of IT-products are Google, Microsoft, and IBM. The key competitive edge of Ukraine is the relatively high level of technical education and high-skilled programmers: 25 percent of projects are conducted in the public sector, 50 percent – private sector, and 25 percent – outsourcing.

The economic development and enhancement of competitiveness of Ukrainian mechanical engineering relies on solving the following tasks: the shift to higher technological patterns ensuring the knowledge-intensive production and the growth of output on the current technological patterns – the combination of technical means of production of goods and services and the most adequate organizational and economic form of business activity.

[97] The Official Site of ATKearney (2017), "The Widening Impact of Automation. 2017 Global Services Location Index", available at: https://www.atkearney.com/strategic-it/global-services-location-index/full-report (Accessed 12 May 2018).

Ukrainian economy has different technological patterns: a combination of third, fourth and fifth states with the prevalence of third and fourth ones. Forming and development of the fifth stage of technological patterns depend on the state support and innovation activity of enterprises. The fifth stage of technological patterns ensures the creation and improvement of new machines and equipment (computers, robots, automated machines etc.) and information systems. The sixth stage of technological patterns relies on biotechnology, artificial intellect, and global information networks. Developed countries enjoy the fifth stage, which is to end in 2020-ies. The sixth stage will be dominant afterwards with annual tempos of growth of 20-100 percent, the basis for the new stage will be nano-technology, genes engineering, nano-electronics, photonics and photo-informatics.

We emphasize that the level of development of mechanical engineering can be one of the factors for evaluating the level of competitiveness of countries: a big share of machine building in industrial production and exports results in the high level of competitiveness. Playing the key role in industry, the mechanical engineering becomes the main lever for transition of a country from one stage of technological patterns to a higher one.

The key reasons for restraining innovation in 2010-2016 were low demand on innovations in the market, low competition, and the lack of good ideas or opportunities for innovations. The other limiting factors were the lack of own capital, credits or direct investments, skilled personnel, difficulties in receiving state support or subsidies for innovations, the absence of partners, undetermined demand on innovative ideas, intensive competition.

Conclusions. The analysis of innovation development of Ukraine enables to determine the key factors for enhancing the competitiveness of national mechanical engineering resulting in ensuring the economic security of the state:

- restructuring the mechanical engineering via creating financial and industrial groups based on cooperation enabling concentration of management of property and capital, increase of specialization of integrated enterprises and enhancement of their competitiveness;

- creating joint ventures for production of highly effective technics based on modern energy and resource saving technologies with the usage of the best samples of foreign elementary bases;
- technical and technological re-equipment of machine-building enterprises providing them with modern quickly adjusting equipment for increasing the output of new technical devices with the use of high-quality constructions, progressive material, improved mechanics and electronics;
- designing and implementing in production new technologies of machine-building, widening the roster of goods, ensuring the servicing of technical devices, shifting to the flexible block-module mode principle of construction;
- output of new types of competitive products, including:
- technical devices for usage of alternative energy sources, machines and equipment for production of bio-fuel, extracting, processing and utilizing coal;
- machines and equipment for railway and lifting transport, cars and other vehicles;
- systems of machines and equipment for energy, metallurgy, extracting and mining industries;
- resource-saving, ecological equipment for oil industry, including low-tonnage production;
- concentration of financial resources, conducting the integrated industrial policy, enhancing the labor productivity, decreasing the cost of production;
- facilitating the formation and development of internal and expansion to the external market of machine-building technics;
- developing export potential of mechanical engineering via activation of external economic activity of national enterprises and credits for exporting machine-building production;
- amending the legal regulation on financial, material and technical supply for mechanical engineering; and the state support for national manufacturers.

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A STRATEGIC PLATFORM FOR EFFECTIVE MANAGEMENT OF ECONOMIC DEVELOPMENT OF DOMESTIC ENTERPRISES

Abstract. The high turbulence of the functioning environment of modern enterprises determines the need for the search and introduction of flexible economic instruments for managing enterprise development.

In view of the variability of external and internal impulses of an influence on the enterprise, the strategic parameter of development effective management is the choice of the development vector and the trajectory, which determines the directions of the enterprise. In order to make the transition to a qualitative state, which will increase the flexibility, adaptability and overall efficiency of the enterprise, the complex ofnecessary changes should be developed at the strategic level of management.

In this context, the proposed methodological approach to the provision of economic development is revealed through a series of stages harmonized in space and time: the formulation of development goals, the study of the current state of the enterprise, the construction of a model of hierarchical diagnostics of the potential state, the definition of attributive characteristics of development, the justification of the strategy of economic development, the formation of tactical and operational economic development management platforms.

An important element of strategic management of enterprise development is the diagnostics of the enterprise economic development potential, which involves the study of three gradients that systematically cover all areas of development processes: the gradient of rapid development, taking into account the dynamic characteristics of economic growth of the enterprise; gradient of intensity development, which is formed by comparing extensive and intensive factors of development and calculation of the pace of enterprise development intensity; gradient of quality development, considered in the context of the company cost increasing as a qualitative aspect of initiation and implementation of development processes.

It is substantiated that the parameters of justification of the enterprise economic development strategy are the initial basis of development, the gradient of rapid development,

the gradient of quality of development, the gradient of intensity of development, the level of influence of the external environment.

Thus, the proposed methodology for the diagnosis of the initial basis for the development of domestic enterprises serves as a holistic integrated system for assessing the prospects and possibilities of providing economic development, which allows forming a qualitatively filled informational and analytical basis for the development of an effective strategy for ensuring the development of the enterprise and the introduction of effective tactical and operational tools in the company's activities for the implementation of this strategy.

JEL Classification System: M21, O10
Key words: economic development, strategy, enterprise, potential, vector, development trajectory

Introduction. The rapidity of change, the high intensity of economic processes, the unpredictability of the behaviour of market actors, the volatility of consumer needs and priorities are signs of a modern economy. The development of enterprises leads to a change in economic trends, but at the same time, complex changes in the nature of the economy determine the need for the introduction of non-traditional methods and management approaches at enterprises, which aims at the long-term effective functioning of the enterprise and its development in the market environment. Ensuring economic development of the enterprise is possible only in the conditions of the formation and introduction of an effective system of management of it.

Summing up the scientific opinions[98], about the essence of the enterprise management system, we will determine that the system of management of economic development is revealed through the logical interrelation of such basic provisions as the definition of the approach or complex of approaches to development management, the essence of the control and management of the subsystems of management, functions, principles, methods and criteria efficiency.

The object of management of enterprise economic development

[98] Economic encyclopedia: in three volumes. Vol.3 (2002) / [editorial; board.: S.V. Mocherny (executiveeditor) andothers.], Kyiv, – K.: Akademia, 952 p.; ZaitsevA.K. (2006) Research of management systems, Nizhny Novgorod, NIMB, 123 p.

(controlled system) is the process of selecting the vector and development trajectory, as well as the mechanisms for determining the developmental space boundaries.

Choosing and justifying the approach to managing economic development of an enterprise is a starting point in the definition of all parts of the management system. Modern economic science is based on the following basic approaches to an enterprise and its subsystem management: process, system, complex, situational, functional, etc. However, the complication of economic relations and economic conditions involves a shift in traditional approaches to new, atypical ones.

Current economic conditions require companies to justify an effective strategy, develop a tactical plan for implementing a strategy and effective operational management. Accordingly, it is quite difficult to develop an effective management system based on a single management approach. Therefore, we propose to manage the economic development of an enterprise on the basis of an integrated approach, which is a combination of several managerial approaches at different levels of management, due to the distinction between objectives, tasks, methods and tools for making managerial decisions at operational, tactical and strategic levels.

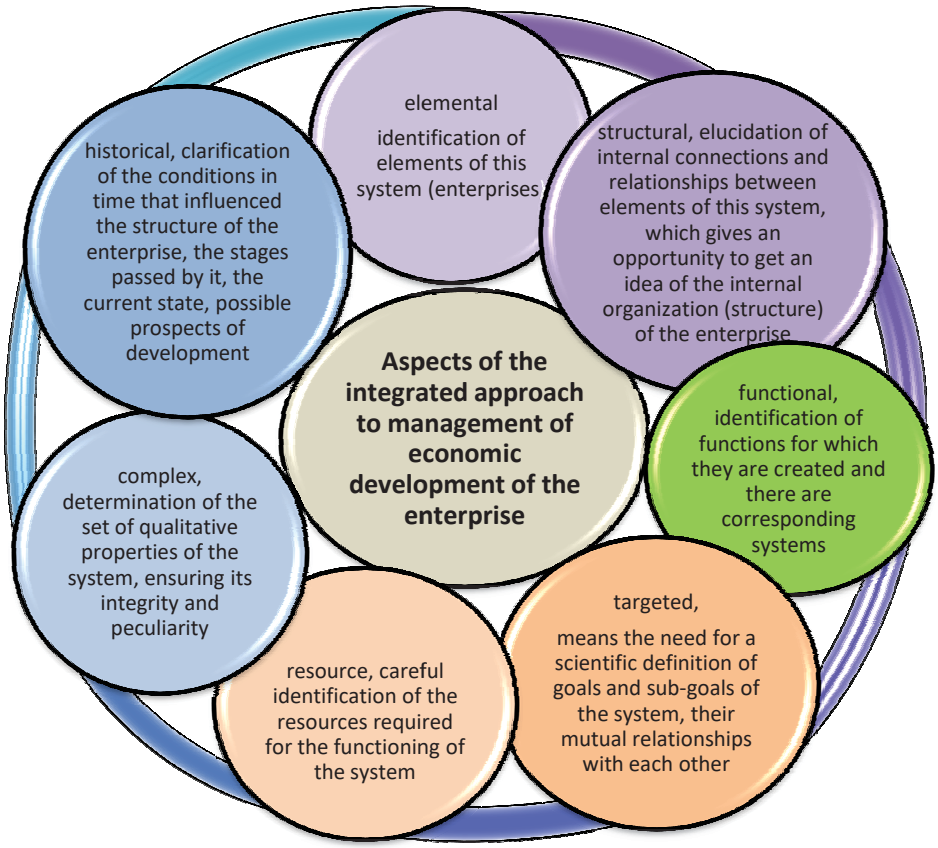
Considering the enterprise as an extremely complicated probabilistic open system, that is, "the set of elements that are in structural interrelation with each other and form certain integrity"[99], and given the variability of external and internal impulses, it is difficult to say about the strategic aspect of economic development management. However, the strategic parameter in this context is the choice of the vector and the development path that determines the directions of the company's activity, since in order to make the transition to a qualitative state that will increase flexibility, adaptability and overall efficiency of the enterprise, the complex of necessary changes should be developed on a strategic level of management. In our view, the formation of a strategic platform for effective management of enterprise economic development should

[99] Sidorenko Yu. V. (2011) Features of management of sustainable development of urban ground electrical transport, Economics and management, Vol. 1

be based on the principles of an integrated approach.

The effectiveness of the integrated approach in managing the strategic platform for enterprises economic development is determined by its main aspects (Figure1).

Figure1. Aspects of the integrated approach to management of economic development of the enterprise



Source: compiled by the authors on the basis of the research

The achievement of management by the economic development management system of an enterprise in order to ensure its efficiency requires the definition of general management principles based on specific features of development processes. Within the framework of the proposed integrated

approach, we believe that the principles of development management are based on the unity of the principles of process, system, complex, situational, functional, etc. approaches.

Therefore, effective management of economic development is based on the following principles: purposefulness, integrity, consistency, flexibility and adaptability, multivariance, formalization, balance, hierarchy and heterarchy, co-evolution. The defined principles clarify and detail each other, which ensure the effectiveness of the management system of economic development.

Determining the effectiveness of enterprise development management involves the formation of a multicriterial system that takes into account both quantitative performance criteria, in particular, raising the level of financial and economic sustainability, as well as qualitative, characterizing the degree of adaptability or resistance to the factors of the external and internal environment.

The processes of providing economic development within the space of development by their nature are complex, that is, those that integrate all processes and subsystems of the enterprise. The set of changes that shape the preconditions for changing the enterprise of its qualitative state, predetermine the heterogeneity of the development of individual subsystems of the enterprise not only in time, but also in terms of the vector, which necessitates the development of a methodical approach that takes into account the multidimensional system of management of economic development.

The methodical approach to providing economic development is revealed through a series of stages harmonized in space and time (Table 1).

Table 1.Stages of economic development of enterprises

Stage	Characteristic
I. Formulation of development goals	the general priorities in the activity of the enterprise are defined, the vision of the result of implementation of development processes and the potential state of the enterprise in the short-term and long-term periods is formed

2. Investigation of the current state of the enterprise	an analysis of the factors of influence of the external and internal environment, the result of which is the construction of the SWOT matrix, and the rapid diagnosis of the main indicators of financial and economic activity, which provides the source information to identify the advantages of the current state and predict the implementation of a complex of changes in the spatial-temporal aspect
3. Construction of a model for hierarchical diagnostics of a potential state (IDPS-model)	includes three steps: the diagnosis of survival potential, the potential for sustainability and the potential for economic development
4. Determination of attributive characteristics of development	determined by the vector of development, that is, its orientation; trajectory vector development; substantiation of the boundaries of the developmental space, that is, finding the upper and lower limits of the dynamic equilibrium
5. Justification of the strategy of economic development	provides development of a set of strategic measures for the transition from the starting point (current state of the enterprise) to a new qualitative state in accordance with the chosen vector for a defined trajectory that lies within the space of development
6. Formation of tactical and operational management platforms for economic development	decomposition of the strategic steps identified at the previous stage

Source: compiled by the authors on the basis of the research

The relationship between the potential of the enterprise and its development is investigated by A.E. Voronkova and Yu.S. Pogoreliev[100], who noted that the potential creates the necessary conditions and contains the

[100] Voronkova A.E., Pohorelov Yu. S. (2009) Potentsial pidpryyemstva yak osnova yoho dovhostrokovoho rozvytku [The potential of the company as a basis for its long-term development], Actual problems of economics, Vol.4 (94).

necessary resources for the implementation of development processes aimed at ensuring the self-reproduction of the economic system of the enterprise, and in the long run the development of the enterprise contributes to its potential, while the strong potential creates favourable conditions for further development. Modern economic science has a large number of works on the nature of the potential, its individual types and mechanisms for managing it. In the process of studying the mutual influence of the potential and processes of enterprise development, the following category was proposed and implemented by the scientists as a "development potential".

It is worth paying attention to the distinction between the categories of "development potential" and "capacity development". Capacity development involves building capacity, changing its quantitative or qualitative characteristics to achieve a higher quality level. As to the essence of the category "development potential", there is pluralism of scientific thoughts and their heterogeneity.

Thus, on the basis of the analysis and synthesis of disparate scientific ideas[101], concerning the development potential we offer our own vision of the essence of this economic category. Potential of development is a set of existing and potential opportunities for the enterprise to change the quality situation in order to increase flexibility and adaptability to the management conditions.

The change in the company's quality status is the result of a well-considered policy, which resulted in a complex of changes of a different nature, taking into account the factors of the external and internal environment. Accordingly, we can say that the potential of economic development is a superstructure of a higher level of basic - the potential of survival and the

[101] Bachevsky B.Ye., Zablodska I.V., Reshetnyak O.O. (2009) Potential and development of the enterprise, Kyiv, Center for Educational Literature, 400 p.; Horbachovs O.M., Dyvohryts O.M. Development of an innovation process in Ukraine,http://www.nbuv.gov.ua/e-journals/PSPE/2009_1/Divogrits_109.htm; ZlenkoV.A. (2007) Formation and development of economic relations in the agrarian sector of Ukraine: historical and scientific analysis, History of science and biography., Vol.1, www.nbuv.gov.ua/e-journals/PSPE/2009; TymoshchukM.R. (2010) Methods of assessing the potential of enterprise development taking into account the importance of financial and economic factors, Lviv, Visnyk of Lviv University. The series is economical, Vol. 44.

potential of sustainability.

The survival of an enterprise is defined as such a state of its development, which implies the timeliness and economy of adaptation to changes in the internal and external environment[102]. However, in our opinion, survival is an objective precondition for development, not its condition, because in essence survival is the state of functioning of the enterprise, the characteristic feature of which is resistance to crisis phenomena. The formation and management of the survival potential is based on resource prerequisites. In particular, the level of survival potential is determined by:

- the composition and modern state of resource support for the functioning of the enterprise;
- the degree of compliance of the resource potential with the strategic goals and objectives of the enterprise;
- the capacity of the resource potential to ensure the stability of the economic system[103].

Sustainability potential as a prerequisite for building the potential of economic development can be represented as a dynamic balance between the ability and the ability of the system to maintain the integrity of the old quality of its resources, processes and the ability to adapt in response to the impact of the internal and external environment. If the potential for survival is largely based on the company's resource capabilities to withstand crisis phenomena, then the sustainability potential is characterized by the ability to ensure the financial and economic stability of the enterprise.

Thus, the characterization of the potential of survival, the potential of sustainability and the potential of economic development allows us to talk about a three-tiered model for ensuring the economic development of the enterprise (Figure2).

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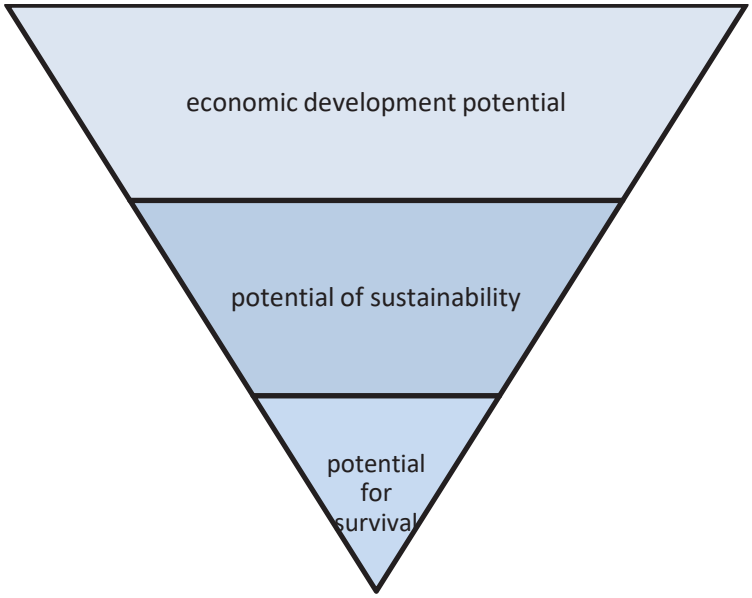
[102]HryaznovaA.V., LenskayaS.A. (1996) How to ensure the growth of capital: the reproductive bases of the economy of firms, Moscow, Financial Academy under the Government of the Russian Federation, 120 p.

[103]LihonenkoL.O. (2001) Anticrisis enterprise management: theoretical and methodological principles and practical tools, Kyiv, KNTEU, 580 p.

Figure 2. A three-level model of economic development of the enterprise



Source: compiled by the authors on the basis of the research

The implementation of the potential for survival and sustainability forms the preconditions for building the potential of economic development, which is determined by the possibility of varying the values of indicators within the development area in order to ensure adaptability to the conditions of enterprise management. Since development potential is a function of many constituents, it is expedient to describe it not by individual indicators, but by gradients.

Based on the spatially oriented approach to the hierarchical diagnostics of the potential state of the enterprise, the gradient characterizes the rate of change in the physical value of a certain indicator in the spatial direction, and its module coincides with the maximum possible rate of growth of a function at a certain point. Diagnostics of the potential of economic development of an enterprise involves the study of three gradients that systematically cover all areas of development processes:

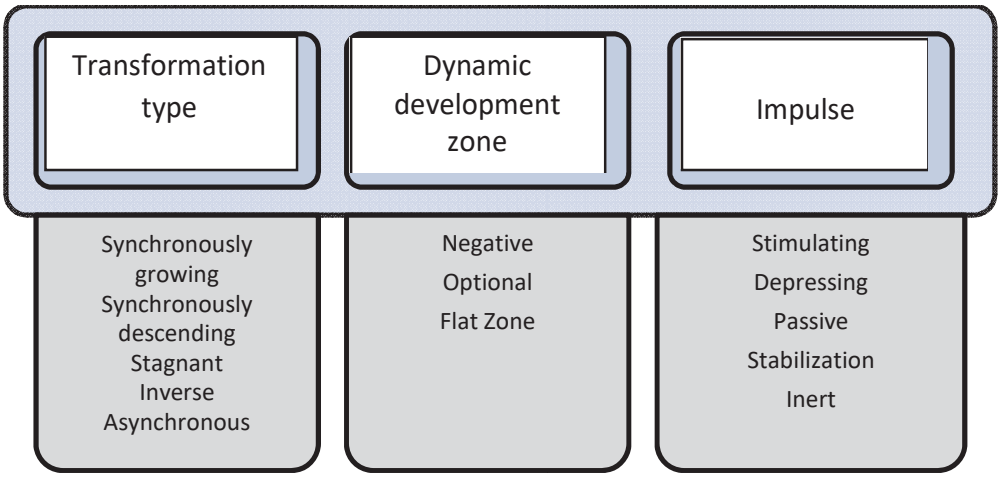
- a gradient of development rapidity, taking into account the dynamic characteristics of economic growth of the enterprise;
- a gradient of development intensity, which is formed by comparison of extensive and intensive factors of development and calculation of the rate of intensity of enterprise development;
- a gradient of development quality, considered in the context of increasing the cost of the company as a qualitative aspect of initiation and implementation of development processes.

Accordingly, the model of hierarchical diagnostics of the potential state of the enterprise lies at the heart of the methodological approach to ensuring economic development. Firstly, on the basis of conducted diagnostics the vector of development, that is, its orientation is determined. The vector of development is an ordered set of indicators that are characterized by a certain direction. Detailed description of the definitionabove, it should be said that achievements of the enterprise determined by the scale of numerical values of indicators, grouped by a certain system, allows us to determine the direction of development - the vector. The development of an enterprise as a projection of its goals and capabilities may take place ascending, descending, and neutral (stagnant) vector.

Taking into account that the ability of an enterprise to move in a certain direction is directly related to the acquired initial basis, the definition can be carried out on the basis of a logical and deductive approach - comparing the general characteristics of a certain potential state of the enterprise in order to formulate a conclusion concerning a single vector of development, which can move the company (Figure 3).

The use of dynamic diagnostics to determine the opportunities for further development of the enterprise within the scope of development is based on the study of the transformation of the spatial-dynamic image of the enterprise in an effective market space for a certain period of time.

Figure 3. General characteristics of a certain potential state of an enterprise to determine the vector of development



Source: compiled by the authors on the basis of the research

The mutual development of the potential for survival and the sustainability of the enterprise form the initial basis for the further change of the enterprise of a qualitative state, and the dynamic coherence of these potentials create a stimulating impulse. The inherent essence of the initial basis of development reflects the effective space that is formed by the enterprise through the development of survival and sustainability potentials. Accordingly, the higher level of quality of the potential state allows forming a larger space of effective functioning, which in the context of the objectives of ensuring economic development is not only a necessary basis for initiating development processes, but also a peculiar reserve of functioning that provides the enterprise with the possibility of an accepTable dynamic fluctuation of the main indicative indicators of the quality level of the potential state. It should be noted that the diagnostics of the baseline of development is mostly carried out using static parameters, that is, quantitatively assessed levels of quality of the potential survival status and stability during the study period, the comparison of which allows determining their dynamic transformation. The establishment of the directions of transformation of the initial basis of the enterprise's development

characterizes the change in the area of useful space for the initiation and implementation of development processes. However, in addition to increasing the physical potential of survival and sustainability, the dynamics of structural change is important. The dynamic consistency of survival and sustainability potentials allows us to find out the level of qualitative volumes of these potentials for further development, which is characterized by the level of dynamic development of the enterprise.

Such an approach enables the combination of tools as a dynamic, that is, proactive, analysis of economic development opportunities and static analysis as a traditional tool for assessing the company's basic capabilities to function effectively in a market environment.

Thus, practically the diagnostics of the directions of transformation of the initial basis of development is realized with the help of the matrix of synchronization of the constituent components of the initial basis of development, which in the abscissa's axis contains a change in the level of the quality of the survival potential, and for the axis of the ordinate, the change in the quality level of the stability potential. According to the results obtained in the process of applying to the matrix the coordinates of values is determined by the direction of transformation of the initial basis of development by the following types:

1. Synchronously growing, reflecting the growth of the quality levels of survival potential and sustainability potential.
2. Synchronously downward, reflecting a decrease in the indicators of the quality levels of survival potential and sustainability potential.
3. Stagnation, in which there is no change in the quality levels of the potentials of survival and resistance, or their change is not significant.
4. Inverse, which is characterized by the reverse direction of change in the quality of potentials.
5. Asynchronous, reflecting a multi-directional nonlinear change in the quality levels of survival potential and sustainability potential.

We want to note that the concept of economic development implies fluctuations of indicators within the development area, therefore, when

comparing the actual and normative levels of dynamic development, it is expedient to operate not the relative deviation of the reporting and base years, which is a momentary indicator, but to use the average annual rates of change that really characterize the dynamics of indicators and their internal potential to increase the possibilities of changing the enterprise of their qualitative state in the functioning space.

The interpretation of the value of the coefficient of dynamic development comes from belonging to one of three zones:

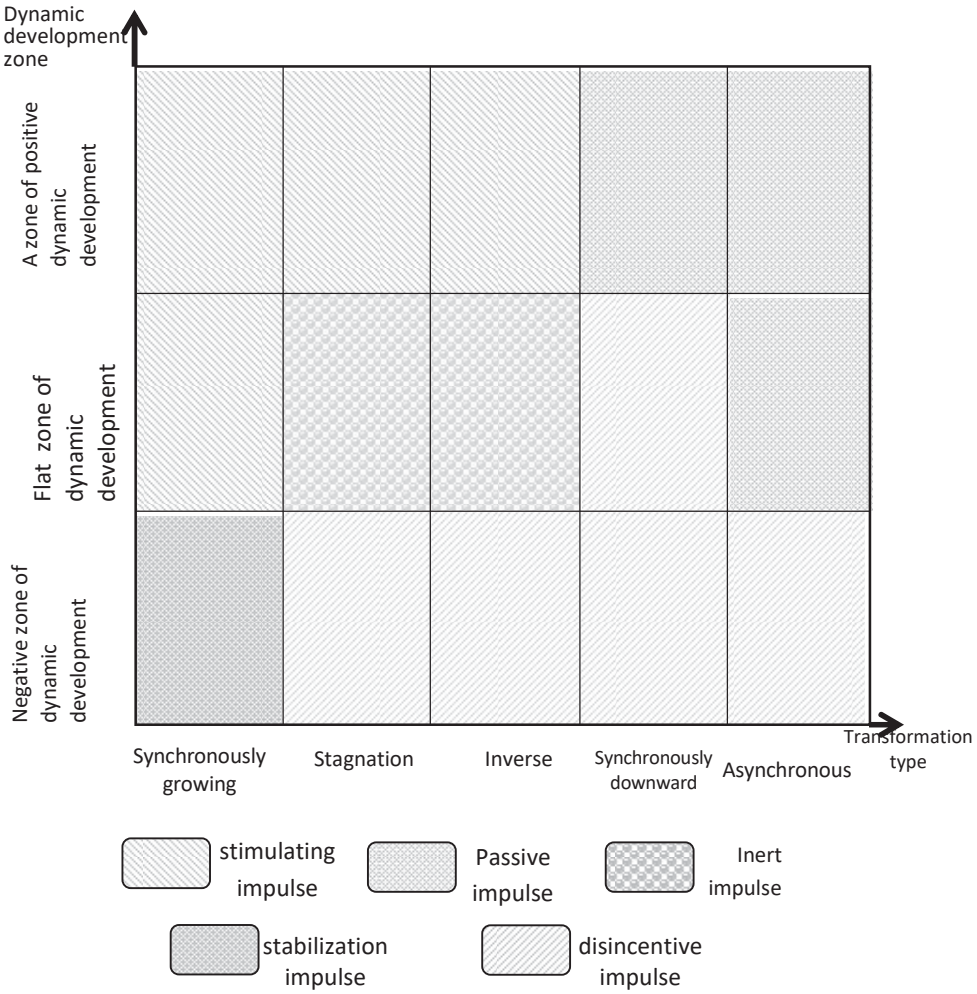
1. A negative dynamic development zone ($K_{ds} < -0{,}01$), which suggests reducing the company's capabilities to ensure economic development based on the acquired levels of quality potential survival and sustainability.
2. A flat zone of dynamic development ($K_{ds} \in (-0{,}01; 0{,}01)$), which speaks about inert possibilities of the enterprise, which in themselves are not an active factor in initiating and implementing development processes, but arise or disappear under the influence of a combination of other factors .
3. A zone of positive dynamic development ($K_{ds} > 0{,}01$), which suggests increasing the company's ability to change its quality status based on the use of available reserves.

Comparing the results of the estimation of the level of dynamic development and synchronization of the components of the initial basis of development allows constructing a matrix of impulse characteristics of the initial development basis (Figure 4), that is, to determine what changes in the qualitative state can be realized by the enterprise on the basis of the acquired potential of a certain volume and quality.

The matrix of impulse characteristics, depending on the ratio of the dynamic development zone and the transformation type, allows distinguishing five types of impulses generated on the basis of acquired initial basis of development:

- a stimulating impulse, which is the most desirable, is the best option for an enterprise, because it determines the necessary ground for initiating and implementing development processes;

Figure 4. Matrix of impulse characteristics of the initial basis of enterprise development



Source: compiled by the authors on the basis of the research

- a disincentive impulse that may indicate either the priority of a downward vector of development that, under given conditions, will provide the enterprise with the preservation of the state of equilibrium functioning, or in the presence of additional active factors for a certain time to maintain a phase of stagnant development;

- a passive impulse, which assumes that the formed initial basis of development is not a determining factor in the initiation and implementation of development processes, but its quantitative and qualitative characteristics can become the basis for economic development, provided that there are additional developmental factors. We want to note that in the presence of such an impulse, the active factor in initiating development may be the emergence of positive opportunities in the market of functioning, as well as negative, turbulent fluctuations; therefore, the role of monitoring the functioning environment for maintaining the market equilibrium within the space of development is increasing;
- a stabilization impulse that indicates that the priority of the enterprise is to restore the dynamic coherence of the local components of the survival and sustainability potentials. The emergence of such an impulse is not a significant barrier to initiating development processes. Against the background of an increase in the useful space of effective functioning, the enterprise can make a transition to another attractor, but the key element of such a transition should be the simultaneous introduction of stabilization measures, since different rates of fluctuation of the parameters caused by the change of attractor in the conditions of dynamic inconsistencies can significantly outpace the plane of development, which threatens the long-term loss of equilibrium functioning;
- an inert impulse that prioritizes the need to maintain existing competitive advantages and build up the initial basis for development in quantitative and qualitative aspects within the stagnation vector of development, since the emergence of an inert impulse indicates the lack of the necessary platform for initiating and implementing the development processes within the development space.

The next attributive characteristic of the enterprise development is its trajectory, which refers to the curve described by the point in its motion relative to the chosen coordinate system. The path of development is

determined according to the chosen vector and characterizes the path through which the change in the quality state occurs. The description of the development trajectory allows us to determine how close the development of the enterprise is to approach the limits of the development area and to develop a list of measures to prevent the loss of equilibrium or its restoration. Given the strategic aspect, the trajectory must specify, in a certain way,the vector of development, that is, to give an indication of how rapid the development of one or another vector is, to reflect the inclination of the enterprise, which will determine the type of strategic behaviour. In this case, the trajectory can be depicted by a straight line that will be transformed into a curve in direct proportion to the reduction of the horizon for estimating the initiation and effectiveness of the implementation of development processes.

Since the trajectory of enterprise development is inextricably linked with the vector of development, it is determined within the given vector, that is, it is its derivative. In the context of the focus on ensuring the economic development of the enterprise, the trajectory cannot be determined by a set of indicators with the assignment to each clear recommended value, since the question of determining the development path is mostly in the plane of the operational platform of management, when management decisions in accordance with the principles of flexibility and adaptability are accepted in inseparable unity with the market state of affairs, but not according to pre-planned legislative directives. Given the perception of the trajectory as a decisive attributive characteristic of the developmental trajectory, it is necessary to specify the vector of development by determining the inclination of the enterprise movement, that is, the nature of development within the framework of a substantiated vector. Subordination of the trajectory of enterprise development to its vector allows us to say that by operating quantitatively measurable parameters, the trajectory more closely reflects the quantitative content of the initial basis of development. Taking into account that the processes of initiation of enterprise development are based on previously adopted management decisions, in determining the trajectory of development as a slope of motion it is expedient to use a tendency relationship between the actual acquired survival potential and the

sustainability potential of the enterprise. It is worth noting that the indicative path of enterprise development must be defined by a certain range of values, each of which will be accepTable for development by a pre-substantiated vector (Table 2).

Table 2. Trajectory of enterprise development according to the development vector

Vector	Development trajectory	
	Path	Characteristic
Ascending	Dynamic	defines the best opportunities for an enterprise to move from one attractor to another, while maintaining the state of equilibrium functioning within the development space. Prolonged holding of the enterprise along the dynamic trajectory indicates a significant margin of economic security, progressive development and, subject to the implementation of proactive policies, the generation of competitive advantages in the market place of operation of the enterprise.
	Progressive	the movement of an enterprise in such a trajectory determines that enterprises are generally able to move to another attractor within the scope of development, but there is a certain delay in the build-up of one volume of potential over another, which requires more time to implement a qualitative leap.
	Counter-dynamic	the enterprise is inclined to feel a rather strong influence of external agents and fluctuations, as in the case of dynamic inconsistency, the amplitude of oscillations may have a nonlinear, chaotic character, which may result in the output of the enterprise beyond the scope of development. However, when forming an effective monitoring system of external and internal factors of loss of equilibrium, the enterprise is capable of progressive development in a counterdynamic trajectory with an emphasis on stabilizing the dynamic matching of potentials.
Neutral	Re-productive	during the movement of an enterprise, the capture of the acquired potential of the enterprise is sustained

		through their permanent reproduction, but no additional possibilities for the formation of a fundamentally new attractor are created.
	Screening	the company is trying to maintain the increased survival potential and sustainability potential until there are additional development opportunities. Retaining its own position is through the formation of resistance barriers to the activators of the loss of the state of equilibrium functioning.
	Indifferent	characterizes the development of the enterprise by inertia. With such a trajectory of development there is no purposeful influence on the formation of new attractors of development, because the complex of factors of influence of the external and internal environment of the functioning of the enterprise is not favourable for the implementation of a qualitative leap or the enterprise is not recognized itself as an active subject of market space and implements a reactive strategy.
Down-ward	Defence	presupposes the need to "protect", retain the potential strength that at the time of the assessment is at the enterprise, and prevent its reduction, and under favourable conditions, increase the additional potential of survival and sustainability in order to form a new development attractor within the ascending or neutral development vector.
	Limited	is evidence of the maturing of the unmanageability of further development. Its feature is the necessity to restrict any development of an enterprise in order to stabilize its activities, to restore dynamic coherence and to conduct internal correction of the enterprise management policy in general and its development in particular.
	Isolation	is an indicator of the presence of crisis phenomena in the enterprise, which are in the active phase. An

		important task when driving on such a trajectory is the formation of maximum resistance to external factors of influence on the period of recovery of internal homeostasis. Strategy and tactics of development management according to this trajectory should be aimed not at finding a new attractor, but on increasing the survival potential and sustainability potential in order to continue functioning in the market space.

Source: compiled by the authors on the basis of the research

An important role in ensuring economic development is the justification of the boundaries of the development space that is, finding the upper and lower boundaries of dynamic equilibrium. The development space implies the presence of several values of indicators that the enterprise can achieve in the course of its development. The boundaries of development space can be determined by the regularity of the equivalence of the system, that is, the assessment of the marginal possibilities of the enterprise. Usually the property of equivalence of a system is reduced to the achievement of a system of a particular end state regardless of the trajectory of motion and is considered separately from the initial conditions in which the enterprise is located and fluctuations of the environment. However, in the context of the aggressive background of the external environment, the space of development should be defined as the function of the marginal capabilities of the enterprise, the initial basis of the development processes (the initial conditions of the enterprise), and environmental factors:

$$\mathrm{SDA} = F(\mathrm{MBO}; \mathrm{IBDP}; \mathrm{EEF}), \quad (1)$$

Where, **DA** – space development area;
MBO – marginal business opportunities;
IBDP – initial basis for development processes;
EEF – external environment factors.

We should note that the space of development space might change in the development of the enterprise, since the boundaries of the development space

are determined not by constant quantities. This is due to the dynamism of external economic conditions, the change of which corrects the phase space ensuring the economic development of the enterprise. Ensuring the economic development of the enterprise should be accompanied by continuous monitoring of the compliance of the enterprise with a definite area of development space, with the aim of early identification of pathogens that may lead to the enterprise exit beyond the development area. In the process of economic development and the achievement of the enterprise of a new qualitative state, new attractors - areas of gravity that can provide the condition to which the enterprise seeks to be formed - can be formed. If the change in the quality of the enterprise immediately triggered the transition from a predetermined plane of economic space to a new attractor, then we can speak about the effectiveness of economic development, which results in a new qualitative state that meets the criterion of development.

The use of the proposed methodological approach to ensuring the economic development of domestic enterprises in the triad "the initial basis of development - the existing and potential opportunities - the change in the quality state" enables the management of individual subsystems of enterprise development, which constitute a coherent system that allows effectively implementing a certain strategy of economic development of the enterprise, conducting a permanent monitoring compliance with the company's chosen development path.

Thus, the definition of attributive characteristics of the enterprise's development is a fundamental element of the superstructure of the strategy of ensuring economic development and the tactics of its implementation. Recognition of the vector, trajectory and boundaries of the space of operation and development of the enterprise reduces the probability and risk of developing an ineffective strategy, and also allows us to reconcile the possibility of achieving the desired result of development with the available reserves of the enterprise acquired during the last period of its functioning in the market space.

The development and implementation of the strategy is carried out under the influence of many internal and external factors, but the main

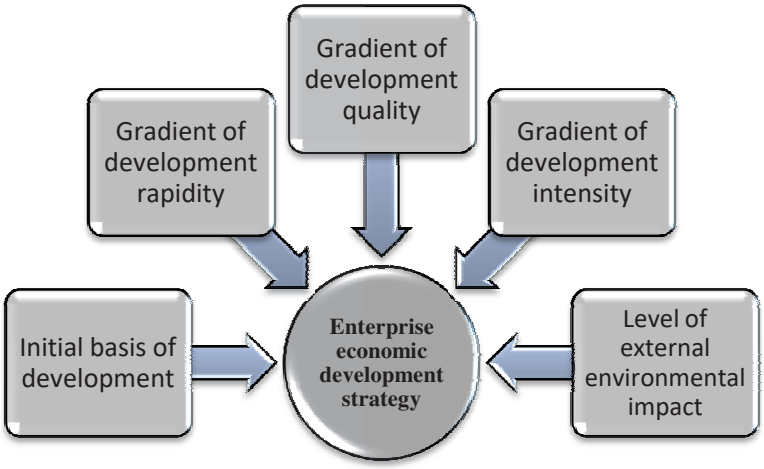
condition for these processes to be subordinated is the need to ensure the state of equilibrium functioning in the strategic period, therefore we consider it necessary to distinguish such concept as the strategy of economic development of the enterprise.

The strategy of economic development is complex, selective, integrates functional strategies and coordinates their development and implementation. The strategy of economic development is a characteristic image and an order of action aimed at achieving the goals of enterprise development, formed in accordance with the existing baseline and attributive characteristics of development.

The substantiated economic development strategy serves as the main link between the initial basis of development and the transition of the enterprise to a new attractor with a change in its qualitative state, which takes place under the influence of an aggressive turbulent external environment, therefore such a strategy should be generalized with a reflection of the acquired initial basis of development, assessment of the level of influence of external conditions, the functioning of the enterprise and the determined rate of transformation of the initial basis of development (Figure 5).

The interpretation of the formed basis of development takes place on the basis of the recommended development path, since this attributive characteristic holistically reflects the vector upon which the development of the enterprise will take place and, accordingly, the transformational type of the initial basis of development, the level of its dynamic development and the created impulse, which were the basis for the vector of development substantiation enterprises.

Figure 5. Parameters of the justification of the strategy of the enterprise economic development



Source: compiled by the authors on the basis of the research

Conclusions. Thus, the proposed methodology for the diagnosis of the initial basis for the development of domestic enterprises serves as a holistic integrated system for assessing the prospects and possibilities of providing economic development, which allows forming a qualitatively filled informational and analytical basis for the development of an effective strategy for ensuring the development of the enterprise and the introduction of effective tactical and operational tools in the company's activities for implementing this strategy.

Management of the enterprise economic development allows increasing the adaptability of the enterprise to changing environment conditions and ensuring the effectiveness of its activities under adverse conditions, as well as a guarantee of satisfaction of the interests of the owners of the enterprise - the receipt of a dividend income; employees of the enterprise - timely receipt of wages to create conditions for career development; partners and counterparties - effective long-term cooperation; local and state government bodies - ensuring long-term development of the industry and replenishing the budget with tax revenues.

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GREEN CONSTRUCTION AS THE PRIORITY DIRECTION OF GREEN ECONOMY FORMATION

Abstract. The essence, characteristics and advantages of the green economy are considered. The feasibility of the transition of our country's economy to a green economy is justified. Green construction is justified as a priority direction of Ukraine's green economy formation. The technologies of green construction have been studied. The advantages of green technologies used in construction are explored. The world standards of green construction are considered. The social, economic and environmental benefits of the categories "green economic growth", "green economy" and "sustainable development" have been analyzed. The economic effect of green technologies implementation is shown. The features of the transition to a green economy are studied. Comparison of green construction promotion measures in different countries is represented. As the methodological support for the transition to a green economy is suggested turning to the basics of the integrated development model, considering constantly changing environmental conditions.

JEL Classification System: D 200, F 200, L 160, L 740, M 140, O 130, P 470
Key words: green construction, green construction benefits, green technologies, green economic growth, green economy formation, sustainable development, national economy.

Introduction. The role of the construction complex in modern conditions is difficult to overestimate becausethe construction industry is the locomotive of the national economy growth. The importance of this industry for the

country's economy can be explained as follows: capital construction creates a large number of jobs and uses products from many sectors of the national economy. The economic effect of the development of this industry lies in the multiplicative effect of the funds invested in construction. Together with the construction industry development, the production of building materials and related equipment is developing, engineering industry, metallurgy and metalworking, petrochemicals, glass production, woodworking, transport, energy are developing. In addition, construction as no other branch of the economy contributes to the development of small and medium-sized businesses. The development of the construction industry necessarily causes economic growth in the country and the solution to many social problems. Therefore, the transition to green building will become the driver for the development of the green economy.

The question about "green building" has become an actual topic in different researches and there are already many developments. Thus, green building in particular was studied in the works of a lot of Ukrainian and foreign scientists. L. Bourdeau, C. Lockwood, S. Fard, T. Woolley, M. Samer, C. Kibert, J. Sendzimir, G. Guy are among of them.

The problem of Ukraine's transition to the principles of the "green economy" and sustainable development was described in the works of A. Martyniuk, Yu. Ogarenko, E. Prushkivska, Yu. Shevchenko, V. Potapenko, V. Pidlisniuk, M. Zagirnyak, E. Yerkova, O. Chmir, N. Zakharkevich and other. In addition, many international institutions are involved in the development and implementation of the green economy concept: World Commission on Environment and Development, United Nations Organization, United States Environmental Protection Agency, Danish Organisation for Renewable Energy, International Chamber of Commerce on Environment and Energy.

The goals of sustainable development in Ukraine need to be understood as a new system of mutually agreed management measures for economic, social and environmental protection measures aimed at building public relations on the basis of trust, solidarity, equality of generations and a secure

environment. These goals should ensure the integration of efforts for economic growth, the pursuit of social justice and the rational use of nature, which requires deep socio-economic transformation in Ukraine and new approaches to opportunities for global partnership. In Ukraine, defining the sustainable development goals, it is necessary to take into account the global development benchmarks, the principles of sustainable development and public opinion regarding the vision of future development. Brundtland Commission in 1987 emphasizethat sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".[104]As international experience shows, social progress depends on maintaining a balance between the goals of supporting economic growth, business competitiveness, environmental security and reducing social inequality[105]. In our opinion, one of the goals for achieving sustainable development, which is of prime importance, is ensuring environmental sustainability of cities and towns, which may be provided right by the transition to the green economy.

In order to investigate in detail the role of green construction in the formation of the green economy, it is necessary to begin with analysing the content of these terms.

Green economy as a component of sustainable development means the economy that results in improved human well-being and social equity, reducing environmental risks and ecological problems. It is one of directions to achieve a resilient economy that provides a better quality of life, it is a means to link the economic, environmental and social considerations of sustainable development to achieve a long-term economic development by investing in environmentally friendly and socially equiTable solutions[106],[107].

[104] Report of the World Commission on Environment and Development: Our Common Future. Available at: http://www.un-documents.net/our-common-future.pdf
[105] Bourdeau, L. (2000). Sustainable Construction: A Framework and International Agenda for Change. Int. Council for Research and Innovation in Building and Construction CIB. Publication No. 260
[106] Lockwood C. Building the Green Way // Harvard Business Publishing. (2006). Pp. 129 - 135.

Green economy is a system of economic activity associated with the production, distribution and consumption of goods and services that lead to a rise in human well-being for a long time, while not exposing the future to significant environmental risks or environmental deficit[108].

According to the United Nations Environment Program definition, the green economy is an economy that leads to an increase in the well-being of people and a strengthening of social justice while simultaneously significantly reducing the risks to the environment and the shortage of environmental resources[109].

"The green economy is an economy where economic growth and environmental responsibility work together, reinforcing each other while supporting progress on social development issues" as said in the Report of the Commission of International Chamber of Commerce on Environment and Energy[110].

Danish Organisation for Renewable Energy[111] suggests understanding of the green economy as the process of transformation, which eliminates the dysfunctions of the modern economy, and which results in the well-being of humankind and fair access to resources for each member of society in the conditions of ecological and economic integrity.

The "green economy" is also considered by scientists in the context of reducing carbon emissions, increasing the efficiency of all types of resources, building a system of public interest. The goal of the green economy is to create an effective environment for economic and social progress, based on minimizing the negative impact on the environment and the efficient use of

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[107] Martyniuk A., Ogarenko Yu. (2012): Prospects for the development of the "green" economy. Friedrich Ebert Fund, 16 p. Available at: http://www.fes.kiev.ua/new/wb/media/publikationen/green_economy_perspectives.pdf.

[108] Report of the Forum of Ministers of Latin America and the Caribbean. Available at: http://www.pnuma.org/forodeministros/17-panama.

[109] Towards a "green" economy: the path to sustainable development and poverty eradication. Full report / United Nations Environment Program (UNEP). (2011). - 739

[110] Report of the Commission of International Chamber of Commerce on Environment and Energy (2011): "Ten Conditions for the Transition to the Green Economy" No. 213-18, 7.

[111] Danish Organisation for Renewable Energy. Available at: http://www.ove.org

natural resources while maintaining a decent standard of living for the population[112].

As we see, there is no singular definition of "green economy", but within the limits of the definitions above the main directions of transition from the "brown" economy, which at present is the economy of Ukraine to the green economy, are outlined. The main focus is on resources: natural ones, because they are limited, human ones - because in most cases they need improvement of usage conditions and creation of decent living conditions.

Since the green economy, which is being implemented by UNEP, aims to help governments in forming and focusing the policies and processes for investing in green sectors of the economy, including clean technologies, renewable energy, water supply, transport, waste management, green construction. It should be emphasized that green construction will be the driver for all of these industries.

Analyzing the essence of “green construction” we may note the definition of National Agency for Sustainable Development, which defines it as a practice of construction and exploitation of buildings whose goals are reducing the consumption of energy and material resources throughout the life cycle building, preservation or improvement of the quality of buildings and their internal environment comfort[113].

"Green construction" is a system of measures aimed at increasing the efficiency of using natural resources with simultaneously reducing the negative impact of buildings on the environment and human life, throughout building cycle and building maintenance[114].

Green construction as the element of green economy means the use of resource-efficient and environmentally responsible processes in construction to ensure lifetime sustainability of the building. Primarily, the sustainability

[112] Pidlisniuk V., Zagirnyak M., Yerkova E. (2013): Strategy of Sustainable Development and Climate Change. Kremenchuk: Shcherbatykh Publishing House; O.S. Chmir, N.P. Zakharkevich (2013): "Green" economy: essence, goals and basic principles.
[113] National Agency for Sustainable Development. Available at: http://green-agency.ru/
[114] Draft Law on Energy Efficiency of Residential and Public Buildings. Available at: http://search.ligazakon.ua/l_doc2.nsf/link1/JF5SR00A.html

context of building implies building operations, site design, maintenance, repair, and demolition with the least harm to the environment. The U.S. EPA says "Green building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from siting to design, construction, operation, maintenance, renovation and deconstruction. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Green building is also known as a sustainable or high-performance building[115]".

The green construction requires close collaboration of the construction engineers, the client and the architects in the entire construction project. The aim is to ensure that building and construction methods are cost-effective, durable and reduce the overall effects on the environment and human health with a central focus on efficient use of energy and resources, water preservation, improved occupational health, and reducing pollution and wastage. Green technology in the construction industry involves producing new buildings that incorporate one or more aspects of environmentally friendly solutions. Green constructing has raised the bar for the housing industry in its entirety by establishing new standards for livability and sustainability. Green construction implies the usage of green technologies, which are different from common technologies used in the standard construction process. The application of green technologies in the construction industry has a high demand in the world. Green technologies allow expanding geography of construction, creating more economically advantageous conditions of operation of buildings, increasing the life of built buildings, and positively affecting the quality of life and health of the population living in green houses. Among them, it is needed to highlight the next technologies[116].

First is the solar power, which has been increasingly exploited as a sustainable construction technology. In green construction, it is utilized in

[115]Green Buildingsat EPA. Available at: https://www.epa.gov/greeningepa/green-buildings-epa
[116] What is Green Construction? // Available at: https://www.conserve-energy-future.com

two ways. One pertains to active solar power and the other is passive solar power. Active solar power is the use of functional solar systems that absorb the sun's radiation to cater for heating and electricity provision. It reduces the need for the use of electricity or gas. The upfront installation costs are higher but in the long-term it saves on energy bills and aids in reducing greenhouse gas emissions from non-renewable energy sources like fossil fuels. On the other hand, passive solar power is a design that uses the sun's rays to warm homes through the strategic placement of windows and the use of heat-absorbing surfaces. The windows let in energy and the heat absorbed reduces the need for warming the house during cold periods such as winter.

Biodegradable materials – the next green technology. The usage of biodegradable materials is an eco-friendly means of making construction sustainable. Most traditional construction methods lead to accumulation of waste products and toxic chemicals, majority of which take hundreds of years to degrade. Moreover, even if they degrade, it contaminates and harms the environment. Biodegradable materials such as organic paints therefore aid to limit the negative impacts on the environment as they easily breakdown without the release of toxins. The use of biodegradable materials for building foundation, walls and insulators are also part of sustainable construction technologies.

Green insulation is among the greatest concerns when it comes to construction of buildings and homes. However, most people do not know that insulators are simply wall filters, which do not need to be made from expensive and highly finished materials. On this basis, the use of green insulation has proven to be a sustainable construction technology as it eliminates the need of high-end finishes made from non-renewable materials. Green insulation offers a solution by making use of old and used materials such denim and newspaper. In other words, it utilizes recycled material to line the walls.

The usage of smart appliances in buildings is important part of green construction technologies. Homes and commercial buildings consume most of the world's energy and for this reason, it has necessitated the use of smart

appliances as part of sustainable construction technologies. The sustainable construction technologies emphasize the installation of energy saving and self-sufficient appliances. Smart dishwashers, refrigerators and washing machines are examples of such sustainable technologies. The technology is oriented towards establishing zero-energy homes as well as commercial buildings.

Cool roofs are sustainable green design technologies, which aim at reflecting heat and sunlight away. It aids in keeping homes and buildings at the standard room temperatures by lowering heat absorption and thermal emittance. The design makes use of reflective paints and special tiles which absorb less heat and reflect away most of the solar radiation. For instance, cool roofs can reduce temperatures by more the 50 degrees Celsius during summer. Cool roofs therefore minimize the dependence on air conditioning and in turn, reduce energy use, which translates into decreased cumulative greenhouse gas emissions from power plants.

Sustainable resource sourcing as the name suggests that it is a prime example of sustainable construction technology because it ensures the use of construction materials designed and created from recycled products and must be environmentally friendly. In most cases, agricultural wastes or by-products are used to produce the construction materials. Overall, the materials are remanufactured, recycled, recyclable, and obtained from sustainable sources.

Sustainable construction technologies typically include mechanisms to decrease energy consumption. The construction of buildings with wood, for instance, is a sustainable construction technology because it has a lower embodied energy in comparison to those build of steel or concrete. Sustainable green construction also makes use of designs that cuts back air leakage and allows free flow of air while at the same time using high performance windows and insulation techniques. These techniques are meant to reduce the dependence on air conditioning and interior heating. Further, the strategic placement of windows is another technique that encourages day lighting thereby minimizing the need for electric lighting during the day. The use of renewable energy such as solar for lighting and water heating is also part of a low-energy house and zero-energy building design. The initial costs of

setting up zero-energy buildings may be high, but they pay off in the long-term.

Electronic smart glass also constitutes one of the technologies in sustainable construction. The electronic smart glass is a new technology that works particularly in summer periods to shut out the harsh heat of solar radiation. The smart glass uses tiny electric signals to slightly charge the windows to change the amount of solar radiation it reflects. It is incorporated into the buildings control system therefore allowing the users to choose the amount of solar radiation to block. With this technology, homes and commercial buildings can save a lot on heating, ventilating, and air conditioning costs. The smart glass is still being perfected and is soon set to be fully used in sustainable construction as a smart energy-saving technology.

Talking about water, there are several water efficient technologies used, which are all part of sustainable construction technologies. Essentially, the technologies encompass re-use and application of efficient water supply systems. Examples are usage of dual plumbing, greywater re-use, rainwater harvesting and water conservation fixtures. These methods ensure that water is adequately managed, recycled and used for non-porTable purposes like washing cars and flushing toilets. Dual plumbing, for instance, decreases sewer traffic and enhances the potential of re-using water on-site. On the other hand, rainwater harvesting provides water for multi-purpose usage and it might be stored for future use. In general, the water efficiency sustainable construction technologies lower water usage costs and help in water conservation. In urban areas, the technologies intend to lower water wastage by 15% to address fresh water shortages.

The health and safety are fundamental and must be guaranteed during the construction of any building or home. As such, sustainable indoor technologies are mandatory in green construction. The materials used must ensure green safety standards which include hazardous free elements, non-toxic materials, low volatile emissions, and moisture resistance like materials

from cork, wood and bamboo are naturally sourced and do not have any toxic, irritating or carcinogenic elements[117].

The advancement to constructing self-powered buildings is an art of sustainable construction technology. The reason is that self-powered buildings bring about the realization of zero-energy construction. The buildings are built so that they are able to generate sufficient power to support their own energy needs and even direct surplus energy back into the power grid. In most cases, wind power technology is used, and it is highly common in skyscrapers whereby wind turbines are mounted at the rooftops. The constant and heavy air currents at higher altitudes propel the turbine blades, which generates the power requirements for the building.

Rammed earth brick is an ancient construction technology, which has lately been re-introduced to cater for the demands of environmental sustainability. The technique uses sustainably sourced raw materials. Due to technological advancements, the process of building a rammed-earth structure has been made easier but it still follows the ancient preparation process. Moist earth mixture and hard substances like gravel or clay are mixed with stabilizing elements such as concrete and compacted to create dense, hard walls. The sourcing and formation process of rammed-earth bricks makes it ideal for sustainable construction as it lessens environmental impacts and the material can equally stabilize the temperature of a building. Rammed-earth structures contribute to fewer emissions and ensure that the buildings remain cool in the summer and warm in the winter[118].

The features, which are different in traditional and green construction are shown in the Table 1.

[117] Fard S. Post Occupancy Evaluation of Indoor Environmental Quality in Commercial Buildings: Do Green Buildings Have More Satisfied Occupants? [master's thesis] (2006). Berkeley: University of California.

[118] Woolley T.(Ed). (2000). Green Building: Establishing Principles. Ethics and the Built Environment. Warwick Fox. Rutledge, London: 44-56.

Table 1. Comparative characteristics of traditional and green construction

Indicators	Green construction	Traditional construction
Energy consumption	low	High
Quality of the environment inside construction	very high	High
Emission level	low	High
Waste management system	high-tech effective	Effective
Building materials	environmentally friendly	environmentally destructive

Source: compiled by the authors on the basis of the source[119]

The widespread implementation of green technologies in construction industry of Ukraine is impossible without the implementation of green construction standards in the usage of the majority of domestic construction companies as well as foreign companies operating in the country.

If we turn to the recognized world standards of construction, which use green technology, we would like to note the standards of green construction of the US, the experience of which can be applied to our transition to green construction standards (Table 2.).

[119] Samer M. (2013): Towards the implementation of the Green Building concept in agricultural buildings: a literature review, Vol. 15. – № 2. – P. 25–46.

Table 2. Green Building Standards

Standard	Building Type	Project Type	Subject Areas
International Code Council's 2012 International Green Construction Code -the model code that contains minimum requirements for increasing the environmental and health performance of buildings, sites and structures. Generally, it applies to the design and construction of all types of buildings except single- and two-family residential structures, multi-family structures with three or fewer stories, and temporary structures.	Commercial: all Industrial: all but manufacturing systems and equipment Mixed use: all Residential: multi-family with more than 3 stories	New construction Additions Alterations	Sustainable sites Energy efficiency Water efficiency Materials and resource use Indoor environmental quality Emissions Operations and maintenance
Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings – the model code that contains minimum requirements for increasing the environmental and health performance of buildings, sites and structures. Generally, it applies to the design and construction of all types of buildings except single-family homes, multi-family homes with 3 or fewer stories, and modular and mobile homes.	Commercial: all Industrial: all Mixed use: all Residential: multi-family with more than 3 stories	New construction Additions	Sustainable sites Energy efficiency Water efficiency Materials and resource use Indoor environmental quality Construction and operations plans
ICC 700-2012: 2012 National Green Building Standard (ICC 700) - the rating and certification system that aims to encourage increased	Mixed use: residential space	Mixed use: residential space	Mixed use: residential space

environmental and health performance in residences and residential portions of buildings. Its criteria apply to the design and construction of homes and subdivisions.			
Green Globes - the series of rating and certification systems that encourage improved environmental and health performance for all types of buildings except residential structures. Green Globes Trade Mark is administered in the U.S. by the Green Building Initiative.	Commercial: all Mixed use: all Residential: multi-family	New construction Additions Alterations Existing buildings	Sustainable sites Energy efficiency Water efficiency Materials and resource use Indoor environmental quality Emissions Project/environmental management
US Green Building Council's Leadership in Energy and Environmental Design - the series of rating systems aimed at increasing the environmental and health performance of buildings, sites and structures and of neighborhoods. Leadership in Energy and Environmental Design covers the design, construction, and operation of all types of buildings.	Commercial: all Industrial: all Mixed use: all Residential: all	New construction Existing buildings Additions	Sustainable sites Energy efficiency Water efficiency Materials and resource use Indoor environmental quality Emissions Operations and maintenance

The International Living Future Institute's *Living Building Challenge* - the certification system that advocates for transformation in the design, construction, and operation of buildings. In addition to encouraging improved environmental and health performance, it supports building structures that are restorative, regenerative, and an integral component of the local ecology and culture.	Commercial: all Industrial: all Mixed use: all Residential: all	All	Sustainable sites Energy efficiency Water efficiency Materials and resource use Indoor environmental quality Equity Aesthetics

Source: compiled by the authors on the basis of the sources[120]

In modern society, exhausted byworldwide ecological problems, in our opinion, it is needed to talk about not just economic, but “green” economic growth.

If we discover the benefits of the categories” green economic growth”, “green economy” and “sustainable development”, we may analyse them from economic, social and ecological points of view[121].

[120] International Code Council's 2012. International Green Construction Code. Available at: https://www.epa.gov/smartgrowth/international-code-councils-2012-international-green-construction-code-igcc; Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings (ASHRAE 189.1). Available at: https://www.epa.gov/smartgrowth/ansiashraeusgbcies-standard-1891-2014-standard-design-high-performance-green-buildings; Green Globes. Available at: https://www.epa.gov/smartgrowth/green-globestm; US Green Building Council's Leadership in Energy and Environmental Design Available at: https://www.epa.gov/smartgrowth/us-green-building-councils-leadership-energy-and-environmental-design-leedr; The International Living Future Institute's Living Building Challenge. Available at: https://www.epa.gov/smartgrowth/international-living-future-institutes-living-building-challengetm-version-30-2014

[121] Prushkivska E.V., Shevchenko Yu.O. (2013): The development of the "green economy": the national dimension. BUSINESSINFORM,3. Available at: http://business-inform.net/pdf/2013/3_0/186_191.pdf; Kibert C., Sendzimir J., Guy G. (Eds.). (2000). Defining an Ecology of Construction. Construction Ecology: Nature as the Basis for Green Buildings. New York: Spon Press, 7-28.

Starting from green economic growth, we may mention ensuring the constant economic progress considering the surrounding environment, more sTable and flexible environment ensures the economic growth using green technologies, innovations. The social aspect of green economic growth is represented as providing the achievement of well-being, in particular social, providing access to the poorest level of the population to main goods, pleasure demand in food production, transport services, housing construction and providing energy.

Continuing with green economy, it is needed to mention such economic aspects: ensuringthe economic growth, increasingthe volume of income and employment, attraction of public and private investments, creation of flexible economy with new economic activities. The social aspects are: involving the achievement of human welfare, social fairness, better quality of life, social development, reduction of social unevenness, fair access to limited resources. The ecological benefits of green economy are that it focuses on reducing environmental risks, deficits citation, carbon emissions into the atmosphere and environment pollution; increasing efficiency usage of resources and energy, requires the responsibilities and load limitations on the ecological the system from all subjects of environmental management.

Ecological aspect is manifested in keeping and preserving natural their assets, the creation of low-coke production effective use fewer resources and energy, quantity reduction emissions and minimization of pollution and environmental impact environment; ensuring climate and environmental sustainability; establishing harmony between economic interests and the state of the environment and its protection.

Finishing with economic benefits of sustainable development we may emphasize the limitation of production growth and consumption in economically developed countries, support sustainable economy, development and introduction of new technologies, reduction investment in the industry that exploit nature. Social aspect: provides preservation of human capital and reduction of quantity destructive conflicts, fair distribution of resources among all members of society, achievement of a decent life and

welfare. In addition, the ecological aspect is represented by providing stability of biological and physical systems by supporting the usage of secondary raw materials, minimizing quantity of waste, distribution of the reproductive energy sources, construction of treatment plants and factories for household recycling and industrial waste reduction of area under garbage cans[122].

Based on the research of V. Potapenko, we may analyze the place of Ukraine according to indicators of sustainable development. Such economically developed countries as Switzerland, Sweden, Japan, Germany and the USA have significantly advanced towards sustainable development. Other countries are far from this, unfortunately, Ukraine is among them.

Therefore, today it makes sense to analyze the experience of the way of the transition of developed countries to the green economy (Table 3).

Table .3. The comparative characteristic of the countries sustainable development indicators

Index	Country						
	Switzerland	Sweden	Norway	Japan	Germany	The USA	Ukraine
Environmental performance index	8,91	8,6	8,11	7,25	7,32	6,35	5,82
Global Competitiveness Index	5,63	5,56	5,14	5,32	5,39	5,43	3,9
Economic freedom	3,05	3,1	2,7	2,5	2,9	3,2	1,35
Human Development Index	0,947	0,949	0,963	0,943	0,93	0,944	0,776

[122] Nwafor, J.C. (2006). Environmental Impact Assessment for Sustainable Development. Enugu: Eldermark Publishers; Woolley, T.(Ed). (2000). Green Building: Establishing Principles. Ethics and the Built Environment. Warwick Fox. Rutledge, London: 44-56.

Growth of GDP, %	2	2,7	1,5	3	3,6	2,7	4,3
GDP per capita, thousands of dollars	4,29	3,9	5,91	3,42	3,59	4,74	0,67
GDP, billions of dollars	0,326	0,354	0,276	4,338	2,96	14,72	0,306
Population growth	0,21	0,16	0,33	-0,28	-0,21	0,96	-0,62

Source: "State policy of sustainable development on the principles of "green "economy" data[123]

Companies with green solutions have also improved financial efficiency, as when compared to conventional businesses that do not implement green applications. Business' survival in the current harsh economic times calls for efficiency and innovations.As a result, green remodeling and building are quickly becoming hallmarks of contemporary business efficiency. Main benefits of the green construction implementation are the availability of demand, the reduction of operational costs, competitive advantages, and international recognitional. A construction company that has sufficient sustainable solutions has reduced energy and operation costs. For instance, resorting to solar power instead of electricity can help cut down utility bills by almost 30%. Moreover, in the developed countries, construction that leverage green technology are eligible to receive tax incentives from the government. The extra cash can then be invested in the operations of the business, thus increasing overall service provisions. While the installation costs of green buildings might be slightly more expensive initially, the long-term benefits are more reasonable. The green technologies are designed to use resources more efficiently, which in turn, leads to reduced costs for owners. Many companies are realizing the need for green technologies and are slowly adopting such methods in their businesses. For instance, buildings that incorporate

[123] V. Potapenko "State policy of sustainable development on the principles of "green "economy". Analytical note. Available at: http://www.niss.gov.ua/articles/1237

solarenergy systems use up to 70% less electricity than conventional systems, according to the U.S Department of Energy[124].

The economic benefits of green buildings in 20 years perspective are represented in the Table 4.

Table 4. The profit from a green building

Category	Net Presented cost for 20 years, Dollars USA per 1 sq.m.
Energy saving	60,7
Reduction of emissions	12,9
Water saving	5,4
Savings on exploitation and Service	91,5
Increased productivity, improved hygiene of labour and housing	397,0 – 595,0
Average rise in the construction cost	-32,3 – 53,8
Total:	535,2 – 711,7

Source: compiled by the authors on the basis of the source[125]

Talking about the green construction state promotion measures, we want to emphasise the experience of the USA, the UK and Germany (Table 5). Today, among all countries, due to the indexes of growth and volumes of the market of green construction, the US is leading, where, the green building is stimulated mainly by the state financial and tax support. In Germany, the general level of energy efficiency of construction is very high, which is ensured by high requirements in the standards. The advantage of Great Britain and Germany is the fact that the state encourages additional initiatives on the use of renewable sources of energy in construction through the establishment of additional requirements for the respective budgets.

[124] U.S Department of Energy. Available at: https://www.energy.gov/science-innovation/energy-efficiency

[125] CEN/TC 350 — Standards under development. Available at: http://www.cen.eu/CEN/Sectors/TechnicalCommitteesWorkshops/CENTechncalCommittees/Pages/WP.aspx? param=481830&title=CEN%2 FTC +350.

Table 5. Comparison of green construction promotion measures in different countries

Promotion measure	The USA	The United Kingdom	Germany
CO2 emissions reducing policy	15% lower by 2020, compared with 2009	34% lower by 2020, compared with 1990	40% lower by 2012, compared with 1990
Normative-legal base of construction	It is determined by the states	A unique method for calculating energy efficiency was developed and approved	Energy efficiency standards were developed in 1977 and constantly became stronger
Energy Efficiency Certification	Energy Star, obligatory for new construction	Energy Performance Certificate, is obligatory for a new construction and Display Energy Certificate	Energy Performance Certificate, is obligatory for a new construction
National environmental standard	LEED	BREEAM	DGNB
Financial Initiatives	A lot of taxes benefits, compensation for the cost of certification	The budget for renewable energy sources is relied on market mechanisms	The promotion of renewable energy sources
The National Council for Green construction	USGBC, 13213 members, (2008)	UKGBC, 200 members, (2008)	DGNB, 300 members, (2010)
Social Responsibility of business	Strongly developed	Strongly developed	Strongly developed

Source: compiled by the authors on the basis of the source[126]

For a truly effective transition to a green economy model, it is necessary to find opportunities and means to solve problems in all spheres in a complex

[126] International practice of green building. United Nations Development Program. (2011): Global Environment Facility. Available at: www.undp.org

way. In order to develop a phased transition of Ukrainian construction industry to green one, we will return to the sectors of the economy. Construction, like every industry, refers to the secondary sector of the economy, and therefore most needs the rational use of energy. Increasing energy efficiency in construction is one of the promising directions that will promote energy saving, reduce emissions and create new jobs. Right together with the direct effect, the "greening" of the construction industry causes a number of related effects: improving the comfort of dwellings, extending the life of the buildings, increasing employment in related industries, reducing the consumption of imported resources, etc. However, the qualitative development of green building is not possible without the tertiary sector - the sphere of services. The tertiary sector is the connecting link within the secondary sector, which ensures the implementation of the concept of a "green economy".

This sector is like a system of industries and activities related to the provision of services to both the population and business. Right this sector covers comprehensive research and development, creation of business plans and programs, development of energy-efficient technologies that can provide qualitative changes in the direction of greening the secondary sector, in particular construction. Creating eco-innovations will improve production processes, effectively organize the business at the expense of resource savings, as well as improve the commercialization and implementation of clean technologies.

Scientists mention a lot of market mechanisms and economic instruments for the transition to the principles of the "green economy":

1) public and private investments in green building;
2) exchange of environmental technologies between countries;
3) public procurement policy, which stimulates the production of environmental friendly products;
4) targeted state support for research and development related to the creation of environmentally friendly technologies;

5) tax-budget reforms - development and introduction of appropriate environmental taxes on the basis of the polluter pays principle;
6) the introduction of a subsidy for environmental production and the corresponding abolition of resource-intensive production.

However, today the analysis of the existing state of the economy gives an opportunity to talk about the delay of the full implementation of the approaches presented for the transition to a green economy. Therefore, we consider it makes sense to turn to the experience of methodological support for the transition to a green economy.

We would like to offer for transition to the green economy referring to the principles of Threshold-21 model, a model that was developed in 1980 by the Millennium Institute in the USA for a complex long-term planning of sustainable national development and successfully implemented in a lot of countries[127]. There are a lot of opposite opinions beeween the scientists according to this model. But weagree with understanding of this model as the one that integrates the economic, social, natural, resource blocks into a single simulation model for achieving a sTable state in a single state (more than 800 parameters and even greater number of equations connecting them), in a group of states and for the world as a whole. This allows us to build dynamic models for integrated long-term planning of national development. The peculiarity of the model is its "clearness" - the structure of the model is interpreted in a meaningful way, not only for developers with high mathematical qualifications, but also for customers (politicians, economists, managers, environmentalists, doctors, etc.). Therefore, if the simulation results of a scenario do not satisfy the researcher, he can look at the modeling process and determine which variables affected the unexpected result. The variables can later be corrected in a new scenario, and the simulation is repeated until the desired result is achieved.

The model has the following key characteristics: integrates economic, environmental and social elements using a system dynamics approach, helps

[127] Threshold-21 http. // Available at: //ledsgp.org/wp-content/uploads/2015/10/T21 Overview1.pdf

create sustainable development strategies and policies by simulating possible impacts of alternative policy choices and strategic options; facilitates transparency, participation, and consensus building by encouraging open consultations with diverse stakeholders and external development partners within a common framework and an easy-to-understand interface; flexible and can be customized to address the unique needs of individual countries through the use of a modular design where existing sectors can be modified and new sectors can be added; produces output for policy documents including a national budget, national development plans, the Country Assistance Strategy, the Poverty Reduction Strategies or UN Development Assistance Framework. The model differs from almost all other global macroeconomic models; it understands the natural resources as a factor of production.

The Environment sphere tracks pollution created in the production processes and its impacts on health, and eventually on production. It also estimates the consumption of natural resources, both renewable and non-renewable, and can estimate the impact of the depletion of these resources on production and other factors. It also examines the effect of soil erosion and other forms of environmental degradation and their impact on other sectors, such as agricultural productivity and nutrition. Additional issues addressed are fossil fuel use, forest depletion, land and water degradation, air and water pollution, and greenhouse gas emissions. That is why, on our opinion, this model may be used for the modelling of national transition to the green economy.

Conclusions. One of the components of the national economy of Ukraine, which creates the basis for its social and economic development, is the construction industry. It is one of the most important sectors of the national economy. The competitiveness of the Ukrainian economy as a whole depends on the level of development of the construction industry, its

competitiveness. That is why we believe that development of green technologies and transition to green construction widespread in Ukraine will become the driver for the transition to the green economy as a whole. The mplementation of green construction standards will lead to environmental stability, which is of great importance not only inside the boundaries of our country but is needed all over the world.

Due to world trends in the investment and construction activities, there are transformational changes in the direction of reducing energy consumption in systems of life support of buildings, fundamental changes in the civil and industrial construction in general. "Green construction" is the result of these changes. That is why green construction here can be understood as a priority direction of the green economy formation. The environmental direction, together with the energy saving and non-emergency technologies introduced in the construction, will provide a sTable and long-lasting demand for green buildings among the people. This trend is easily formed by a public opinion, law projects of the state, aimed to implement the green technologies into states. Companies are always looking for alternative solutions to help cut down on costs. The construction industry for sure can benefit from green energy solutions in many ways. Researches have shown that there is a compelling need for the construction industry to adopt green technologies. The green buildings are not just about maintaining the environment, but sustainable solutions make genuine sense for a construction company. It is important to note that businesses adopting green solutions are more likely to attract clients than their counterparts. This benefit relates to corporate social responsibility of the given company whereby they are inclined to give back to the society in one way or another. For many people all over the world a company, which is concerned itself with preserving the environment, will look more attractive.

It is needed to emphasize one of the main conclusions: the transition of the Ukrainian economy to a green one nowadays stimulates economic growth, an income increase and an employment level. Although in the short term in the green scenario economic growth rates may be lower than in the usual scenario development, but in the long term the transition to a "green" economy will achieve higher performance for our country.

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TRANSFORMATION OF STATE REGULATION OF ECONOMIC RELATIONS IN THE GAS SECTOR OF UKRAINE

Abstract. With Ukraine adopting a sustainable development strategy, many organizational and economic issues in the gas sector of the economy have emerged and they need to be addressed. This concerns the need to ensure the diversification of sources of gas supply, energy efficiency, the exploration and extraction of shale gas deposits, the reduction of harmful emissions into the atmosphere, and above all – the growth of production of traditional natural gas. This entails the necessity for additional funds for exploration, an improvement of technologies for the development of fields and intensification of gas extraction and waste utilization.

These problems can be solved by state regulation, which is being significantly transformed as part of the EU integration. In order to refill the state budget, the Government actively implements the policy of raising prices and tariffs for products and services of the gas sector that is economically justified, but is opposed by the population and other energy consumers. Legislation in the regulation of rental relations has undergone significant changes. The rent has lost its role in filling the budget and has ceased to significantly affect the development of hard-to-reach gas fields, which leads to a decrease in gas production. Rental relations should also be reformed. The number of private gas companies grows, many of which belong to government officials. This requires more transparency and clear principles for granting permits for the development of deposits by private enterprises. Therefore, the transformational processes in state regulation of the gas sector of Ukraine, which are the subject of the study, become particularly acute and relevant.

The article focuses on changes in the gas sector of Ukraine in the conditions of the EU integration and on the regulatory policy measures in the field of economic relations in the gas sector –specifically, on price and tariff regulation, rental taxation, licensing and permission policies.

JEL Classification System: L38, L51, L71
Keywords: state regulation, gas sector, prices, tariffs, rent payments, economic relations, sustainable development.

Introduction. Providing energy is one of the most important global issues in the world. Demand for oil and gas continues to grow, and hydrocarbon production is steadily declining. Today, 3.5 billion people live in the countries rich in oil, natural gas and minerals. With proper management, the extraction of these resources can bring high incomes for economic growth and poverty reduction in these countries. The peculiarity of world energy is that the centres of production and consumption of oil and gas resources do not coincide geographically. At the beginning of the third millennium, developed countries produce less than a third of world primary energy, and consume almost half of it. Disproportions in energy consumption contribute to preserving global inequality, increasing social tension, and slowing down the growth of real incomes of the population. The energy supply of low-income countries remains unsatisfactory. This limits the potential of industrial development, puts an excessive burden on the natural environment and slows down the growth of real incomes of the population.

To accelerate sustainable development of the EU Member States, the European Commission identified a list of tasks that set strategic guidelines for the transition to a competitive low carbon economy by 2050. Accordingly, Ukraine should ensure the mobilization of investment resources to solve economic problems in the energy sector (changing the structure of the energy balance in favour of renewable sources of energy, energy efficiency and energy saving policies, increasing natural gas production, and developing shale gas deposits). An important direction in the realization of these tasks is the transformation of processes of state regulation. Therefore, the purpose of the study is to provide scientific substantiation of measures of state regulation of market relations in the gas sector under conditions of reforming the national model of the energy market in the direction of deregulation and liberalization.

The need for liberalization of the gas market and reforming state regulation. Liberalization of natural gas markets is one of the main tendencies of recent years in European and world energy production. The reason for this is that the old system ceased to meet the requirements of market entities. The system was based on large, vertically integrated gas companies, which were acting as monopoly suppliers and importing gas under long-term contracts at prices, which were tied to the cost of oil. Instead of the old system a fundamentally new one is created, the basic components of which are free competition between suppliers at all levels - from local to international one, separating the operation of gas transportation companies into a different type of activity with the right to use the network on a non-discriminatory basis, market exchange pricing. In 2009, the Energy Community Secretariat initiated preparations for the implementation of the Third Energy Package into the legislation of the member countries of this organization. There also was a possibility for the EU countries to participate in the work of the Agency for the Cooperation of Energy Regulators (ACER) on condition they fulfilled their acquis communautare obligations.

However, the implementation of basic provisions of the European legislation does not automatically mean achieving the desired result, since the functioning of the market can be influenced by a set of objective and subjective factors. With the old model of the market organization, the state of gas assets, primarily, the use of the gas transportation infrastructure was characterized by a lack of investment in the industry. This complicated the provision of reproduction of fixed assets. In the industry, 85% of the equipment, machinery, construction of the main and auxiliary production, 5% of gas equipment, 62% of wells, as well as 84% of special machines and mechanisms ran out half of their resource. The efficiency coefficient (24-26%) of the park of gas compressor units of gas compressor stations is significantly lower than the coefficient of current energy efficient units (34-42%), which results in significant production and technological spending of gas for its

transportation needs[128]. In the field of gas distribution in Ukraine, there are 46 gas distribution companies, employing about 75 thousand employees. The total length of the network is about 400 thousand km. In 2014, every hundredth kilometre of distribution pipelines in Ukraine was in need of repair. By 2020, every 10th km. will be in this state; 3,5-4 thousand km must be replaced annually. The cost of such works to prevent accidents in the gas distribution system of Ukraine is about 2-2.5 billion UAH. For planned urgent replacement of technically dangerous plots, one should spend about 7 billion UAH annually. The technical condition of the gas distribution points (GDP) is also problematic. Experts suggest that only 4% of the GDP is not in need of replacement. If in 2014 every 12th gas distribution point in Ukraine was in a critical condition, then by 2020, every sixth GDP will be in this condition[129].

The formed organizational structure of the market and the place in it of transport infrastructure as part of vertically integrated companies led to significant misuses. These were unclear accounting and the possibility of non-transparent distribution of natural gas between different categories of consumers, coverage of physical losses of the network at the expense of households' consumption. There were no incentives to curtail expenses. The possibility of a third party to enter the gas transmission network and create competition for prices and terms of delivery was limited. The competition itself was not favourable to the state-owned vertically integrated company, as it was a supplier of natural gas to the final consumers and a transporting entity at the same time. This situation is a prerequisite for creating competition in the market in order to reduce the transaction losses of the society and the energy system as a whole.

[128] Horal L.T. Problems and Prospects of Innovative Development of the Gas Transportation System of Ukraine / L.T. Horal // Scientific Bulletin of the Ivano-Frankivsk National Technical University of Oil and Gas. - 2011. - No. 2. - P. 56-62.

[129] Statistical data on the ratings of "Regional Gas Company", NJSC "Naftogaz", "Ukrtransgaz", "Ukrgazvydobuvannya" [Electronic resource] – Available at: http://dt.ua/ECONOMICS/cherez-5-rokiv-avariynist-rozpodilnih-gazoprovodiv-v-ukrayini-zroste-v-10-raziv-187741_.html

Thus, the current old system of tariff formation did not promote rational behaviour of consumers. This has exacerbated pressure on the state budget. Until recently, the rules of delivery have not guaranteed the provision of appropriate quality services. The absence of sufficient investment in the gas transport sector has complicated the expanded reproduction of fixed assets. The existing rules of transportation and distribution have become a barrier to free access of third parties to networks and the development of competition in the supply chain.

In 2013, about 7 billion cubic meters of natural gas was sold to enterprises of communal heating (CH) at economically unreasonable prices. The prices were more than twice lower compared to tariffs for industrial consumers and budget institutions. This practice of subsidization has led to the loss making of NJSC «Naftogaz of Ukraine». The losses of the Company for only 2013 amounted to over 12.5 billionUAH. The household tariff was 5.5 times lower than the tariff for industrial enterprises. This has caused significant imbalances in the financial provision of natural gas to the population. It was necessary to constantly reimburse the difference between the sold natural gas and the extracted in Ukraine or imported one using money from the state budget.

The need to transform the institutional provision of the gas market is conditioned not only by the accumulation of intraeconomic crisis phenomena. This is also required by the international obligations of Ukraine within the framework of the Energy Community, which have identified the directions of further sectoral reforms. After signing the Association Agreement with the EU, Ukraine actualized its commitments to implement the norms of the Second and Third Energy Packages into national legislation. They provide for a fundamental change in the model of state regulation.

For example, Poland has not been able to achieve significant openness of the domestic gas market and create competition between gas suppliers. Poland has met many commitments to the EU: it implemented European directives and regulations, put a number of important institutional reforms into practice, participated in numerous pan-European technical projects on the convergence of national energy markets. It managed to achieve some

positive results of the gas market reforms: to keep one of the lowest prices for natural gas for industry in Europe and relatively low prices in the region for households, to attract significant investment in mining, including in exploration of shale deposits, as well as in development of GTS[130].

After joining the EU, Poland committed itself to reforming the domestic energy market in line with European requirements. Since 2004, the processes of separating vertically integrated companies by type of activity have begun. In the same year, the implementation of the "second energy package" directives on granting third party rights of access to energy networks in accordance with the Directive 2003/55 / EU started. Subsequently, in the process of separating the company PGNiG, one created the operator of the systems of transportation and storage of natural gas – GAZ - SYSTEM S.A. However, after the reforms, Poland failed to ensure the development of competition in the national gas market. In 2009, PGNiG still controlled 97.4% of retail sales. This is explained by the fact that only PGNiG made all wholesale purchases of imported gas. The suppliers that did not belong to the PGNiG group could sell natural gas exclusively through their own distribution networks and were not able to supply gas to other consumers. Independent suppliers had to buy gas from PGNiG. In its turn, PGNiG did not sell gas to consumers that were connected to the distribution networks of independent suppliers. In spite of the formal implementation of the competition rules into national legislation, the changes did not actually take place[131].

As a result of the division of regional vertically integrated companies in 2011, 18 companies – System Operators (DSO) appointed according to the decisions of the national regulator – were operating on the market. In 2012, the gas market in Poland remained fully regulated. The wholesale segment of the market, as before, was characterized by the dominance of one enterprise – PGNiG. Although about 97 enterprises had the right to trade gas, the share of PGNiG in the

[130] Vytvytskyi Ya.S., Lebeha O.V. Modelling of economic indicators of the shale gas extraction / Ya.S. Vytvytskyi, O.V. Lebeha// International Economic Relations and World Economy. Uzhgorod - 2017. - Issue 14. - P. 41-45

[131] National Report: The President of the Energy Regulatory Office in Poland 2011 [Electronic resource] – Available at: http://www.ure.gov.pl/download/2/245/NationalReport2011.pdf

retail segment of the domestic market was also dominant and amounted to 94.64%.

Thirteen largest trading companies, independent of PGNiG, sold in 2012 a total of about 1,336.52 million cubic m. of natural gas to 14,124 consumers. The activity of these companies is largely based on the resale of natural gas purchased from private extractive companies or PGNiG. Gas is mainly supplied to end users using local distribution networks owned by the companies themselves. The actual absence of competition in the Polish gas market creates a situation in which gas prices for all consumer groups are subject to state regulation or are under the monopoly influence of the supplier[132]

Reforming the functions of the bodies of state regulation of the gas market. At the present stage of forming a single European gas market, Ukraine continues to play an important role in the development of the European gas market. However, fully-fledged, effective cooperation in the gas sphere between Ukraine and the EU is hampered by the absence of proper normative and legal and organizational provision of the gas market of Ukraine. It still does not meet the European regulations and standards.

The national system of the gas sector management does not correspond with European liberalization trends, as state authorities continue to apply significant levers of administrative regulation of the gas market. State authorities regulating the energy production sphere are obliged to participate in the regulation of the gas market according to a number of the following main areas:

- direct state regulation of prices and indirect regulation of free prices by establishing rules that ensure a competitive decrease in prices;
- normative and legal regulation of investment activity, the purpose of which is to create favourable conditions for attracting external and internal investments

[132] National Report: The President of the Energy Regulatory Office in Poland 2012 [Electronic resource] – Available at: http://www.ure.gov.pl/download/2/378/NationalReport2012.pdf

- ensuring the development of regional and global competitive relations through the structural and functional restructuring of economic ties;
- economic non-price methods of influence (taxation and credit, legal basis of depreciation policy, regulated rent, etc.);
- signing interstate agreements, trade in energy resources and the entry of the country into intergovernmental energy units.
- The National Commission regulating the spheres of energy and communal services (NCRECS) carries out state regulation of activities of actors of the natural gas market. The main responsibilities of the NCRECS include133:
- the approval of licensing conditions for the implementation of certain types of commercial activities in the natural gas market, as well as control over compliance with licensing conditions by licensees;
- the determination of the procedure for access to the unified gas transportation system of Ukraine;
- ensuring the implementation of tariff and pricing policies in the natural gas market;
- the approval of the procedure for setting and revising tariffs on transportation, distribution, supply, loading, storage and selection of natural gas;
- the approval of the methodology for calculating tariffs on transportation, distribution, supply, loading, storage and selection of natural gas
- the development of competition in the natural gas market.

In 2010, the Law of Ukraine "On Principles of the functioning of the Natural Gas Market" was adopted, according to which free and equal access to the gas transmission system should be provided for the purposes of gas supply to Ukrainian consumers and the purposes of transit of gas through the

[133] On Approval of the Provision on the National Commission for State Regulation in the Spheres of Energy Production and Communal Services: the Decree of the President of Ukraine dated September 10, 2014, No. 715/2014. Legislation. [Electronic resource] – Available at: http://zakon2.rada.gov.ua/laws/show/715/2014

territory of Ukraine. This means that Ukraine must ensure the transit of gas through its territory to all interested economic entities that have appropriate permits.

The Law of Ukraine «On Oil and Gas» regulates the economic activity of extractive companies[134], and the Law of Ukraine "On the Natural Gas Market" extends to extractive companies only under the circumstances when they begin to sell the extracted natural gas in the market as a wholesale supplier (trader) or supplier. Extractive companies sell natural gas at unregulated prices, except when they are assigned special duties. By a decree of the Cabinet of Ministers dated 1.10.2015, No. 758[135], the state company PJSC "UkrGazvydobuvannya" was obliged to sell natural gas to NJSC “Naftogaz” at a regulated price.

A wholesaler is an entity that carries out economic activity in the sphere of sale and purchase of natural gas in the wholesale market. It makes the purchase of natural gas from domestic extractive companies or traders, as well as foreign extractive companies or traders. A trader sells natural gas to another wholesale buyer or supplier on the basis of a sales and purchase agreement and operates without the need for a licence. The absence of the necessity for licensing a trader's activity is related to the fact that the parties of the market relations are considered qualified actors of the market and therefore they are in the same negotiating positions.

A supplier is an entity that owns the right to retail sales of natural gas to final consumers. The supplier is also responsible for the physical delivery of natural gas to the final consumer, and thus it owes a duty to the transport operators to keep the balance of the system. The supplier buys natural gas from Ukrainian extractive companies, traders or foreign counterparts abroad. In order to fulfil the functions of a supplier, one needs to obtain a special

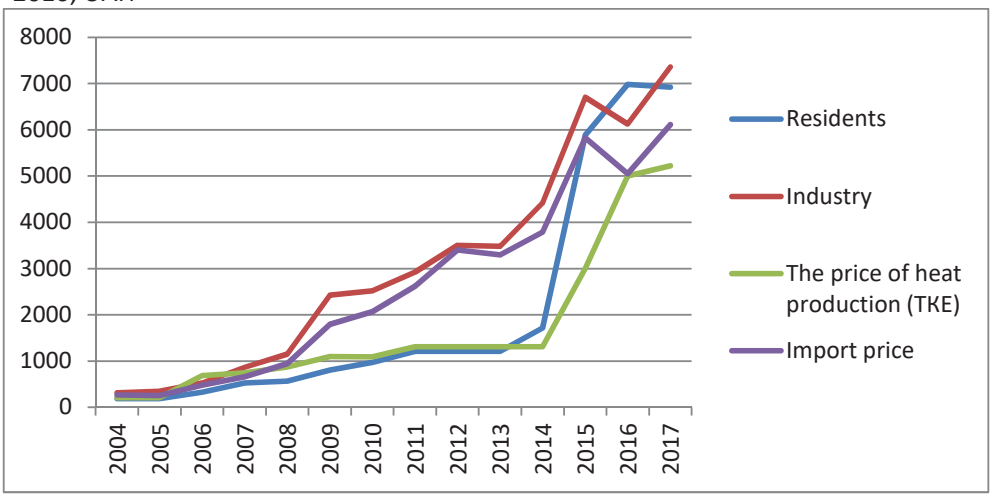
[134] Law of Ukraine "On the Natural Gas Market". Legislation. [Electronic resource] - Available at: http://zakon5.rada.gov.ua/laws/show/2665-14

[135] The resolution of the Cabinet of Ministers dated 1.10.2015, No. 758. Legislation. [Electronic resource] – Available at: http://zakon5.rada.gov.ua/laws/show/758-2015-%D0%BF

licence. The sale of natural gas to final consumers is based on the conclusion of standard contracts, approved by NCRECS. The interaction with other entities of the market takes place on the basis of compliance with the norms of the Law of Ukraine "On the Natural Gas Market" and complies with the rules of natural gas supply.

Regulation of prices and tariffs. Up to now, prices have been subject to strict state regulation and have been set for different categories of consumers at all stages - from extraction to the supply of gas to final consumers. The National Regulator (NCRECS) approved retail gas prices for households and enterprises of CH, marginal prices for gas for industry, tariffs on transportation, distribution, supply of gas, prices at which the state-owned company NJSC "Naftogaz of Ukraine" bought and sold Ukrainian gas to consumers (Figure 1).

Figure 1. Dynamics of natural gas prices for various categories of consumers in 2004-2016, UAH



Source: calculations are based on data from the State Statistics Service of Ukraine, NJSC "Naftogaz of Ukraine", and "Ternopilmiskgas".

The gradual increase of prices for various categories of consumers to an economically justified level has a significant consequence for the development of competition and for obtaining economically more favourable and quality

services by consumers. By October 1, 2015, it was envisaged that the supply of natural gas to final consumers could be either regulated or unregulated. In December 2015, in Ukraine, about 200 companies were licensed to supply natural gas at unregulated tariffs, and 49 companies were licensed to supply natural gas at a regulated tariff (oblagaz).

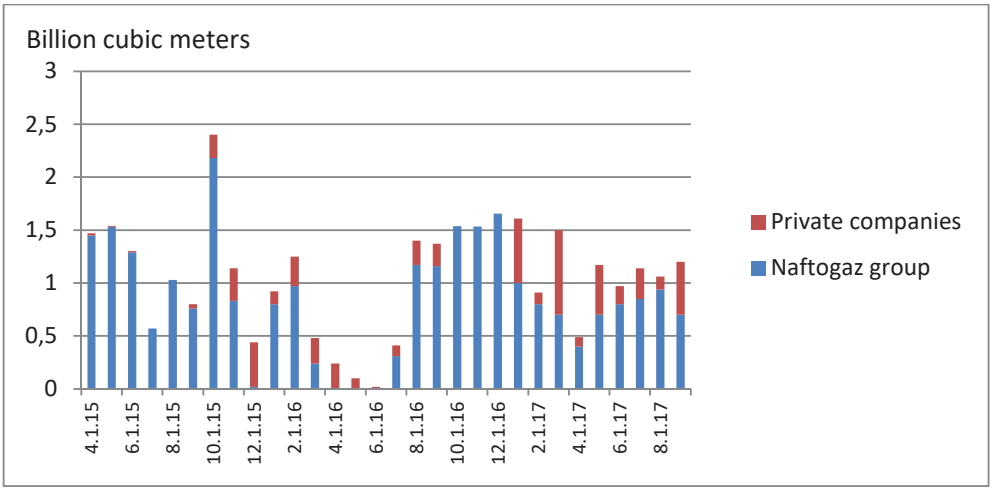
For 2015, Ukraine used 33.8 billion cubic meters of natural gas, of which NJSC “Naftogaz of Ukraine” sold to end consumers 20.5 billion cubic meters, which was about 61% of sold products.

Similar market transformations at this stage of development are characterized by the parallel existence of three types of contracts: short-term (delivery within a month); medium-term (delivery within 1-12 months); long-term (delivery for more than one year).

The advantage of short-term contracts for the supply of gas is that they allow consumers to meet unforeseen needs, provide sufficient flexibility to achieve the physical balance between demand and supply in the short run. However, the main advantage of such contracting is the ability to achieve a decrease in expenses due to the constant search for a gas source at the lowest price (Figure2).

The introduction of market prices for all categories of consumers should eliminate the imbalance between NJSC “Naftogaz of Ukraine” and, accordingly, the state budget, even with the significant subsidization of consumers and state support for implementing energy efficiency measures for the least secured categories of the population. The final financial effect of establishing market prices lies in the fact that the budget will not carry the burden of indirect subsidies to wealthy households due to the equalization of prices for industry and population, the corrupt component will disappear, and, the costs of the public debt management will be reduced in absolute terms.

Figure 2. The ratio of natural gas imports from European countries by private companies and NJSC “Naftogaz of Ukraine”, billion cubic meters



Source: Calculations are based on data from the State Statistics Service of Ukraine, NJSC “Naftogaz of Ukraine”.

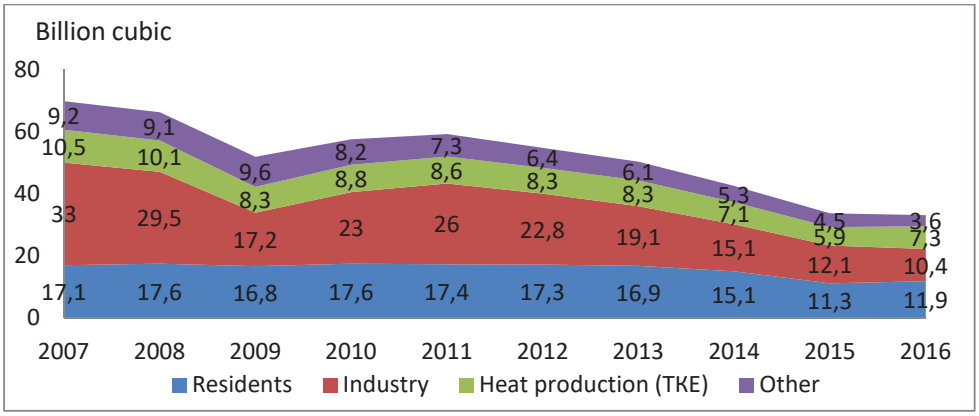
For previous periods, Ukraine has inherited a habit of using cheap energy sources, which does not encourage to save energy, especially in a situation, where the ability to cut physical consumption is limited due to the high level of wear of the housing stock. While there was a situation of low regulated prices, the cost of installing gas meters and heat modernization paid off over a considerable period of time, and therefore, there was no incentive to save energy. As a result, the natural gas consumption in Ukraine is higher, and the gas content of the national economy is 5 times higher than in the EU (Figure 3).

However, the situation in the segment of natural gas sales at an unregulated rate is particularly essential. In 2015, NJSC “Naftogaz of Ukraine” sold 30% (2.7 billion cubic meters) of the total volume of natural gas sales on this segment of the market, while other individual suppliers had:

- PJSC "Ukrnafta" - 17%;
- DTEK - 14%;
- Burisma Holdings - 13%;

- PrJSC «MC «Ukrnaftoburinnya»- 4%;
- Geo Alliance - 3%;
- JRX - 2%;
- Other private extractive enterprises - 17%.

Figure 3. Consumption of natural gas in Ukraine by consumer categories, billion m^3



Source: According to the National Commission for Energy Regulation and Communal Services

The fall in physical volumes of natural gas use by the population in 2014-2015 was due to a number of factors: an increase in the average temperature of the environment during the heating season; a rise in retail prices for natural gas; changes in consumption norms by households that did not have metering devices; an economic downturn.

The difference between the indicators of private companies and state ones is mainly conditioned by the fact that until recently, enterprises operating in the territories controlled by Ukraine have sold the extracted natural gas at different prices. Private gas producers in Ukraine sold natural gas at a price of 5.9 thousand UAH (about 270 USD) per 1 thousand cubic meters (before payment of rent), which approximately corresponded to the price of gas imports according to IV quarter of 2014. At the same time, the state-owned PJSC "Ukrgazvydobuvannya" received 1590 UAH (about 73 USD) per 1 thousand cubic meters of gas (before payment of rent). According to the data of NJSC "Naftogaz of Ukraine", the cost price for PJSC "Ukrgazvydobuvannya", which will

allow attracting investments for the development of new deposits and increasing production, is about 220 USD per 1 thousand cubic meters without rent payments. The gas extracted by Ukrgazvydobuvannya is used to satisfy the needs of Ukrainian households. NJSC “Naftogaz of Ukraine” imports the volumes of natural gas that are not enough to meet the needs of the population and preferential consumers at the market price.

On the other hand, a rise in the purchase price in PJSC "Ukrgazvydobuvannya" to the level of 4849 UAH per 1000 cubic meters has led to the situation when the price for domestic consumers is 6879 UAH for 1000 cubic meters. The price for gas for the population is set in the amount of 6957.9 UAH per 1,000 cubic meters, which is generally lower than for the households of European capitals.

In June, 2017, retail gas prices in the capitals of European countries were as follows (Table 1).

Table 1. Retail gas prices for the households in European capitals, hrn/m^3

№	Capital	Country	Retail price
1.	Stockholm	Sweden	72,53
2.	Copenhagen	Denmark	30,14
3.	Lisbon	Portugal	24,27
4.	Rome	Italy	24,05
5.	Vienna	Austria	22,25
6.	Amsterdam	The Netherlands	21,48
7.	Madrid	Spain	21,36
8.	Dublin	Ireland	20,79
9.	Paris	France	20,58
10.	Berlin	Germany	19,93
11.	Athens	Greece	19,15
12.	Ljubljana	Slovenia	19,03
13.	Prague	The Czech Republic	18,09
14.	Tallinn	Estonia	18,06
15.	Brussels	Belgium	17,60
16.	London	Great Britain	16,42

17.	Bratislava	Slovakia	14,18
18.	Luxembourg-Ville	Luxembourg	13,81
19.	Warsaw	Poland	13,78
20.	Vilnius	Lithuania	13,75
21.	Sofia	Bulgaria	13,00
22.	Zagreb	Croatia	12,38
23.	Riga	Latvia	12,23
24.	Budapest	Hungary	10,27
25.	Belgrade	Serbia	9,53
26.	Bucharest	Romania	9,09
27.	Capitals of the EU	On average	19,52
28.	Kiev	Ukraine	6,96

Source: authors' own calculations

It is clear that taking into account the average household income in these countries, the price situation in the gas market would look different for them, but in absolute terms, the price of gas for households in Ukraine is one of the lowest in Europe. Therefore, one can understand the EU requirement to raise prices for natural gas in Ukraine.

The increase in the purchase price of natural gas at PJSC "Ukrgazvydobuvannya" in 2016, on the one hand, was intended to overcome the crisis in gas production by a state-owned company. It will provide an opportunity to attract investments to achieve the target indicator of natural gas production in the amount of 20 billion cubic meters by 2020. The price structure is composed of: the cost of purchasing gas from PJSC "Ukrgazvydobuvannya", import – 71%; the margin of NJSC "Naftogaz of Ukraine" - 1%; an average weighted distribution tariff (private operators GDM) – 7%; an average weighted tariff on main transportation ("Ukrtransgaz") – 3%; the cost of delivery (private gas suppliers) – 1%; value added tax (State Budget) – 17%.

The member states of the Energy Community are gradually integrating into the energy market of the European Union, where one is trying very hard to introduce mechanisms that will promote the gradual equation of gas prices throughout the EU. Such integration should lead to the formation of

competitive, transparent, balanced energy markets, which will encourage the constant attraction of necessary investments. Thus, Ukraine's membership in the Energy Community is not only an international obligation, but also an event that is directly relevant to its own national interests.

Furthermore, the most significant benefits for Ukraine consist in the fact that using the conditions of functioning of the Energy Community, it can achieve transparency and increase (introduce) competition in the national gas market, which means to provide consumers with the free choice of gas suppliers, obtain market and more competitive prices, increase safety of transportation and gas supply, as well as diversify gas supplies to Ukraine.

At present, there is a redistribution of volumes of gas production between the companies of NGSC “Naftogaz of Ukraine” and private companies. The emergence of non-state-owned joint enterprises in the gas market at the beginning of the new century, and in 2010-2014 the emergence of private gas-extracting companies, have contributed to the increasing competition in the gas market. This can be considered a positive factor, since private owners are more efficient owners in comparison with the state ones, and they invest in gas extraction by increasing the volumes of extraction. However, the activity of private gas companies, among which there are numerous representatives of the government, and the attitude of regulatory bodies to them, raise many questions. This emphasizes the need to strengthen state control over granting permits for gas extraction.

Table 2. The extraction of natural gas by enterprises of Ukraine, mln. m^3

Enterprises	2012		2013		2014	
	volume	%	volume	%	Volume	%
Gas extraction, mln. м³	20191,5	100,0	20998,2	100,0	20510,4	100,0
NJSC «Naftogaz of Ukraine»	18208,1	90,18	18663,2	88,9	17195,0	83,8
«Ukrgazvydobuvannya»	15023,09	74,4	15109,3	72,0	15115,4	73,7
«Ukrnafta»	2010,53	10,0	1903,16	9,1	1739,8	8,5
«Chornomornaftogaz»(Crimea)	1174,46	5,82	1650,74	7,8	339,8	1,6
NJSC «Nadra Ukrainy»	30,661	0,10	24,108	0,05	10,832	0,05
Other enterprises, including:	1983,38	9,82	2334,96	11,1	3315,2	16,16
JV Poltava Petroleum Company	264,599	1,31	222,487	1,06	248,554	1,2
«Naftogazvydobuvannya»	645,228	3,20	505,712	2,4	750,458	3,66
«Esko-Pivnich»	185,301	0,92	433,233	2,06	584,935	2,85
PJSC «Natural resources»	206,588	1,03	291,919	1,4	252,748	1,23
«Kub-Gaz»	200,260	0,99	282,137	1,34	336,047	1,64
“Ukrnaftoburinnya»	116,007	0,57	136,553	0,65	170,146	0,83
PJSC «Ukrgazvydobutok»	82,107	0,40	97,63	0,46	116,202	0,57
PJSC «Plast»	38,816	0,19	39,182	0,14	48,949	0,24
JV«UkrKarpatOil»	29,641	0,15	30,168	0,13	29,232	0,14
«Regal Petroleum»	74,535	0,37	69,261	0,33	57,697	0,28
«Devon»	25,605	0,13	46,736	0,22	42,739	0,20
Sirius -1	-	-	44,743	0,22	87,175	0,42
«First Ukrainian Oil and Gas Company»	1,719	0,01	2,252	0,01	75,480	0,37
«Gravelit-21»					171,8	0,84

Source: authors’ own calculations

As a rule, private enterprises operate on already developed, effective deposits with favourable mining and geological conditions. State resources were spent on the development and arrangement of these deposits, as most of the deposits had been developed when the presence of private enterprises in the oil and gas industry had been limited. At that time, private enterprises worked as part of joint enterprises only on depleted deposits of the last stages of exploitation, where oil and gas extraction required the use of new technologies and, accordingly, investments.

Private and state-owned enterprises operated in the energy market of Ukraine under unequal conditions. State-owned enterprises were forced to supply all the extracted natural gas to gas storage facilities for selling it to the population and certain state institutions at regulated prices, which resulted in the accumulation of losses of gas-extracting enterprises. Private enterprises sold gas to legal entities at market prices, which were much higher.

Problems of rent tax. One of the possible tools and sources of funds to ensure market transformations of the gas sector of Ukraine can be a rental component. Natural rent as an economic category is an income from public ownership of mineral resources. By its nature, the rent is "something that is not earned by labour and capital, but provided by Nature," and that is why it cannot be appropriated by an enterprise, but must be withdrawn and used for the benefit of society as a whole, namely, to ensure the transition to sustainable development of the economy.

Many scholars dealing with rental taxation substantiate the need to establish differentiated rates for rent payments, [136] as stipulated by the Law of Ukraine "On rent payments for oil, natural gas and gas condensate". Now, this Law has been cancelled. Taking into account the experience of foreign countries, the rent can be used as a source of funds accumulation for solving the problem of long-term development on an innovative basis[137] that is

[136] Danylyshyn B.M, Mischenko V.C. The rent policy in Ukraine / B.Danylyshyn, V.Mishchenko // - Kyiv, CSPFNASofUkraine, 2004. - 67 p.
[137] Kvasniuk B. Ye.– Rent and rental relations in Ukraine /B.Kvasniuk // Economic Theory. – 2004. - №1.-p.9-23.

sustainable development, the reformation of natural monopolies. In this case, the natural resource rent should be considered as "unearned" part of incomes, super-profits of users of subsoil resources, working in a*lready developed, highly efficient deposits with favourable mining and geological conditions.*

The Constitution of Ukraine proclaims that people have the right of ownership of natural resources; they can own, use and manage the country's natural resources, and the rent, (rent income) as an economic category, characterizes any income received on a regular basis from the use of natural resources and does not depend directly on the results of economic activities. Since the extraction of natural resources is associated with contamination of the plots of land on which the extraction process is being carried out and pollution of the environment as a whole, this causes the need to accumulate funds for their recovery, one of the sources of which can be the rent. Nowadays, the state owns subsoil resources, and this is not only about privileges, but also about responsibility; first of all, responsibility for the rational use of natural resources, which are unique and difficult to renew by their nature. The state exercises this right by issuing licences for the development of mineral deposits (in particular, oil and natural gas) to extractive enterprises that proved themselves to be good before and that have new resource-saving technologies.

Usually, the state solves such problems through the mechanisms of rent taxation, but NJSC “Naftogaz of Ukraine”, which must represent and protect the interests of the state in the oil and gas market, cannot handle these functions. The current system of rent payments in the field of hydrocarbon extraction does not take into consideration the features of the oil and gas industry in Ukraine, which is characterized by a variety of mining and geological conditions for the development of oil and gas fields, about 70% of which are in difficult mining and geological conditions and have a low hydrocarbon output.

The state as the owner of natural resources should receive benefits from the rent and replenish the budget, including at the expense of incomes from rent payments of the extractive enterprises, but the basis of this should

be a regulatory, and not just a fiscal approach. It is necessary for the extractive enterprises investing enormous resources in the exploration of natural resources, the preparation of deposits for industrial use, and which possess substantial privileges in the production technology, not to be put by the current tax system and the existing legislation in worse economic and legal conditions compared with other enterprises and institutions (for example – commercial or financial ones).

Certain economic levers for the development of such deposits were foreseen by the Law of Ukraine "On rent payments for oil, natural gas and gas condensate". The system of lease payments introduced by this Law on the basis of the differentiated method helped to stabilize the production of hydrocarbons in old, small- and low-yield deposits and deposits with significant depth of location, which would allow taking into account different expenses of enterprises in accordance with the conditions of extraction.

In addition, overbased volumes of oil, natural gas and gas condensate extracted from deposits that were approved by the Cabinet of Ministers of Ukraine as those having problematic and exhausted reserves, could be exempted from taxation by rent payments. This encouraged domestic oil and gas companies to increase volumes of hydrocarbon production, ramping up overbase volumes of extraction, and, accordingly, saving state budget funds that were spent on the import of oil and gas. However, this Law was not fully implemented because its effect was suspended by the Laws of Ukraine "On the State Budget of Ukraine" in 2004 - 2009, and on the basis of the Law No. 2275-VI (2275-17) dated May 20, 2010, the Law was no longer in force.

During the reformation of the tax system, the Law of Ukraine "On rent payments for oil, natural gas and gas condensate" was abolished. This law introduced a rent payment in a differentiated manner, depending on the types and conditions of the extraction of resources, the characteristics of the deposits and the labour intensity of the extraction processes, which created incentives for enterprises to continue their exploitation of depleted

deposits[138]. Since 2011, rental functions have been transferred to a tax on subsoil resources use, which, both in terms of content features and the tax base (per unit of extracted resources in tons of oil and gas condensate or thousands of m^3 of gas) did not correspond to the main task of the OGC – to increase the production volumes of resources. Further reformation of the tax system has led to the unification of all environmental, rent taxes and the tax on the use of mineral resources in a single rent payment with the presence of the same defects of its charging i.e. the tax base that does not stimulate to increase the volume of production and the absence of any benefits in the process of extracting from exhausted deposits. The very notion "exhausted deposits" was cancelled. Since 2015, the basis for charging rent payments by the Tax Code of Ukraine was the volume of commodity products extracted from depths up to 5000 m and more than 5,000 m. The tax rates take into account only the type of resource (natural gas, oil, gas condensate) and the category of consumers - the population or legal entities. On natural gas, the tax rate of rental payment for households is 70%, for commercial consumers - 55%. At the same time, different expenditures on the extraction in separate deposits are not considered; hence, it is not beneficial for enterprises (usually state-owned ones) that work in more depleted fields, to extract all possible hydrocarbon resources, including associated (oil) gas and gas condensate due to high labour costs. This phenomenon, as well as the redistribution of productive deposits of natural gas in favour of private enterprises, caused a reduction in the production of hydrocarbons by the enterprises belonging to PJSC “Naftogaz of Ukraine”.

At the same time, different extraction expenditures were not taken into account, and one did not pay attention to the fact that state-owned enterprises operated in more depleted fields, that is why it was not advantageous for them to extract all possible hydrocarbon resources, spending on it both time and additional funds. This situation put enterprises in

[138] Lapko E.A. Rent and problems of its use in Ukraine / E.A.Lapko, S.B.Pedko.Tax burden: problems of science and practice: Monograph under editorship of Ivanov Yu.B. – Kharkiv: PH "INZHEK", 2006. - p. 176 - 193.

different conditions of existence, which led to a drop in oil and gas production in low-yielding fields, and it practically stopped the production of gas condensate and associated (oil) gas. Thus, the system of rental relations pushed enterprises to cease exploitation of unprofiTable deposits, since there were no incentives for those enterprises to invest in their development, which was not in line with the state's desire to improve the energy independence and security of the state by increasing the volumes of hydrocarbon production in Ukraine.From January 1, 2015, the Tax Code of Ukraine determined that a newly introduced concept of "rent payment" would substitute all taxes related to the use of subsoil resources, including environmental tax. Rent payment rates remained the same as for the tax on the use of natural resources.

Since 2015, regulated gas tariffs have been abolished and all enterprises, regardless of the form of ownership, have been able to sell natural gas at market prices. The rent rates for gas production for the population have been raised from 20% to 70% (from deposits up to 5 km) in order to attract additional revenues to the state budget, which should be aimed at direct support of low-income households, as well as increase net revenues of gas extraction companies that will be used for further development of the industry. The rent rate has amounted to about 55%, and it has remained at the level of 28% for deposits at a depth of 5,000 m. Given that the cost price of gas production is uneven and ranges from 243 UAH to about 30 USD then, even under such circumstances, enterprises will keep a significant amount of profits. However, the rental system itself is incorrect because it does not consider its content and purpose.

Taking into account the aforementioned, we find it necessary to leave two types of taxes instead of existing rent payment today: natural resource (mining) rent and payment for the use of subsoil resources. Their unification into a single tax is not correct, since natural rent by its nature is an income from the public ownership of the subsoil, and it should be regarded as an "unearned" part of incomes, the super-profits of subsoil users, who work in already developed fields with favourable mining and geological conditions. The basic principles and terms of its charging were defined in the Law of

Ukraine "On rent payments for oil, natural gas and gas condensate". The use of withdrawn funds should benefit society as a whole; therefore, they should go to the state budget and be one of the main sources of financial support for the reformation of natural monopolies.

They should ensure the interest of extractive companies in developing deposits, not only with favourable mining and geological conditions, but also with complex ones, and they have to respond adequately to changes in market prices for hydrocarbons. For Ukraine, one of the ways of building a system of rental relations that would ensure sTable revenues to the state budget and at the same time maintain the conditions and incentives for the continuation of the development and exploitation of all oil and gas deposits without exception, is the establishment of economically justified rent payments depending on the price of sold products and their differentiation depending on various mining and geological conditions for the development of deposits. It should be noted that there is a lack of funds for financing geological exploration, aimed at providing an additional increment of hydrocarbon reserves in the oil and gas industry. Consequently, the only way to increase the volume of oil and gas extraction is to create beneficial tax conditions for enterprises operating in the OGC.

The market participants that want to carry out economic activities in the gas market require the establishment of a general regulatory framework, which necessitates adopting appropriate requirements of the criteria for ensuring these functions in the market. It is provided by licences or other permits issued by state authorities of the corresponding jurisdiction; by agreements on the transfer of gas with gas transport operators.

Licensing should be understood as permission from a relevant government body to carry out certain economic activities in the market. In this case, a licence serves as an agreement, a contract between the state and the economic entity, in which the state certifies the compliance of the subject of economic activity with the established requirements in the market. Doing this, the state, represented by some relevant bodies, establishes and controls a certain qualitative threshold of functioning of the market, which should

ensure its security, transparency and openness. Network users intending to get access or provide the necessary throughput capacity in the gas transmission network, conclude agreements with TSO for these services. If the main purpose of licensing is the protection of end-users, then the main goal of making contracts with TSO is to ensure business processes in the market.

Nonetheless, one of the main objectives of these reforms is to increase competition between different suppliers: both between gas distribution companies and between energy and gas companies in general.

Conclusions. The liberalization of the national gas market leads to a change in the functions of the state from managerial to predominantly regulatory ones, which focus on control over prices and pricing through the regulation of profit rates, the establishment of a mandatory level of cost efficiency, the formation of a transparent methodology of pricing and tariff setting for all market actors; control of the quality of products or services with the definition of new standards and requirements for the technical quality of transportation and supply services, the formation of market functioning rules in accordance with the target model, which takes place by means of creating the appropriate normative and legal framework and the adaptation of the organizational and functional structure of market institutions; the regulation of the functional separation of the market entities activity and cross-border cooperation, which necessitates the harmonization of the internal environment with European requirements and practices.

The impact of integration factors has caused significant resulting changes in the institutional environment and the market structure, which are manifested in reducing the dependence on the monopoly provider of natural gas imports and the development of competition through diversification of sources of supply, achieving security by means of improving requirements for the quality of supply; the refusal of state regulation of manufacturer's transfer prices and prices in the wholesale gas market, dividing natural monopolies into potentially competitive market segments, introducing non-discriminatory access to gas transportation systems and creating incentives for the

emergence of new market participants, which was conditioned by the implementation of the factor reducing the barriers to trade in natural gas.

The priorities of state policy in the sphere of transportation and supply of natural gas are ensuring availability and high quality of services at market prices, taking into account the principles of safety, reliability, transparency, openness and market liquidity. The analysis of the international experience and the institutional environment in the domestic market has shown that licensing and typical contracts with transport operators are effective means of implementing state policy. Hence, the transformation of the Ukrainian gas sector necessitates adapting the permit system according to the new market conditions.

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INNOVATIVE DEVELOPMENT OF TERRITORIAL COMMUNITIES IN THE FOURTH TECHNOLOGY REVOLUTION: PRIORITIES AND PROSPECTS

Abstract. The issue of the analysis and implementation of modern models and scenarios for the innovative development of territorial communities in the context of the transition to the fourth technological revolution and the likely scenarios for Ukraine are acquiring at the present stage of development the paramount importance. There is a need for forming the main directions of the systemic approach to modeling the process of integration of territorial communities into the ecosystem space declared by the international community on the basis of the experience of developed foreign countries concerning integrating diverse and complex innovative technologies into national innovation systems, which are united on a planetary scale into a network infrastructure on the basis of digital assets.

In this context, there is a need to consider some theoretical approaches to the modeling of territorial communities, to analyze factors and potential results during the construction of management systems with the help of innovative development of territorial communities through the implementation of relevant functions and a holistic view of the processes, resources, objects (infrastructure) of innovation activities that form an innovative basis for the development of appropriate development strategies.

JEL Classification System: R110, R 190, R 220, R 580.

Key words: Big Data, Blockchain, Internet of things, information technology, digitizing European industry, National system of innovation, regTech digital rights, management Artificial Intelligence, virtual reality quality of service.

Introduction. Modern innovative technologies such as cloud technologies, modern methods of collecting and analyzing large data sets (Big Data), crowdsourcing, biotechnology, unmanned cars and medicine, cryptovolume and Blockchain technologies radically change the whole sectors of the economy. Based on these technologies, the digital revolution goes into the fourth industrial revolution (Fourth Industrial Revolution, Industry 4.0), the

essence of which is the massive introduction of cyberphysical systems into production, which erases the boundaries between the physical, digital and biological spheres, and the emergence of a completely new type of industrial production, which is based on the processing of a large array of data to achieve complete automation of production and the implementation of the latest scientific and technological achievements in technological processes. It is anticipated that these cyberphysical systems will be integrated into a single self-regulated network, communicating with each other in real-time mode and promoting radically new methods of interacting in the process of creating added value.

The implementation of the policy of social and economic reforms in the state and the change of the approaches to the formation of regional politics in the context of the intensification of European integration processes and the spreading of the Internet of Things (further - IoT) as a concept of space, where the real and virtual worlds integrate, have caused the need for concentration of resources on the main forecasting models and scenarios that will have a systemic and long-term impact on sustainable and innovative development of territorial communities.

However, the development of communities at the present stage is accompanied by a number of structural threats and challenges in the national and regional dimensions that require a systemic solution and depend on considering uncertainties associated with climatic, socio-economical and managerial conditions that influence decision-making process concerning the effectiveness of usage of the territorial resources. Article 142 of the Constitution of Ukraine defines the territorial resources of communities and the material and financial basis of local self-government as movable and immovable property, revenues from local budgets, other funds, land, natural resources owned by territorial communities of villages, settlements, cities,

town districts, as well as the objects of their common property, which are under the management of district and regional councils[139].

One of the main principles and mechanisms of the action of the self-governing bodies, approved in the European Charter, is the decentralization of power and the application of the principle of subsidiarity in the territorial communities. The Constitution of Ukraine defines the exclusive ownership of the territorial communities of the village, settlement, city, that is communal property (Articles 13, 14, 142), which both legally and economically acquired features of an independent form of ownership - the right of a territorial community to own, expedient, economical, and efficiently use and to dispose of the property belonging to it, both directly and through local governments, at its discretion and in its interests[140].

Ukraine has all the necessary conditions for the sustainable development of territorial communities with high added value - strong industrial traditions, along with a developed industrial base, allow today to have positive results in the implementation of the "smart" specialization approach, but the lack of a strategy and distinct future priorities for the development of innovation in Ukraine pull back the development.

The creation of centers of competence, business climate and the implementation of innovative ideas in territorial communities is considered as a priority task at the present stage of the development that requires the implementation of systemic economic decisions in accordance with the best European and world practice that embrace polictics, processes, methodologies and tools for maintaining access to information surroundings based on open systems (Open Systems, OSI) correlation model and define network connections with other systems.

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[139] The Constitution Of Ukraine: The Supreme Council, the law since 28.06.1996 № 254к/96-ВР [Electronic resource]. – Access : http://zakon2.rada.gov.ua/laws/show/254%D0%BA/96-%D0%B2%D1%80

[141] About the local self-government: the law of Ukrainesince 21.05.1997 № 280/97-ВР http://zakon3.rada.gov.ua/laws/show/280/97-%D0%B2%D1%80

The formation of a common digital capital market and the united market for consumer services in the territorial communities necessitates a prompt revision of existing standard solutions to stimulate new business models, programs and processes based on startups of secure regulatory communications platforms (RegTech) designed for the usage of distributed resources, connection of internal and external networks of all sectors of economics and their identification on the basis of the mechanism of commercialization of intellectual property of network infrastructure in the digital asset market as the basis for building a digital economy in a non-tariff way in the future.

In international practice, the proactive management of innovation in the territorial communities is the main driver of sTable long-term community competitiveness, which includes all phases from the visualization of the context-based scenario to the realization of specific business models, and requires a systematic approach to the process of integration of territorial communities into the ecosystem space declared by the international community in those sectors, where there is potential for the creation of new markets based on the IoT and the common consumption economics, which function as a new economical geopolitical formations of the integration of diverse and complex technologies in the National System of Innovation (NSI), and are united on a planetary scale into a networked infrastructure based on digital assets.

In accordance with the international asset management standard ISO 55000: 2014 (EN)[141], an asset is treated as an element, thing or object that has a potential or actual value in material and physical subjects as well as in immaterial assets. The series of standards ISO 55001[142], ISO 55002[143] and ISO 55000 regulates the requirements for the management of any assets and their

[141] ISO 55000:2014(en)Asset management — Overview, principles and terminology [Electronic resource]. – Access:https://www.iso.org/obp/ui/#iso:std:iso:55000:ed-1:v2:en

[142] ISO 55001:2014 Asset management – Management systems – Requirements [Electronic resource]. – Access : https://www.iso.org/standard/55089.html

[143] ISO 55002:2014 Asset management – Management systems – Guidelines for the application of ISO 55001[Electronic resource]. – Access: https://www.iso.org/standard/55090.html

maximum usage, including the local communities. Digital asset management requires the inextricable linkage of the ownership of the digitized object based on the chosen digital rights management method (DRM), while providing access for those who have been granted access rights to such access[144].

Technological development of network segmentation and sectoral decentralization of territorial communities is of paramount importance for the digital transformation of society. The digital economics is regulated by the parameters of digital quality of the electricity. The modernization of the grid infrastructure basedonsustainable energy systems in accordance with national circumstances, needs and priorities, taking into account international commitments to mitigate climate change effect and achieving the goals of sustainable development, contributes to the flow of important investment and is an important part in removing the existing shortage of resources, which, in turn, necessitates the simulation of the development of territorial communities based on the scenario studies tested by the international practice of the formation of modern innovation network infrastructure that changes the dynamics of production and transforms the network into a 3Ds system - more digitized, decarbonized and decentralized (digitalisation, decarbonization and decentralization). The planning of such a system in 3D format requires the definition of key tasks and system infrastructure decisions of local governments and civil society to ensure the effective implementation of policies, processes, methodologies and tools to support access to network infrastructure based on the distribution of quality software services for consumers (Software-as- a-Service, SaaS). Enterprises that have access to large amounts of data will be able to radically improve the quality of the decisions made on their basis, which is primarily related to banking, legal services, insurance, accounting and reporting, management, consulting and auditing, metrological support, health protection and so on.

[144] DAM Survival Guide: Digital Asset Management Initiative Planning (English Edition)[Electronic resource]. – Access: https://www.amazon.fr/DAM-Survival-Guide-Management-Initiative-ebook/dp/B008BV879G

The initiatives within the digital technology market relate first of all to cybersecurity, the 5G format, regulatory norms to achieve the goals of sustainable development, taking into account the specifics of national development. The concept of sustainable development of the "smart" community means the effective development of a community that meets the needs of the present generation without compromising the ability of future generations to realize their own needs based on intellectual management and integrated information and communication technologies with the active participation of citizens.

The transition of territorial communities to high-tech economic development based on the Industrial Internet of Things (IIoT) is considered as an association of smart machines ecosystems, digital systems and people capable of conducting production operations at a new intellectual level. First and foremost, *IIoT* is aimed at providing reliable protection against unauthorized interference during network attacks, expansion of transformational security capabilities, and ensuring the dominance of the intellectual component. First and foremost, PIR is aimed at providing reliable protection against unauthorized interference during network attacks, expansion of transformational security capabilities, and ensuring the dominance of the intellectual component. The use of 5G as a new technological component for industrial facilities is in line with the principles of the strategy stated in the Industry 4.0 doctrine and indicates the emergence of a new class of cyber-physical industrial Internet management systems with features of informational and functional security.

The world is now moving to a new era of digital globalization, to more holistic transformations, from digital products and infrastructure to digital divisions and web strategies based on digital self-monitoring technologies, analysis and reporting technology in network infrastructure. n developed countries, the management of industrial objects is carried out using digital technologies, Internet energy, complemented reality systems, Artificial Intelligence (AI), voice recognition, virtual reality (VR), etc. For example, in the UK, companies that create alternative fiber optic and wireless networks

(Altnets) stimulate investment in industry by reducing tariffs on new networks with ambitious targets for reaching 50% of the population and enterprises by 2025. According to international experience, territorial communities initiate the use of local energy resources and network infrastructure creation to expand the tax base, improve energy supply and address the need for expanding services. Such an approach requires a reliable network infrastructure - integrated energy systems that optimize efficiency and reduce costs based on scenario studies of innovative ways to control the stability of the network infrastructure, taking into account the nation-wide integrated energy model. Ukraine should become a full member of the energy distribution system, which connects the population with local and wholesale energy markets on the basis of modern technologies, modern developers of which are large infrastructure and technology companies, including Schneider Electric, Siemens, S & C Electric and GE and others. However, the growing globalization of markets and the progressive internationalization of business based on the new generation of information technology leads to complications in planning and managing network infrastructure and Quality of service (QoS) and requires, first of all, to determine the optimal structure of the domestic network, process planning in domestic network infrastructure as well as in local area networks of territorial communities in combination with a global network of choice of optimal capacities, etc.

Ukraine's commitments on overcoming climate change, reducing greenhouse gas emissions into the atmosphere require large-scale and rapid investments to create a new innovation infrastructure of the territorial communities. To fund global events, the World Bank and the United Nations have created a new Invest4Climate platform, which brings together national governments, financial institutions, investors and international banks to support reform policies and attract private investment in deploying a "smart" network infrastructure.

The system-wide model of state-management innovation activity for the formation of capable territorial communities in Ukraine, their coherent orientation of network access to resources and the establishment of

cooperation is implemented taking into account the current legal[145] framework and conceptual approaches outlined in the European Charter of Local Self-Government, which guarantee political, administrative and financial independence of municipalities[146]. From a conceptual point of view, a "reasonable" territorial community, as defined by the British Standard Institution (BSI), is considered as "an effective integration of physical, digital and human systems in an artificially created environment to provide citizens with a sustainable and prosperous future." In the forecast of the National Intelligence Council of the United States on the development of the world by 2035, the growing role of local authorities in managing social needs in the context of global economic challenges[147] is highlighted. Local governments, for example in the United States, focus primarily on solving issues concerning the question how clean energy can help them meet different energy, economic and environmental goals. The growth of economic activity (measured as a gross domestic product) is historically linked to an increase in electricity consumption, as the population grows and produces more goods and services. The economic and achievable potential is defined as the energy savings that can be achieved relative to the theoretical maximum that is calculated as the

[145] About the Principles of State Regional Policy: the law № 156-19 since 05.02.2015 [Electronic resource]. – Access :http://zakon2.rada.gov.ua/laws/show/156-19; About stimulating the development of regions: the law 2850-15 since 02.12.2012 [Electronic resource]. – Access: http://zakon2.rada.gov.ua/laws/show/2850-15; about voluntary association of territorial communities : the law 157-19 since 16.04.2017 [Electronicalresource]. – Access: http://zakon3.rada.gov.ua/laws/show/157-19; About Local Self-Government in Ukraine : the law 280/97 since 02.08.2017 [Electronic resource]. – Access:http://zakon3.rada.gov.ua/laws/show/280/97-%D0%B2%D1%80;State Strategy for Regional Development: the Decree of the Cabinet of Ministers of Ukraine 385-2014-п since 06.08.2014 [Electronic resource]. – Access:http://zakon2.rada.gov.ua/laws/show/385-2014-%D0%BF;National program for the development of small cities: the law 1580-15 від 10.06.2012 [Electronic resource]. – Access:http://zakon2.rada.gov.ua/laws/show/1580-15

[146] European Charter of Local Self-Government [Electronic resource]. – Access: http://zakon3.rada.gov.ua/laws/show/994_036

[147] Global Trendsparadox of Progress [Electronic resource]. – Access: https://www.dni.gov/files/documents/nic/GT-Full-Report.pdf

economic and technical potential of increasing energy efficiency[148] with the expansion of Behavioral, Retro-Commissioning and Operational Savings, BROs in residential, commercial, industrial sectors, water drainage, water / sewage, agriculture, mining, street lighting, military sector, government, distribution networks and behavior[149].

The transition to sustainable development of the territorial organization of power based on the principles of the International Energy Charter and the integration of regional energy markets on the basis of decentralization is one of the key directions of systemic social transformations in Ukraine and actualizes the need to increase the effectiveness of local government activities in managing innovative community development.

The theory of diffusion of innovations (Diffusion of Innovation, DOI), developed by E. M. Rogers, is one of the theories that explains the extension of an idea through a specific territorial community or social system, the ultimate result of which is that people as part of the social system adopt a new idea , behavior or product as new or innovative. Communities are dependent on changes in the information picture of the world, which determines the future global vector of development, but they are faced by an intricate task to combine this information space with the ontological design of community network infrastructure, modeling complex activities, managing key data and resources. First of all, it is about changing the philosophy of realizing global tasks in the regional, territorial dimension and forming an innovation model and scenarios for future community development, as the world moves from information technology (Information Technology, IT) to technology of large data sets (Data Technology, DT), cognitive technologies that fill the content part of the formation and development of the information environment, while technological platforms become appendices to geographical information

[148] For reference. The technical potential is considered to be an energy efficiency improvement at the expense of total energy, which can be saved by any measures of efficiency, and economic potential is considered as a sub-group of technical potential, which is considered cost-effective in comparison with energy production.

[149] Energy Economy [Electronic resource]. – Access :https://www.energy.gov/energy-economy

platforms. That is why the main issues of the jubilee report of the Club of Rome in 2017 became "the philosophical roots of the current state of the world", which is in danger under the influence of nuclear threat and "change of world outlook" as a way to salvation. Since innovation in territorial communities does not allow simultaneously accurately determine the coordinates and speed of planetary changes in accordance with the Heisenberg[150] uncertainty principle, which influence the efficiency of territorial resources and long-term development, therefore, in the overwhelming majority, the community as a kind of continuum[151] determines or expresses its strategic Vision by means of scenarios where macrocosmosis, society, energy fields, etc. are inherent in universal laws (not unity, non-linearity, fractality, etc.) that are considered as spatio-temporal coordination and the definition of causal relationships in accordance with the principle of complementarity as interaction in that part of economic cooperation, which allows to develop the form of technical and economic relations in the production of certain species goods and association of objects and forms of ownership, and which has signs of cooperation[152].

The formation of digital industrial platforms is an important prerequisite for the innovative development of territorial communities. The digital program for the transition to the innovative development of territorial communities should first of all provide broadband access; promotion of digital innovation; accelerating innovation in mobile financial services, e-commerce and related communities; increasing confidence and security in the digital economy, as well as the digitalization of industry. Creating and adapting digital industrial platforms to market realities is essential to ensure the required scale

[150] Heisenberg's uncertainty principle [Electronic resource]. – Access: http://elementy.ru/trefil/21096/Printsip_neopredelennosti_Geyzenberga

[151] For reference. Continuum (topology) is a coherent compact Hausdorff's topological space

[152] V. M. Heets Complementarity and contradictions in the social and economic modernization of Ukraine and Russia / V.M.Geets // Social and economic development of Russia and Ukraine: contradictions and complementarity / ed. R.S. Grinberg and V.M. Geitsa - Moscow: Institute of Economics, Russian Academy of Sciences, 2014.

and coverage of national and regional initiatives concerning industrial digitization and community ownership initiatives.

The deployment of new networks and services, primarily on the basis of 5G technologies, requires the adoption of Network Functions Virtualization (NFV) for the purpose of creating telecommunication services (services), the so-called virtualized network services (VNF) that allow using cloud computing infrastructure taking into account indus try standards based on ultrafast fiber optic networks and high-speed wireless broadband. The growing pace of innovation and changing business strategies now require flexible, cost-effective, cloud-based solutions. As enterprises gradually migrate to cloud services, it is very important that their business goals and security objectives are consistent and controlled.

In the EU, for example, on the one hand, the initiatives to build the future of digital industrial platforms are aimed at combining digital technologies, in particular, the formation of Innovation and Technology Tariff (ITT) of large data and cloud computing, autonomous systems, artificial intelligence and 3D printing into integration platforms that solve cross-sectoral problems, and on the other - to integrate convergent digital innovations into such industry platforms as: Factories of the Future (FoF), sustainable industrial development Explanations through the use of resources and energy efficiency (Sustainable Process Industries through Resource and Energy, SPIRE) and Bio-based Industries (BBI).

In this context, the Digitizing European Industry Initiative (DEI) aims to unite the efforts of common interests on the platform economy and to ensure future global standards for connecting smart enterprises (Connected Smart Factory) and involves investing in digital innovation capabilities based on the standards of information and communication technologies and the adaptation of the workforce by training human capital to acquire the necessary skills for digital transformation.

Interoperability is important for deploying IoT and unhindered flow of data across sectors and regions. However, as noted, the current fragmentation of IoT platforms creates a problem that requires targeted interaction between

commercial or non-profit platforms, for example, focusing on semantics and ontology and requires collaboration on common interfaces. Large-scale pilot projects help to test existing standards and support standardization activities at the international level, for example, such as global initiatives on intermodal interoperability standardization and the IoT (Standards for M2M and the Internet of Things, oneM2M).

Open standards with fair and non-discriminatory economic and legal conditions (fair, reasonable and non-discriminatory, FRAND) are necessary to provide business entities with access to new technologies and new business practices and serve as key elements of the platforms. The need to use them is to provide compatible solutions for a global standard initiative, such as oneM2M, W3C, etc., covering requirements, architecture, application programming interfaces (APIs), security and compatibility of technologies" Interoperability (M2M) and IoT and form the basis for supporting applications and services such as smart network, connected machine, home automation, public safety, health, etc.

The United European Digital Market Strategy envisages measures aimed at improving the standardization of ICT technologies, in particular with respect to five priority areas - 5G, cloud computing, Internet of Things, data technology and cybersecurity. The Single European Digital Market Strategy envisages measures aimed at improving the standardization of ICT technologies, in particular with respect to five priority areas - 5G, cloud computing, Internet of Things, data technology and cybersecurity. This strategic course is supported by regular monitoring, long-term political dialogue with all stakeholders, deepening cooperation with standardization organizations and strengthening international participation. In addition, ICT standardization is based on a balanced intellectual property rights policy for access to standard-essential patents (SEPs) based on Fair, Reasonable and Non-Discriminatory conditions (FRAND)[153].

[153] ANNEX Implementation of the Digital Single Market Strategy to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the Mid-Term Review on the

The convergence of various digital technologies leads to changes, in particular in the areas of IoT, large data sets, cloud computing, robotics, artificial intelligence and 3D printing, which help the industry respond to the major aspirations of modern customers, such as personalization, security and comfort, as well as energy efficiency and resource conservation[154].

Such innovations lead to greater interdependence between the progress of digital technologies and their use in various industries and require the creation of highly innovative digital sectors and the renewal of digital innovation capacity in all sectors. For this purposeseveral national and regional initiatives such as Industrie 4.0 (DE), Smart Industry (NL), Catapults (UK) and Industrie du Futur (FR)[155] have been launched to take advantage of the opportunities offered by digital innovation in Europe. For example, for Industrie 4.0 in Germany, the reference architecture for industry (Reference Architectural Model Industrie 4.0, RAMI 4.0) was created on the basis of the IEC 62264*[156]* standard for the integration of enterprise management systems, which promotes understanding of what standards are needed for the introduction of Industry 4.0. In particular, the IEC 62264 standard details the models: objects and attributes of production operations; Integration and management of production operations; service of messages and business, etc. In addition, in Germany, ProSTEP iViP has developed a catalog of compatibility criteria for infrastructures, interfaces, standards, architectures, and more. in

implementation of the Digital Single Market Strategy A Connected Digital Single Market for All {SWD (2017) 155 final}

[154] For reference. Energy saving according to The National Standard of Ukraine ДСТУ 2420-94. Energy saving. Terms and definitions are considered as activities (organizational, scientific, practical, informational), which is aimed at the rational use and economical use of primary and transformed energy and natural energy resources in the national economy and implemented with the use of technical, economic and legal methods

[155] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the RegionsDigitising European Industry Reaping the full benefits of a Digital Single Market {SWD (2016) 110 final} [Electronic resource]. – Access : http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX: 52016DC0180

[156] IEC 62264-5:2016 Enterprise-control system integration – Part 5: Business to manufacturing transactions [Electronic resource]. – Access:https://www.iso.org/standard/57308.html

the form of a code for product lifecycle management (PLM) (Code for PLM Openness, CPO)[157].

Examples of national and regional programs for improving the digitization of industrial production of territorial communities can also be the initiated initiatives "Produktion 2030" in Sweden, "Industry 4.0" in Spain, the industrial alliance "Industrie du Futur" in France, the Italian national industrial plan "Italy's National Industrial Plan" etc. China's manufacturing companies are also showing an interest in digitizing businesses, but another approach is used, relying more heavily on direct investments in European companies, in particular Krauss-Maffei, Stoll, Manz Group, and Kuka, which have a significant impact on them. China's investment level in relevant technologies exceeds the level of investment in the EU. China's popular programs are «Made in China 2025», which is considered to be the Chinese equivalent of Industry 4.0 and Internet Plus (IP).

In order to transform the industrial production management system in Ukraine, the implementation and realization of the digitization of the industry of the territorial communities should be aimed primarily at the development of mechanisms for adapting the country's economic system to the pan-European space and the implementation of projects of common interest, PCIs) and require collective efforts with the involvement of public and private stakeholders at the regional and national levels. For this purpose, in international practice, a framework has been defined for the identification, planning and implementation of PCIs based on the provision of a single, consistent regulatory framework.

The implementation of the Important Projects of the Common European Interest (IPCEI) in the production and creation of future digital industrial platforms, which require the development of reference ecosystem architectures and standardization, is of particular importance for attracting

[157] Code of PLM Openness [Electronic resource]. – Access : https://www.techniatranscat.com/about-techniatranscat/about-techniatranscat/code-of-plm-openness

large-scale investments in innovation spheres[158]. Technological innovations have already led to the reorientation of industry from mainframes to personal computers, the Internet on smartphones, global connectivity (compatibility) to integratation of the digital and physical worlds on the basis of digital platforms and ecosystems, where there is a need for digital security on a principle design according to design, taking into account devices, platforms and network infrastructure. The IIoT platforms, the large-scale pilot projects and test platforms currently being implemented in the EU, are now recognized as the best practices in the industrial environment and act as platforms for activation applications (platform activation applications, AEP). A striking example of the digital platform of connected enterprises today is the Smart, Safe & Secure, S3P platform, developed with the support of the French government, «Nouvelle France Industrielle», which aims to ensure the rapid development and operation of devices and applications, supporting IoT security, speed and portability of industrial production[159].

The conceptual model of the EU is seen primarily as a top model of the environment, as well as a link between different models from different points of view of the reference architecture and is three-dimensional in terms of functional compatibility of the hierarchical levels, management of the smart grid system (business, functions, information, communications and components, ie zones covering: processes, field, station, operation of enterprises and markets) and domains (generation, production, transmission, distribution, demand management and consumers). In Germany, for example, the framework for establishing interoperability between network operations and market operations developed by the German Association of Energy and Water Industries (BDEW), are called the traffic light (TLC) (Traffic Light Concept) , since, based on the traffic light function, three different states or levels (green, yellow, red) interact with the network and operations on the

[158] Commission Decision of 30 January 2018 setting up the Strategic Forum for Important Projects of Common European Interest [Electronic resource]. – Access: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:JOC_2018_039_R_0003

[159] Digitising European Industry: Working Group 2 – Digital Industrial Platforms [Electronic resource]– Access: https://ec.europa.eu/futurium/en/system/files/ged/ dei_wg2_final_ report.pdf

market, which send signals to network operators about the current and forecast state of the network.

The codes of the European energy network - ENCs (European Electricity Network Codes), which are intended for border trade in the European network of system operators of electricity transmission - ENTSO-E (European Network of Transmission System Operators for Electricity) and in the European Network of System Operators of Natural Gas Supply - ENTSO-G (European Network of Transmission System Operators for Gas) are used for the interconnection between different models. ENCs relate to the relevant energy transport infrastructure and cover network connections, markets and operation systems. They are divided into 4 classes: connection codes (generation, connection, demand, HVDC networks); market codes (volume of distribution and reload, distribution of capacity, balancing of electricity); Codes of Operating Systems (Security, Planning, Load, Frequency, Management, Reserves, and Emergency Recovery) and Transmission Regulation Codes regulated by Regulation (EC) 713/2009 [9], 714/2009 [8], 715/2009.

In Ukraine, the national standard, the Code of Good Practice, has been developed as a template for use in assessing compliance of processes and systems with established requirements. It is also used in accordance with the Agreement on Technical Barriers to Trade of the WTO at both governmental and regional levels. However, there are no such normative documents in the domestic power industry as the codes of the established practice in the power industry at present, including the assessment of the conformity of processes and systems in terms of the formation of reference architecture and unified standardized rules of management of the energy system, which makes it impossible for the participants of the energy market to interact.

The experience of building an innovative business model in the British electricity grid and building a Smart Grid is most systematically presented in the standardized approaches to the Smart City model. A distinctive feature of the Smart City model, which is planned to strengthen the country's position after Breckish, is the formation of the integrity of the system based on industrial development that will be supported by the introduction of innovative energy technologies and developments in the field of artificial

intelligence - AI (Artificial Intelligence), 5G networks and robotics. For their development in 2017, it is planned to allocate £ 4.7bn and an additional £ 556m for energy development in the north of the country.

Issues that require urgent resolution include, in particular, digital network infrastructures for utilities, electricity, water, waste, environment, mobility and transport, construction infrastructure, information and communication infrastructures, etc. To use the resource potential of communities (communities) developed as new standardized automated communication processes for the main interfaces, as well as methods of standardization between systems and infrastructure within the calculated area. Consequently, in the United Kingdom, a conceptual model and functional infrastructure architecture called Smart City Infrastructure Architecture Model (SCIAM), has now been formed to describe the interaction of complex systems and the provision of uninterrupted provision of utilities based on standard approaches. Priority is given to electricity connection services - ECS (Energy Connection Services), which are system-level runned and can be used globally.

Strategic unified Smart City standards developed on the basis of interoperability of intelligent networks by The British Standards Institution, the British Standards Institution, the Netherlands Standards Institute, the Dutch Standardization Institute and the German Association of German Engineers (the Verein Deutscher Ingenieure), is the basis of the interaction between different systems in different industries and is considered as the reference visual 3D model of open systems OSI (ISO / IEC 7498-1), which consists of seven spheres - from physical level to application level. In the subject area, this reference model can be expanded, checked and tested on the basis of unified Perinorm database standards grouped on the basis of the international classification of standards ISO-ICS (International Classification for Standards)[160] and are now presented at three levels: technical standards, process standards and strategic standards.

[160] World Wide Web Consortium, an organization that develops Internet standards and provides recommendations for their implementation, with the aim of fully internationalizing the Web and providing access to it to people with disabilities (HTTP, HTML, XML data structures, etc.).

Standardization of Sustainable Development in Territorial Communities includes requirements, guidelines, auxiliary methods and tools that help communities to become more resilient to potential threats, and to make progress in this direction. Consequently, the International Standardization Organization (ISO) has established the ISO / TC 268 Technical Committee for Standardization in Sustainable Development in Communities, consisting of experts, as well as representatives of consumer associations, academia, non-governmental organizations and government working in subcommittees and working groups, in particular: ISO / TC 268 / SC 1 «Smart Community Infrastructures», WG 1 «Management Systems» and WG 2 «Urban Indicators» (City Indicators).

In order to standardize the integration processes of heterogeneous complex technologies in the field of ICT, the ISO / IEC Joint Technical Committee (JTC 1) was formed as part of ISO and the International Electrotechnical Commission (IEC) - ISO / IEC JTC 1 (Information technology) as well as the Smart City Strategic Advisory Group (SAG) Advisory Group on Strategic Development. According to research results, SAG unveiled infrastructure projects for potential standardization, including the concept of Smart City infrastructure as a system interconnection of various components (water and gas supply, power systems, mobility systems, communications, etc.), which requires a cross-functional approach and harmonization of common positions from the development of common standards with the participation of all interested parties.

Proposed by the ISO in conjunction with other institutions, of a set of international standards that promotes the development and implementation of holistic cross-sectoral territorial approaches to the sustainable development of the territorial communities, includes standards for:

- architecture and interaction of Smart Grids, based on the principles of a system organization;
- services (including e-commerce, business processes, billing, security, etc.);

- management and information exchange in energy information networks (measurement, synchronization, automation, control, diagnostics);
- innovative technologies (including "smart" devices).

In addition, the International Telecommunication Union (ITU) created an open platform for "smart cities" (FG SSC), which produced recommendations for system solutions for building smart urban infrastructure (Innovations as Intelligent Transport Systems, ITS). Within the framework of the 5th ITU Research Group 5 (SGU) concerning the environment and climate change, the recommendations about the standards to be developed within SC & C and IoT as a global infrastructure for the information society have been made, enabling the expansion of services on the basis of the formation of common approaches to the standardization of IoT "smart" cities and "smart" communities.

The creation of a global network infrastructure is a supranational project that currently forms a new model for managing the state, regions, and territorial communities in cooperation with international institutions concerning the changes that need to be introduced to form the future energy system. This is in line with public policy goals, in particular those related to greenhouse gas emission reductions, affordable energy supply and energy efficiency. As a result of the technological revolution, society goes to more decentralized systems, where the Smart Grid is one big network that connects everyone in the modern economy and leads to the convergence of the two macroeconomic trends that underlie the investment transition of the world energy markets to much more decentralized distributed systems and development of platforms that will provide new forms of consumer participation.

According to the definition defined in the European Technology Platform of the future European Networks strategy[161], Smart Grid is considered as an electrical network that can integrate the actions of all its connected users (generators, consumers, etc.) in order to effectively ensure the sustainable

[161] Smartgrids, European Technology Platform on Vision and Strategy for Europe's Electricity Networks of the Future. s. l. : EUR 22040, 2006.

economic and safe supply of electricity, incl. . taking into account RES, which are joined by local operators of distribution systems to micro-networks (Microgrids). Due to this, the distribution networks are transformed from passive to active and facilitate integration of demand management (Demand Side Integration, DSI), generation, RES and implementation of energy storage technologies based on common protocols and basic principles of standard development.

The results of their common activities are based on the standardization of processes in Smart Grids as "smart" systems (the Smart System), which serve as the main technical documents for building a reference model of the network architecture architecture for:

- formation of uniform technical parameters of the reference architecture;
- functional interaction;
- integration of users into the system;
- security and privacy.

In the context of the above, the priority task is to create energy supply self-regulatory organizations for consumer groups, which are concentrated in compact cities, united territorial communities for the transmission of electric energy and technological connection of consumers to the grids in accordance with harmonized standards, norms and rules[162]. The development of the domestic concept of power supply self-regulatory organizations should now be considered by the government as a model for the functioning of the retail segment of generation, networks and consumers, a priority pilot project designed to take advantage of distributed generation and intellectual energy. The introduction of such a model will enable investors to create compact energy centers for consumer groups concentrated in industrial parks, cities, and territorial communities, making such territories more attractive in economic relations by solving the problem of high cost of energy supply for

[162] Characteristics of power supply voltage in electrical networks of general purpose: DSTU EN 50160-2014. [Effective from 2014-10-01]. - K .: National standards of Ukraine, 2014 - 27 p. - (National standards of Ukraine).

new consumers. Reducing energy costs can reach 30% by optimizing the payment of electricity.

In order to implement the concept of energy supply self-regulatory organizations for the community's intellectual infrastructure, the following technical standards have been developed and published in ISO:

- ISO / CD 37155. Framework for the Integration and Exploitation of Community Intellectual Infrastructure - Part 1: Opportunities and Challenges from Interaction in the Intellectual Community Infrastructure in All Aspects Through the Life Cycle;
- ISO / AWI 37156. Recommendations for data exchange and information exchange for community infrastructure;
- ISO / FDIS 37157. Intelligent transport for compact cities;
- ISO / DIS 37158. Intelligent transportation of buses and accumulators for public transport systems for the implementation of urban centers with zero emissions of greenhouse gases and small particles, a relaxed environment and safe ride by bus;
- ISO / CD 37159. Intelligent transport for fast transit to / between major urban areas and adjacent areas;
- ISO / AWI 37160. Electricity Infrastructure - Method for measuring the quality of the thermal power infrastructure and requirements for the operation of the plant.

According to the Energy Information Association (EIA), global energy production in the world is increasing, and the production of electricity from Distributed Energy Resources (DER) is increasing, that leads to the formation of a new energy architecture (New Energy Landscape, NEL). In response to this new dynamic, there are new network technologies that combine innovative hardware and software to integrate DER and bring more affordable and sTable energy. Experts estimate that over the past decades, Distributed Generation (DGs) has steadily increased in territorial communities, and it is typically associated with medium (Medium Voltage, MV) and high (High Voltage, HV) voltages requiring first of all, a completely new organizational-legal and economic model of functioning of the generation, network infrastructure and

consumers. An example is the Infrastructure Canada initiative aimed at creating economically viable, strategically planned, sustainable and inclusive communities to improve the lives of their citizens through innovative technology and digital data transformation capabilities and access to world-class educational and research institutions, modern healthcare facilities, active entertainment, tourism, etc[163]. For example, in March 2018, Kingston City Council (Canada) approved an agreement concerning the public-private partnerships to use the Smart City platform to create a more mobile, efficient and environmentally safe "smart" city based on the IoT attract investments to social, green, public transit and other infrastructure based on micro-networks.

Microgrids as the new architecture of the distribution network were first proposed within the Smart Grids concept that can take advantage of integrating a large number of small distributed energy resources into a low voltage power distribution system to increase energy efficiency and reliability of supply, minimize overall energy consumption, reduce environmental impacts , operational advantages of the network, in particular loss reduction, voltage management or security supply and more cost-effective replacement of network infrastructure.

According to the definition of the International Council for High Voltage Electric Systems (CIGRE), Microgrids are power distribution systems that contain loads and distributed energy resources (distributed generators, storage devices or controlled loads) that can be managed by a controlled or concerted manner when connecting to a main power grid or to an electric island. In fact, Microgrids has become one of the most effective ways of managing utilities and terminal users to manage DER based on digitization (Google Tag Manager, DER GTM).

However, the main function of the active distribution network requires the implementation of a fundamentally new systemic concept for the formation of the network infrastructure of territorial communities, which is considered as "building" blocks of the new structure of Smart Grids to increase

[163] Infrastructure Canada [Electronic resource]– Access : http://www.infrastructure.gc.ca/about-apropos/index-eng.html

the penetration of distributed generators, allowing Microgrids to operate independently from the main network. And if earlier the focus was on a single market model - the main instrument for ensuring the adequacy of the energy system, then, with the transition to distributed resources, market mechanisms typically form three distinct short-term market models: 1) Day-Ahead Market, DAM); 2) Intraday Market (IDM); 3) Balancing Market (BM). All of them play a key role in improving short-term electricity markets[164].

In the context of the above, it should be noted that the micro-networks of territorial communities are the most important component of the energy revolution with the convergence of digital communication technologies and innovative technologies, as well as intellectual platforms and network infrastructure, since they are localized and less risky in providing continuous economic and efficient electricity management in SC & C.

EIA experts predict that in the US by 2020, Microgrids will reach 3.7 GW in operative capacity, which will be more cost-effective to obtain its own energy than its purchases from centralized sources, while the cost of heat and natural gas, as well as the production of solar energy is decreasing. Microgrids differ from centralized networks using System of Use (UoS), which are applied in addition to the wholesale electricity market price and are localized by a group of sources and loads that are typically connected and synchronous with the traditional centralized network or function autonomously depended on physical and / or economic conditions.

According to experts' assessments, only in the EU, the digitization of electricity production by 2025 will provide economic benefits of around 125 trillion Euro[165]. According to the GTM report, in the US, by 2022, they plan to attract investments in the development of Microgrids in the amount of $ 12.5

[164] Refining Short-Term Electricity Markets to Enhance Flexibility [Electronic Resource] – Access: https://www.agora-energiewende.de/fileadmin/Projekte/2015/Penta_EOM/Agora_Penta_Refined_ST_ Markets_and_Flexibility.pdf

[165] The United Digital Market for Europe [Electronic Resource] - Access Mode: http://www.consilium.europa.eu/en/policies/digital-single-market/

billion[166]. Over the past five years the United States has already allocated $ 86 million for technological innovations related to micro-networks and project approaches, as well as $ 189 million to build new Microgrids.

In Ukraine, at the present stage of energy sector reform, financing of network infrastructure is one of the components of the management process that can acquire the features of a regulatory mechanism for influencing regional development, namely: to form financial self-sufficiency of territorial communities, to intensify local economic development, to provide population of territorial communities with public services at a legally determined level, taking into account the patent right for intellectual property.

To ensure the development of the necessary infrastructure of standardization, metrology, accreditation, conformity assessment and market surveillance systems, and the convergence of national and European technical regulation provided in the Association Agreement between Ukraine and the European Union, the Government of Ukraine has taken the first steps[167]. In particular, draft laws concerning the introduction of the institution of the Commissioner of Economic Operator have been developed and are under consideration by the relevant committees of the Supreme Council of Ukraine; joining the new common transit system (New Customs Transit System, NCTS); protection of intellectual property rights; features of taxation of operations on import into the customs territory of Ukraine, etc.[168]. The Intellectual Property Council, set up by the decision of the Cabinet of Ministers of Ukraine[169], is intended to coordinate the interaction of executive authorities in the field of intellectual property with the purpose of identifying ways and mechanisms to solve the problematic issues that arise during the formation and

[166] New GTM Report Forecasts $12.5B Microgrid Investment within US by 2022 [Електронний ресурс]. – Режим доступу : https://microgridknowledge.com/microgrid-investment-gtm/
[167] The government reduced the share of dividends by state enterprises of standardization and metrology to 30% [Electronic resource]. - Mode of access: http://www.kmu.gov.ua/control/uk
[168] New Policy of Energy Independence (Excerpt from the program of the Cabinet of Ministers of Ukraine) [Electronic resource]. - Access: http://mpe.kmu.gov.ua/minugol/control/uk/publish/article?art_id=244973094&cat_id=244973080
[169] The Cabinet has created the Council concerning the Intellectual Property [Electronic Resource]. - Access: https://www.rbc.ua/eng/news/kabmin-sozdal-sovet-voprosam-intellektualnoy-1518002387.html

implementation of state policy in the field of intellectual property in order to ensure Ukraine's integration into the international and European intellectual space.

However, Ukraine ranked 60th in the global and digital competitiveness ratings of the IMD-2017[170] countries of the International Institute for Management Development (IMD). However, Ukraine is in the last position alongside Indonesia, Mongolia, Peru and Venezuela in the Digital Competitiveness Index concerning the implementation and research of digital technologies that lead to a transformation in government practices, business models and society as a whole.At the end of 2017, the Cabinet of Ministers of Ukraine approved the Concept for the Development of the Digital Economy and Society of Ukraine for 2018-2020 and adopted a plan of measures for its implementation[171]. The main purpose of these documents is to implement the Digital Agenda Ukraine 2020 (Digital Strategy) to remove barriers on Ukraine's digital transformation way in the most promising areas. A key reform is the completion of the transformation of the energy sector to overcome the historically negative effects[172].

Conclusions. The elimination of normative vacuum in power industry is one of the urgent tasks in the field of ensuring the reliable operation of network infrastructure of territorial communities and requires the provision of normative regulation of technological activities in the power industry in terms of establishing mandatory requirements for the industry. The rules of technological functioning of power systems should become the basis of the updated regulatory and technical basis of the power industry, on the basis of which the creation of more precise and regulated procedures in specific areas

[170] Create your own infographics [Electronic Resource]. – Access : http://www.liga.net/infografica/ 336825_ukraina-opustilas-v-reytinge-samykh-konkurentosposobnykh-ekonomik.htm

[171] The Cabinet of Ministers approved the Strategy for the Development of the Digital Economy by 2020 [Electronic Resource]. - Access: http://ua.interfax.com.ua/news/economic/477494.html

[172] Vice President of the World Bank Cyril Muller: "The economy has started to grow. This is important. But is this enough? "[Electronic resource]. - Access: https://zn.ua/macrolevel/vice-prezident-vsemirnogo-banka-siril-muller-ekonomika-nachala-rast-eto-vazhno-no-dostatochno-li-etogo-275580_.html

in the regional and territorial dimensions should begin, including the deployment of micro-networks, because due to technical requirements the general obligatory requirements for generating equipment are established for all participants of the wholesale market of electric energy and power for determining the volume of electricity of energy. System services of the power industry entities that are necessary for ensuring the reliable functioning of the unified energy system should include services of normalized primary regulation and automatic secondary regulation of frequency, power flow, reactive power regulation, etc.

Another direction to work about - changes in the regulatory framework. Currently, the powers of the executive authorities regarding the establishment of mandatory requirements in the power industry are not regulated. In particular, the powers of the Ministry of Energy and Coal Industry of Ukraine concerning the development, adoption and updating of regulatory acts, which establish mandatory requirements to ensure the reliable and safe operation of the network infrastructure, are not defined.

The development and implementation of relevant development strategies should play an important role in implementing an integrated model of the management system for the innovative development of territorial communities based on the reliable and safe functioning of the network infrastructure, which requires first of all training users to improve the skills of energy workers, information and communication technologies and information securit. The certification of personnel in accordance with ISO / IEC 17024: 2012 on the general requirements for certification bodies in the field of energy efficiency and RES is an important part of the verification of the competence of employees[173] for compliance with sectoral competencies.

[173] ISO/IEC 17024:2012 Conformity assessment – General requirements for bodies operating certification of persons [Electronic resource]. – Access : https://www.iso.org/standard/52993.html

PART 4.

THE RESTORATION OF A SOCIAL INFRASTRUCTURE AND REFORMS IN THE POLITICAL SPHERE

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SOCIOLOGICAL MONITORING OF MATCHING SKILLS AND JOBS IN UKRAINE

Abstract. Under the conditions of labour market structural transformations the problem of mismatching labour force qualifications and demands for existing, new and prospective workplaces is of great importance. It is stipulated by the fact that employees are not able to perform their duties and, therefore, tend to fail jobs requirements for lack (excess) of educational and qualification characteristics and skill obsolescence. Thus, the imbalance between labour force skills and workplace structure at the labour market occurs, specified by overeducation or undereducation, lack of skills or skills excess. The problem of skills mismatching has become aggravated lately and is reflected in high rates of youth unemployment, increase in 'shadow' employment, skilled labour outflows abroad, which in the end tend to confront society and economy with new challenges: sequential loss of economy competitiveness and shortage of skilled labour force with innovative thinking and ability to work in prospective branches of economy. Within this context, the necessity for organization and providing skills monitoring at the labour market to make the ground for efficient employment policy development is of great significance.

JEL Classification System: J01; J21, J24, J62
Key words: labour market, skills, matching (mismatching) skills, overeducation, undereducation, supply, demand, imbalance, sociological monitoring.

Introduction. The majority of the world countries, especially the developing ones, experienced serious consequences of the deep economic crisis of 2008-2009. The number of new jobs created in after-crisis period was insufficient enough to meet all the needs of surplus labour force. This situation caused imbalance increase in the labour market and escalated the problem of skills mismatch and job needs[174].

[174] Vlasiuk, O., Ilyash, O., Osinska, M., Sobchak-Michalovska, M., Smoliar, L., Kreydich, I.Eds. (2017) *Structural risks and systemic dynamics of socio-economic development of the national*

Mismatching labour force skills and labour market demand puts obstacles in the way of economy competitiveness growth. First of all, this phenomenon is closely linked to the existence of structural and youth unemployment. Skills mismatching per se is a sign of imbalance, particularly overeducation or undereducation, a lack of skills or skills excess, profession obsolescence etc. Concerning the search for the ways of balancing supply and demand for skilled labour force, education and business are worth considering as two interlinked and interacting social subsystems with their own needs, rules and logics of development[175]. Therefore, regarding the circumstances of skilled labour force shortage, the search for the ways of these two systems convergence and harmonization, working out their adjustment mechanism, which being in complex can reduce quantitative and qualitative skills divergences are the main task. Simultaneously, to ensure its fulfilment it is necessary to conduct the constant monitoring of labour force skills that allows giving an accurate account of supply and demand imbalance in the labour market and corresponding the reliable basis to ground the reasonable administrative decisions.

The purpose of this paper is diagnostics of educational and qualificational imbalances in Ukraine and European countries by gender and age characteristics as wel as revealing the results of sociological monitoring of matching employees' skills and jobs needs. The results of sociological monitoring in Ukraine allowed to astimate the discrepancy between the existing and desired level of employees' skills; reveal the impact of overeducation and undereducation on labour productivity; define the set of perspective skills needs.

Ukraine and other countries from the point of view of matching skills to jobs. The scholars' research into educational and qualification matching skills to jobs requirements reveals that overeducated labour force has a set of drawbacks comparing with the labour force whose skills meet job

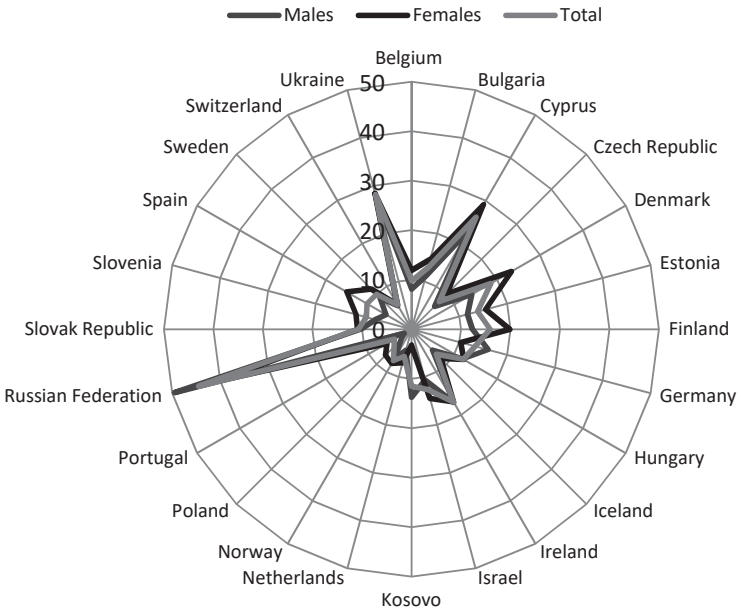
economy: the European vector, vol. 2, Bydgoszcz, Poland: University of Economy in Bydgoszcz, Publishing House, 299 p.

[175] Lipsey, R. (1960) The relation between unemployment and the rate of change of money wages in the United Kingdom, 1862–1957: a further analysis, Economica, vol. 27 (105).

requirements in full. Uppermost, it concerns remuneration of labour. Overeducated employees get the same wage as the employees with required skills, as employers are not willing to pay more for the skills unpractised at their enterprises.

Skills mismatching among both the employed and the unemployed is a significant gap all over the world. As a rule, it varies from 10% to 30% among the overeducated and nearly 20% among the undereducated. For instance, the general skills mismatching among the employed in European countries reaches from 30 to 60%. Figure 1 and 2 show incidences of overeducation and undereducation by sex.[176]

Figure 1. Incidence of overeducation by sex (ISCO-based, %)



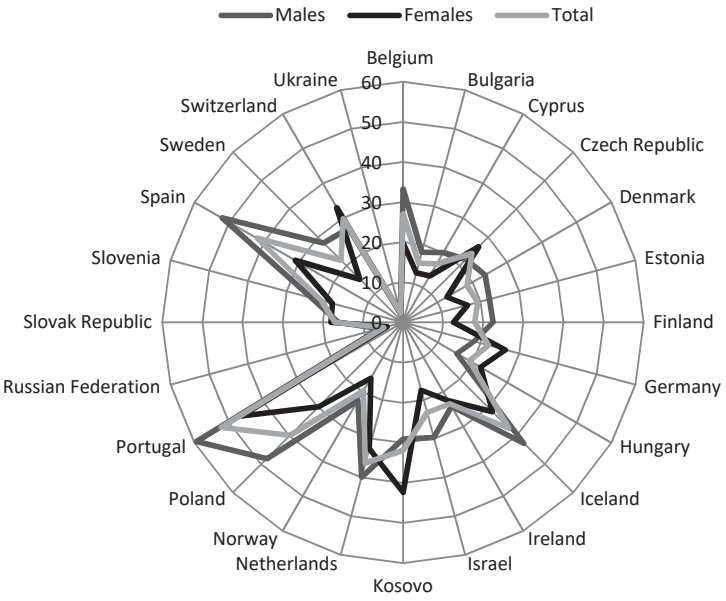
Source: Information provided by ILO.

Correspondingly, undereducated employees get significantly lower wage than those whose skills match the job. Generally, employers hire the overeducated more willingly than the undereducated, as the latter need much more capital investment to overcome mismatching between skills and jobs

[176] ILO (2014) Skills mismatch in Europe [Statistics brief], Geneva: International Labour Office.

(i.e. retraining and improving qualification courses) and the time taken for it [177].

Figure 2. Incidence of undereducation by sex (ISCO-based, %)



Source: Information provided by ILO.

In case of vertical skills mismatching (a level of education or skills is lower/higher than necessary) overeducation does not encourage employers to raise the rate of wage, as they can sign up employees with wider range of skills paying them the same amount of money as to rather qualified staff[178]. However, there are great risks that the overeducated are a resolutely uncommitted group of staff because of the absence of opportunities for career development, thus willingly engaging in more appropriate job search[179]. In

[177] Rubb, S. (2003) Overeducation in the labor market: A comment and re-analysis of a meta-analysis, Economics of Education Review, vol. 22, №. 6, pp. 621-629.
[178] Korpi, T. (2009) Educational mismatch, wages, and wage growth: Overeducation in Sweden, 1974–2000, Labour Economics, vol. 16, №. 2, pp. 183-193.
[179] Blenkinsopp, J. (2007) Hey, GRINGO!: The HR challenge of graduates in nongraduate occupations, Personnel Review, vol. 36, №. 4, pp.623-637.

such a way, having the overeducated group of staff is undesirable for the enterprise, as the employees dissatisfied with the job will engage in better ways of application their skills which leads to an increase in stuff turnover and negatively affects overall productivity[180].

By the types of skills mismatching among European countries there are substantive divergences (Graphs 1 and 2). Particularly for the last twelve years, the dynamics of overeducated labour forcehas been growing. According to International Labour Organization (ILO), the largest percentage of the overeducated was typical of Russia – 44,5% of employees, Ukraine – 28,1%, Cyprus – 26,1%. The lowest indicators of the overeducated was characteristic of Portugal (4%), Poland (5,0%), Luxemburg and Switzerland (5,7%), the Netherlands (7,3%), Iceland (7,1%), Turkey (7,7%), the Chech Republic (7,9%). In most EU countries these figures vary between 10 and 20%[181].

By gender indications women are often more overeducated than men[182]. The exceptions to the rule are Russia (a gender gap among the overeducated amounts to 9,5% to the men's advantage) and Kosovo (10,5% to the men's advantage). The western experts note that the rate of overeducation for women increased during the height of the global economic crisis (2008-2010), pointing at the need for female workers to take lower level jobs at times of intense job competition[183].

By age, youth are often overeducated. According to ILO, particularly, the highest incidences were in Russia (48,5%), Cyprus (36,1%), Ireland (26,0%) and Ukraine (21,0%). The lowest number of overeducated youth live in Iceland (3,9%). The ILO investigations into this issue are conclusive evidence of the fact that most European countries suffer from labour market discordance due to skills mismatch. Though overeducation is widely discussed nowadays, the incidence of undereducation significantly exceeds the incidence of

[180] Wald, S. (2005) The impact of overqualification on job search, International, Journal of Manpower, vol. 26, №. 2, pp.140-156.
[181] ILO (2014) Skills mismatch in Europe [Statistics brief], Geneva: International Labour Office.
[182] Gonzalez, J. (2012) Real Time Jobs Data Show Community Colleges What Employers Need Now, Chronicle, August 13.
[183] ILO (2014) Skills mismatch in Europe [Statistics brief], Geneva: International Labour Office.

overeducation. They are virtually the same in Denmark (18,4% and 18,5% correspondingly). More than 25% of the undereducated live in Iceland, Italy, Spain, the Netherlands, Poland, and Portugal. The rate of the undereducated ranges from 5% to 52,3%. Substantial lack of skilled labour force is observed in Portugal, where nearly half of the population is undereducated, in Switzerland and Italy, where every third person is undereducated, in Spain, Poland and the Netherlands, where every fourth person is undereducated[184].

For the last years, there has been a sTable tendency towards anincrease in the overeducated and a decrease in the undereducated by age group in Europe. By sex, the situation was opposite. One could observe an increasing tendency for women and a decreasing tendency for men. Undereducation decreased at least in 14 out of 25 countries, and increased in five countries. Only in four countries, the sTable tendency of skills mismatch decrease is observed (Ireland, Israel, Poland and Slovenia).

Matching skills and jobs in Ukraine. Skills mismatch among employees is studied as a problem braking economic development in Ukraine. The research results made by Ptoukha Institute for Demography and Social Studies of the National Academy of Sciences of Ukraine prove that in every sixth of the Ukrainian employees among the youth having a job matching their level of education, every fourth considers oneself well or poorly educated for the job one has. In general, 26,6% of young employees consider themselves overeducated for the job they do, only 23,5% – undereducated[185]. Such situation is mostly stipulated by the fact that the majority of Ukrainian youth have higher education, the fewer part of them have full secondary education.

The up-to-date situation with the application of youth educational and qualification characteristics at Ukrainian labour market is specified with significant disproportions. The data analysis of skills matching between employers and jobs they have supports practically the conclusion concerning

[184] See ibid.
[185] Libanova, E., at all. (2016) Labour market transitions of young women and men in Ukraine: results of the 2013 and 2015 school-to-work transition surveys, Geneva: International Labour Office, 118 p.

an essential role of experience, adaptability and initiative in contemporary conditions of employed social potential use. In 2015 matching skills to jobs in Ukraine was characteristic of 62,8% of the employed youth, which indicates low efficiency use of employees' social potential. The highest level of matching skills and jobs by occupational groups is observed among professionals (86,6%), skilled agricultural, forestry and fishery workers (81,3%), craft and related trades workers (80,4%), plant and machine operators, assemblers (75,9%), managers, senior officials and legislators (73,6%)[186].

By occupational grouping youth overeducation is mostly noticeable among youth are employed in elementary occupations (96,7 %), clerical support workers (71,8%), service and sales workers (32,1%). Besides, a large proportion overeducated youth (48,7 %) exists among technicians and associate professionals[187]. Experts state that it is stipulated by the need for a high level of adaptability in this occupation. This phenomenon is rather extraordinary and may have ambiguous interpretation: firstly, a high level of the overeducated among technicians is evidence of rather low job requirements, secondly, Ukraine possesses considerable stuff potential to be used within the terms of labour informatization and intellectualization, which contributes to faster innovation perception and spreading in all spheres of social life.

It should be mentioned that the high level of overeducation for Ukrainian youth is evidence of mismatching economy path dependency and youth's requests, as well as insufficient efficiency of vocational guidance mechanisms and vocational education operation (both vocationaleducation and training (VET) andhigher education (HE)).Motivation guidelines for likings for higher education compared with VEThave been shaped by the contemporary Ukrainian youth. High rate of labour supply among the youth with higher education leads to skilled labour cost reduction as well as to the exclusive standards from employers. In its way, according to the survey results, employers tend to think that overeducated young applicants for jobs

[186] See ibid.
[187] See ibid.

will perform a higher level of creative, cultural and social skills despite their application limits at the jobs and comparatively low remuneration of labour. It is the negative consequence of such attitude to highly skilled labour force that one observes the expulsion of employees, whose skills match job requirements that are engaged by the staff with higher education, to a lower skilled level of employees. It just prolongs the chain of mismatch between jobs and skills level of employee.

Insufficient skills are specific characteristics of the Ukrainian youth who work as legislators, higher authorities, managers (26,4 %), skilled employees in agriculture and timber industry, fish farming and fishery (70,2%). Considering the specificity of work in these occupational categories, it can be tolerated that the former is characterized by such essential features as entrepreneurship, creativity, initiative and team-management skills as well as work experience. However, the latter bears professional experience as its decisive factor. Therefore, the reserves for qualification improvement for both occupational categories are practical experience whose possibilities of realization are guaranteed by the initiative rate[188].

The special attention should be paid to the employed in elementary occupations, which do not need special professional skills and experience. Skills matching in this occupational group is obtained by 51,3% of the people without vocational education and training, 48,7% of the employed are classified as undereducated. It may well be that such proportions of the young employed in this occupational group have been formed due to spreading negative employment practices. That led to the situation when the skilled employed are incapable to actualize own labour potential.

The phenomenon of overeducation occurs because of shortage of jobs matching the specific level of education. Such mismatch between supply and demand forces young people with higher education to apply for the jobs with low qualifications requirements. On the one hand, the overeducated youth bid

[188] Libanova, E., at all. (2016) Labour market transitions of young women and men in Ukraine: results of the 2013 and 2015 school-to-work transition surveys, Geneva: International Labour Office, 118 p.

fair to earn less than they could and lack an opportunity to augment their potential. On the other hand, the youth displacement representing the lower part of educational pyramid is observed: less educated people turned out to be at the end of the list of applicants for even the jobs matching their skills.

A subjective approach to measuring matching skills and jobs. A subjective approach to measuring matching skills is based on gathering the information among the employees and employers concerning educational and qualification training and skills and jobs requirements matching. Carrying out social monitoring of educational and skills matching (mismatch) self-assessment is the main method of a subjective approach. It is held by conducting the survey of the employees on the issue of matching skills acquired and the job they are engaged in. It is reasonable to conduct such surveys among the employers, as it is of great assistance to find out their subjective opinion on matching (mismatch) of the employees' educational and qualification level and jobs requirements. Despite its subjectivity, this double-ended estimate is of existential character. Uppermost it is grounded by the fact that the employees become more aware of their real educational and skills level required to fulfil their duties at the job. Besides, such a survey enables to get the detailed pattern of matching skills and jobs both from employees and employers, and thereupon develop recommendations for the educational establishments concerning curriculum improvement and taking into account existing shortage of skills and prospective demand for them. Differences in educational and skills levels are defined with the help of respondents' opinions aggregation.

Sociological monitoring of enterprises on issues concerning labour force matching by educational and qualification levels should be of integrated nature and conducted once a year. It will contribute to research into stuff qualitative composition, revelation of subjective perception as for the level of satisfaction with jobs, conditions and remuneration of labour, self-assessment of matching between own skills and job done. As for employers, such monitoring will allow shapinga subjective opinion on up-to-date labour force requirements, their educational and qualification matching the jobs demands,

correlation with labour efficiency and generalization of skills needed in the nearest future.[189]

Nowadays there is no accurate procedure of conductingsuch a survey. Some elemental notes on similar research conducted in the United Kingdom[190] and Switzerland[191] have been made in scientific literature. As a rule, forms contain the questions on the educational and qualification level identification, presence of extended education, opportunities for qualification improvement, matching between knowledge and skills and job requirements done by the respondents, an effect of overeducation and undereducation on working efficiency etc.

Main results of measuring matching skills and jobs in Ukraine. To obtain external information base concerning matching labour force skills and jobs requirements in Ukraine the author of this study conducted sociological survey among the employers and the employees. From the standpoint of employees the goal of the survey was to investigate attitude of minds as for their satisfaction with jobs, conditions and remuneration of labour, self-assessment of own educational and skills matching the jobs done; from the standpoint of employers the goal of the survey was to reveal subjective opinion on up-to-date labour force requirements, their educational and qualifications matching the jobs demands, correlation with labour efficiency and generalization of skills needed in the nearest future.

The analysis of data received allowed shaping the integral pattern reflecting subjective perception of the problem matching skills and job requirements in Ukraine, ascertaining its subjective correlation with labour efficiency and determining the priorities in training system taking into account the peculiarities of different sex and age groups. Employers and employees were the object of the research conducted with the method of random

[189] Ilich, L. (2017) Strukturni transformatsii tranzytyvnoho rynku pratsi Ukrainy [Structural Transformation of Transitional Labour Market in Ukraine], Kyiv, Alerta, 608 p.
[190] Dolton, P. (2000) The incidence and effects of overeducating in the UK graduate labour market, Economics of Education Review, vol. 19, pp. 179-198.
[191] Battu, H. (2000) How well can we measure graduate over-education and its effects?NationalInstituteEconomicReview,vol. 171 (1), pp. 82-93.

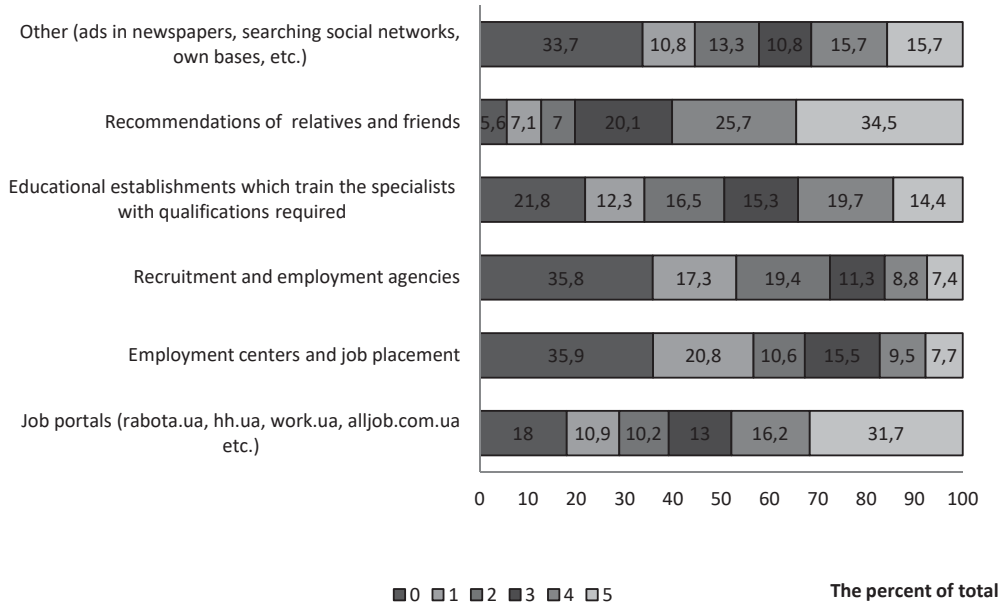
sampling. The value of select error allows us to generalize and aggregate conclusions made. The total number of respondents constitutes 1200 employees and 300 employers.

Employees' educational training, ways of searches for jobs and staff to replace vacancies. According to the survey results, of respondents totality, the majority of employees have the full higher education – 60,5%, basic higher education – 18,4%, undergraduate education – 16,1%, full secondary education – 5,0%; by educational and qualification levels: 31% obtained Master's Degree, 30% – Specialist's Degree, 18% – Bachelor's Degree, 16% – Junior Bachelor's Degree, 5% – skilled workers. Extended higher or professional training was obtained by only 19% of all questioned. Most of respondents note that they got education at the cost of state budget (52,5%), actually every third of them got education at the cost of their parents, every eighth obtained education at their own cost and only 2,6% of all respondents state they got education at the cost of enterprises. Thus, the main sources of investments into human capital in Ukraine are state budget and household savings.

Among the main ways of search for jobs Ukrainians mentioned recommendations of friends and acquaintances (43,7% of employees), personal application to employees (23,7%), search for vacancies in media and the Internet (21,6%). The tenth of the questioned noted the assistance of employment agencies (3,4%) and recruiting or personnel agencies (2,5%). Just 5% of surveyed mentioned other ways of job search, in particular, setting up own business – 17 people; receiving personal invitation from the employer (including those ones which arrived after undertaking an internship at the enterprise) – 19 people; getting a job for its intended purpose – 12 people; vacancy propositions from the universities' Career development centres.

The employees were offered to range the ways of staff recruiting by priority from 0 to 5 points, where 5 points means 'use the most often', whereas 0 points – 'disuse at all' (Figure 3).

Figure 3. Ranging the ways of staff recruiting by priority (employers' choice)



Source: authors' own calculations.

As the priority ways of staff recruiting used by the employees the most often, the following ones were mentioned: recommendations of relatives and friends – 34,5%, job portals (rabota.ua, hh.ua, work.ua, alljob.com.ua etc) – 31,7%, educational establishments which train the specialists with qualifications required – 14,4%, employment centers and job placement – 7,7%, recruitment and employment agencies – 7,4%. Yet among the priorities the employers noted another ways of staff recruiting used the most often, in particular, creating own personnel base by the necessary positions, head-hunting, leasing, outsourcing, search for staff in social networks (for instance, LinkedIn) and search engines, creating own stuff reserve, personnel selection while practical training.

There is a widespread thought in the society that market is congested with labour force having higher education who can easily integrate knowledge

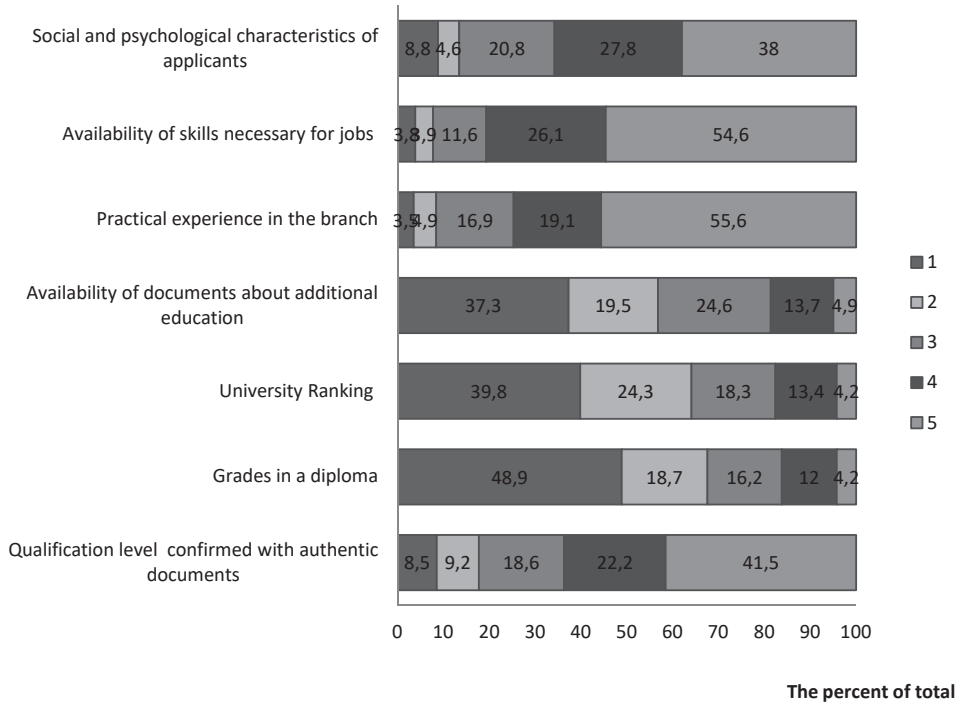
gained into different spheres and is capable to learn quickly. Therefore, employers are at premium while selecting applicants from a number of specialists mainly having higher education. But the survey results reveal that 37,7% of respondents experience difficulties while staff recruiting; 30,6% of employers find rather complicated to select personnel they need, 22,2% of them find the process of staff recruiting fairly easy and only 9,5% have no challenges of this process.

First and foremost, the employers relate all the complications to skilled staff shortage (52%), low rate of labour remuneration (49%), mismatch between skills and job requirements (45,3%), steep demands of applicants for jobs (23,3%), negative appeal of conditions and labour contents (13%), changes in job requirements (7,7%), skills obsolescence (6,7%). Moreover, every fourth of the questioned mentioned other reasons among which there were applicants' low incentive to efficient labour, a lack of skills, a lack of professional mobility, shortage of funds for staff additional material encouragement, a lower level of applicants' professional ethics, cutback on social safety net, absence of applicants' skills professional assessment internal system.

By the way of ranging the priority characteristics of applicants for jobs according to the employers' choice (Figure 4) the following ones were mentioned: the practical experience in the branch (55,6% of respondents mentioned it as foremost), the availability of skills necessary for jobs (54,6%), qualification level confirmed with authentic documents (41,5%), social and psychological characteristics of applicants (38%).

Among the characteristics which were not of great importance or not essential for respondents were grades in a diploma, University Ranking and availability of documents about additional education.

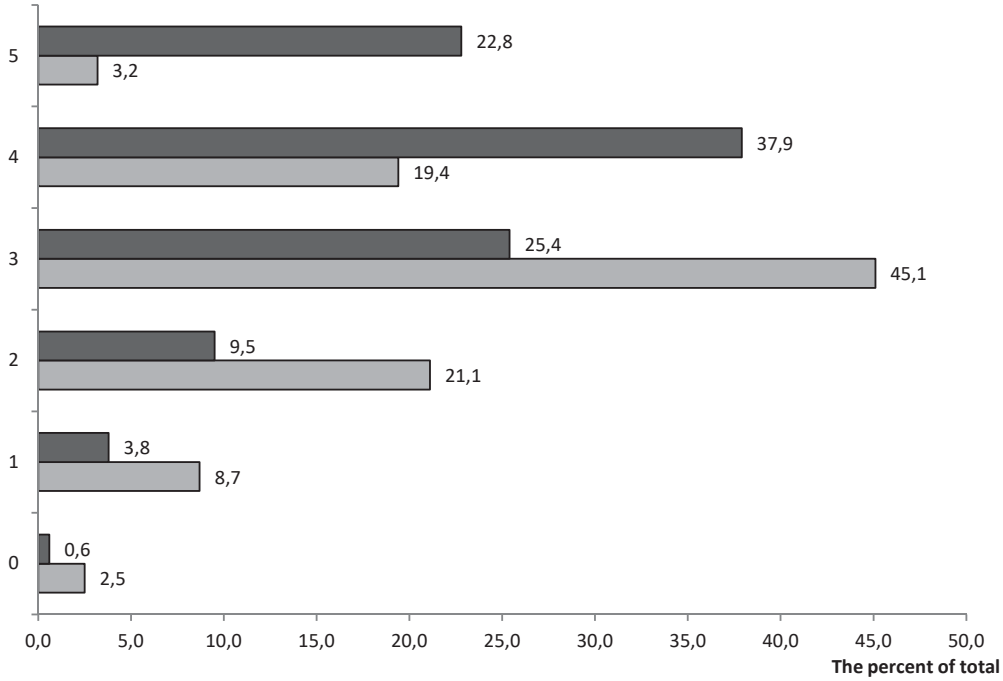
Figure 4. Ranging the main characteristics of job applicants by priority from 1 to 5 (1 point – unimportant, 5 points - prime).



Source: authors' own calculations.

Both employers and employees were suggested to estimate VET and HE matching jobs requirements on-scale, where 5 points mean full matching, 0 points – full mismatch (Figure 5). In such a case, employees estimated matching of employees' professional training working at their enterprises or applicants requesting for vacancies. The results revealed that both employers and employees assess the training system differently. Presumably, employees estimate VET and HE matching job requirements within the range from 3 to 5 points, though employees tend to estimate it from 2 to 4 points.

Figure 5. The subjective assessment of VET and HE matching labour market needs



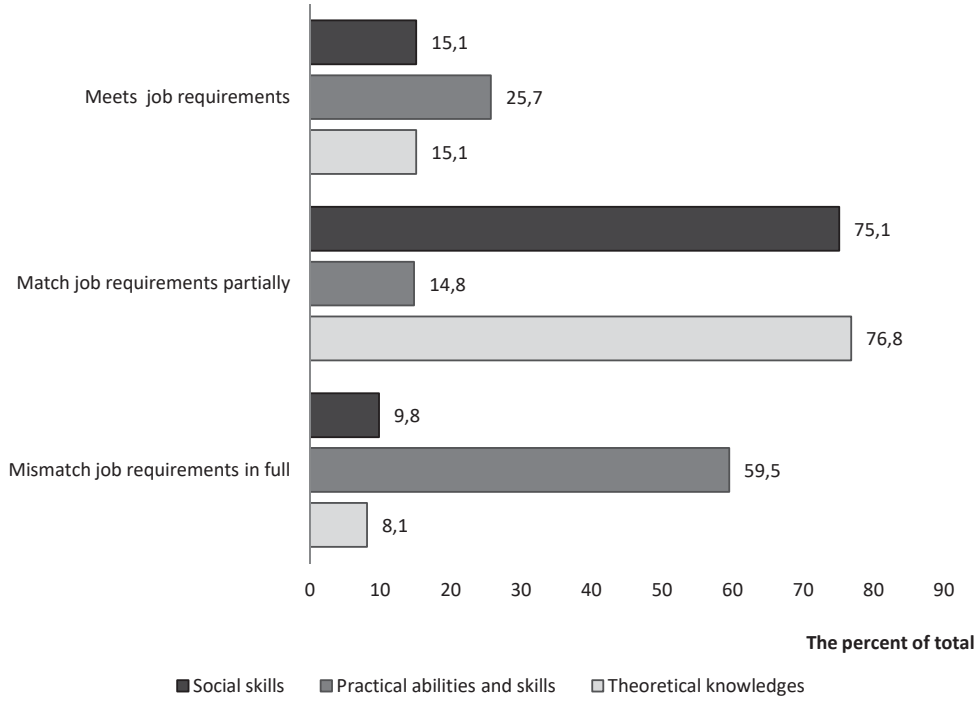
Source: authors' own calculations.

Thus, there are discrepancies in subjective assessments of employers' and employees' educational training. Particularly, 45,1% of employers consider that knowledge got by the VET and HE is appropriate to the average level, but 37,9% of employees assess the personal training as fairly good, 22,8% – as excellent, a 25,4% – as satisfactory.

In major cases (Figure 6) the employers noted that theoretical knowledge and social skills gained by the applicants in educational establishments match job requirements partially (76,8% and 75,1%), whereas practical skills mismatch job requirements in full (59,5%). The similar results were received during the survey on higher education Ukrainian graduates'

placement,[192] in which employers stated that the main obstacles for job application are a low level of training (59%), steep demands for salary and inadequate graduates' career expectations (40%) and working experience (37%). Besides, the report mentioned dissatisfaction of employers with the level of higher educational graduates' theoretical training, which was called low, or lack of necessary skills for jobs (32%)[193].

Figure 6. Matching applicants' skills and jobs



Source: authors' own calculations.

Nowadays Ukrainian employees more and more see eye to eye that personnel training system should be closer to up-to-date realities while educational establishments should be more open to new technologies in real

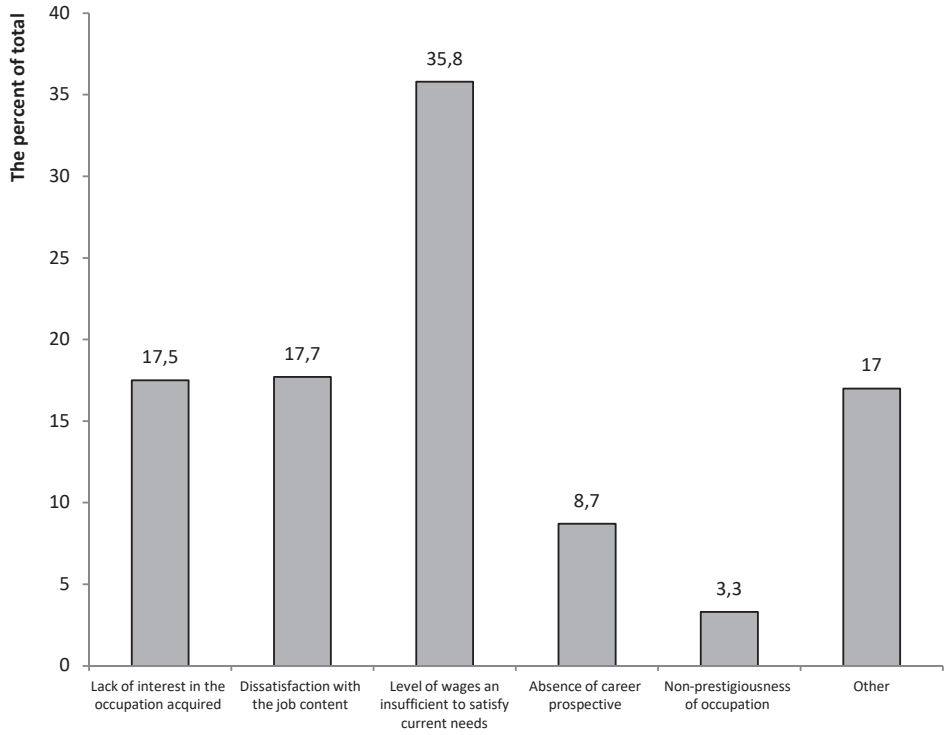
[192] SKM, (Oct 15, 2013) Employment experience of high ereducation graduates: a view of graduates and employers.
[193] The same.

life as well as in education. Contemporary education system should be aimed at shaping practical skills. However, the society more and more often face the challenge when theoretical overtraining sets obstacles for reference implementation of skilled acquired. Job applicants often note that knowledge gained in VET and HE is out of date and unnecessary in practice. As a rule, the issue is directly regulated at the workplaces with the assistance of different educational programs and trainings letting pull up the staff's skills to the inner production requirements or by the ways of attempts to interact with educational establishments preparing the specialists of positions needed[194].

The majority of employees questioned (51,7%) noted that work in their degree field. Among the reasons of unwillingness to continue working by occupation the following ones are mentioned by 48,3 % of employees: an insufficient level of wages to satisfy current needs (35,8%), dissatisfaction with the job content (17%), a lack of interest in the profession acquired (17,5%), absence of career prospective (8,7%), non-prestigiousness of occupation (3%) (Figure 7). 17 % (or 204 people) mentioned other reasons, including failure to be employed without full higher education (46 respondents); rejection in job placement because of a lack of working experience (42 respondents); absence of demand for the occupation in the labour market (32 respondents); willingness of retraining (34 respondents); smashup of business (15 respondents); changing of place of residence and absence of jobs by occupation there (19 respondents); family circumstances (16 respondents).

[194] Hrynkevych S., T. H. Vasyltsiv, N. R. Hural Eds. (2016) Theoretical and methodological principles and application management tools of intellectual and staffing support of enterprises, Lviv, 308 p.

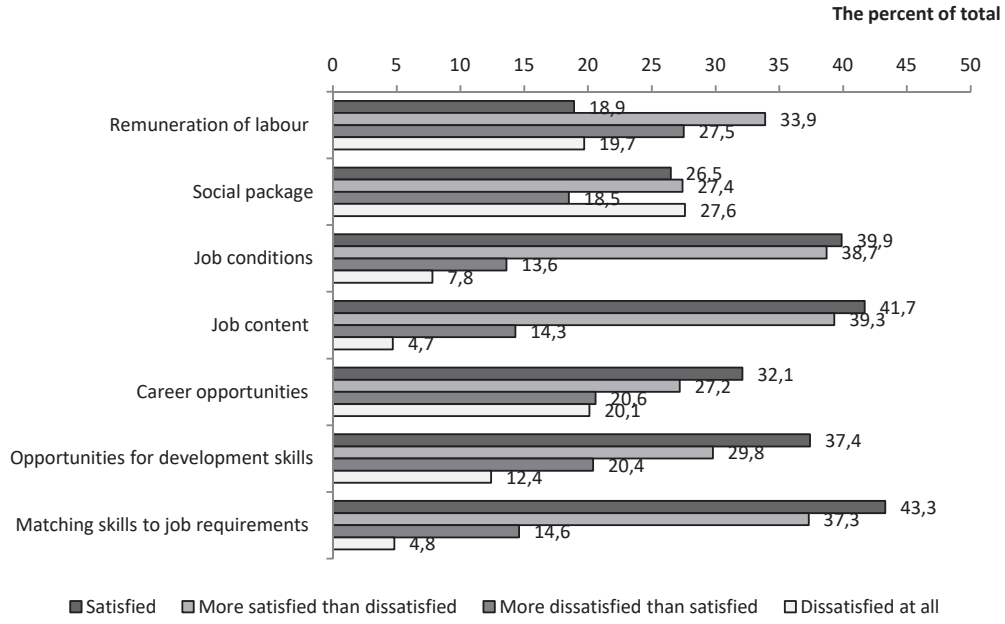
Figure 7. The main reasons of employees not continuing working within speciality



Source: authors' own calculations.

The survey revealed that of utmost importance are a degree of employees' satisfaction with a job and own self-assessment of job matching educational and skills characteristics. Thus, employees were suggested to define to which extent they were satisfied (or dissatisfied) with the conditions and remuneration of labour, and to what degree their skills matched jobs they did (Figure 8).

Figure 8. The degree of employees' satisfaction with job conditions and remuneration and the degree of matching their skills and job requirements.



Source: authors' own calculations.

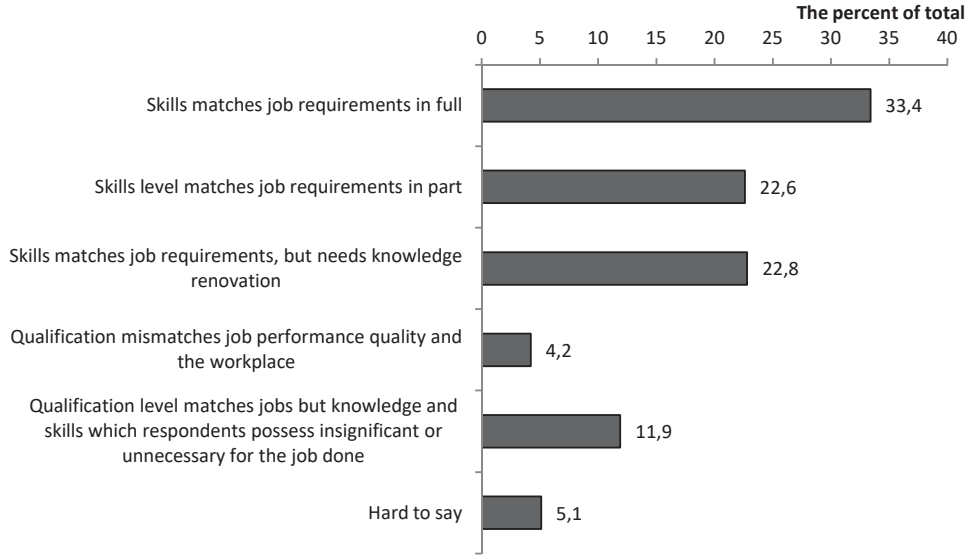
The employees noted they are satisfied with remuneration of labour (18,9%); social package (26,5%); job conditions (39,9%); job content (41,7%); career opportunities (32,1%); opportunities for development skills (37,4%). As for own self-assessment of matching skills to job requirements, 43,3% of respondents noted their satisfaction with skills, knowledge and training matching, 37,3% are more satisfied than dissatisfied, 14,6% are more dissatisfied than satisfied, 4,8% are dissatisfied at all.

One of the goals to conduct the survey was revelation of employees' perception of matching their skills and job requirements. Therefore, the question was set: 'To which extent do you think, requirements of jobs they have to do match the level of education acquired?' Half of the respondents noted that job requirements match their level of education in full (50,3%).

Every fourth had the job the requirements of which were lower than the level of education acquired, every fifth worked at the place which required the higher level of education than the employee had. Only 9,5% mentioned that their education matched the job in full.

Estimating the skills matching job requirements, 33,4% of employees mentioned that their skills matched job requirements in full, 22,8% – that their skills matched job requirements, but needed knowledge renovation, 22,6% – that their skills level matched job requirements partly, 11,9% – that their qualification level matched jobs but knowledge and skills which respondents possessed were insignificant or unnecessary for the job done (Figure 9).

Figure 9. Employees' perception of matching their skills and job requirements



Source: authors' own calculations.

Only 4,2% of employees questioned thought that their qualification mismatched job performance quality and the workplace, though 5,1% found no answer to the question.

As the fact was revealed that employees admitted mismatching of their skills and job requirements in some cases, as well as employers complained

about lack of employees' theoretical knowledge and practical skills necessary for job performance quality, both groups of respondents were suggested to estimate the effect of such mismatch on labour efficiency. Therefore, the question was set: 'Does lack/excess of skills affect labour efficiency?' The scale of estimation ranged as follows: 'does not affect at all', 'affects insignificantly', 'affects', 'affects much'. It should be mentioned that employers spoke on the subject concerning interaction between labour efficiency and overeducation / undereducation more emphatically: 67,5% of respondents noted its significant effect, 24,7% – its slight effect, only 4,6% - its insignificant effect and only 3,2% - absence of effect.

As for the employees 14,5% noted no direct effect, 19,8% – its insignificant effect, 23,8% – some effect, 41,9% emphasized its significant effect. Despite the differences in opinions, there is a common thing. Both groups admit the effect of skills lack/excess on labour efficiency. Hence, prospective research into this issue should be made to estimate the level of this effect right at workplaces.

While conducting the survey it was revealed which skills were in utmost demand in the labour market, whether there were discrepancies in knowledge, skills, training gained and job requirements both by direct and indirect consumer of educational services. It allowed detecting subjective perception of existing and necessary skills, as well as imagining the level of educational services consumers' satisfaction with education system in general. To perform this task employers and employees were offered to estimate 'existing' and 'necessary' levels of skills on a 1-5 scale.

The primary goal of estimating theskills gained was to reveal to which extent employees possessed general skills, which were in demand at work, in particular: communicative, mathematical, educational, entrepreneurship, socio-economic, managerial, analytical and diagnostical, subject, technological, research, regulatory.

The goal of estimatingnecessary skills was to define the level of importance of specific skills as for workplaces offered in the labour market by employers and employed by the respondents. It is clear that the estimation

was general in character as respondents from different branches of economy took part in the survey, though they allowed revealing the peculiar differences between 'existing' and 'necessary' levels both by employers and employees. Such an approach was adapted from service quality marketing estimation procedure ServQual, which lets appraise consumers' opinion on expectations (in our case expectation of skills matching/mismatch by comparing subjective estimations of 'existing' and 'necessary' levels). Thus, skills of utmost importance for educational service consumers nowadays, skills of highest quality for meeting the job requirements were revealed, as well as the extent to which employees' self-assessment coincide with (differ from) employers' estimation.

The results received in the group of an 'existing' level of skills indicate that employees estimate such a level higher than employers do. In general employees' subjective assessment of general 'existing' level skills varies within 3,2-4,1 points (average – 3,7), whereas employers consider this skills matching as 2,9-3,5 points (average – 3,1).

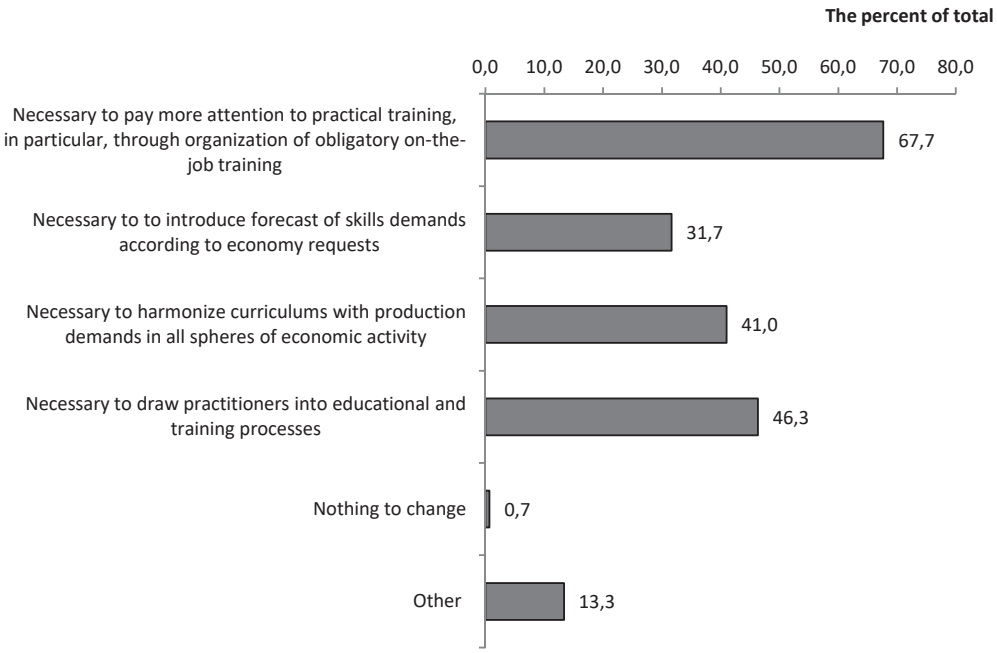
The employees consider their strong points the following ones: an appropriate level of communicative (4,2), training (4,0), subject (3,9), analytical and diagnostical (3,7), managerial (3,7) and technological. Legal and regulatory and research skills were mentioned as weaknesses. The employees noted the satisfactory level of communicative skills (3,5), whereas other skills were estimated at an average and low level, employees' research skills being the lowest (2,8).

The results of sociological monitoring allowed revealing the gap between levels of employees' 'existing' and 'necessary' skills. The survey conducted enables us to get the pattern of skills matching and create the subjective frame of labour market balance. Nevertheless, its results provide strong evidence that under the existing circumstances employers lack experience of stuff with skills needed, while employees admit the existence of skills lack/excess, which negatively influences the labour efficiency. Thus, it is necessary to develop an action framework aimed at overcoming existing misbalances in the labour

market by introducing a set of measures concerning improvements in education system development.

It should be mentioned that in general both employers and employees admit the existence of specific discrepancies in skills and job requirements. Among the main ways of solvingthis challenge 67% of employees consider it necessary to pay more attention to practical training, in particular, through organization of obligatory on-the-job training (Figure 10), 46,3% find it important to draw practitioners into educational and training processes, 41% – to harmonize curriculums with production demands in all spheres of economic activity, 31,7% – to introduce forecast of skills demands according to economy requests.

Figure 10. The ways of approximation of labour force skills and public demand (a few options to choose were suggested)

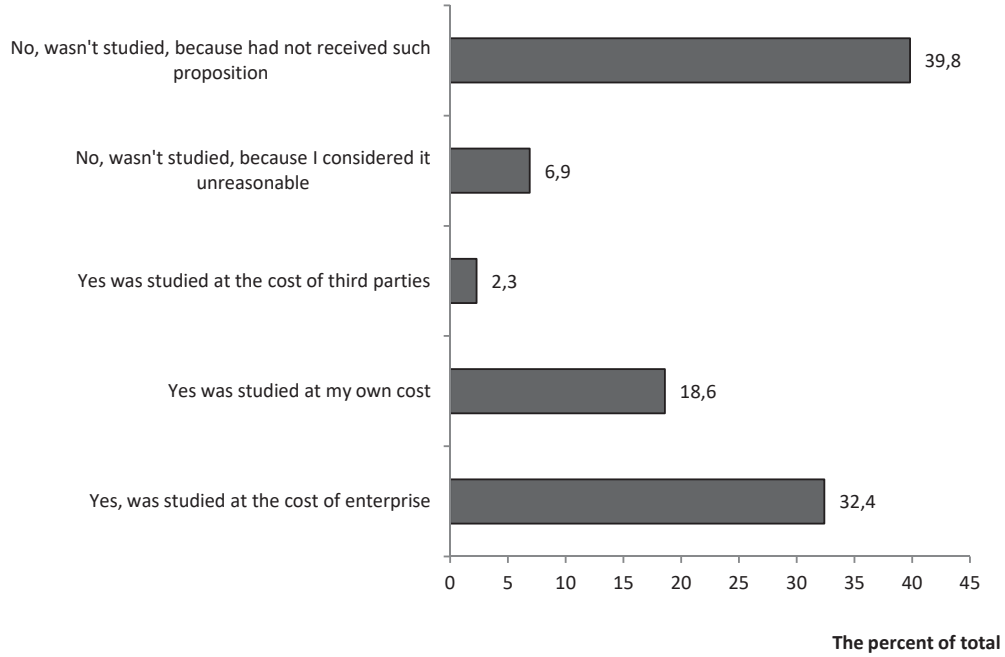


Source: authors' own calculations.

Among the ways of drawing near labour force skills and public demand matching respondents noted the following: reinforcement of educational establishments social responsibility for personnel training; employers' participation in professional standards development; providing publicity of information concerning prospective socio economic development and results of skills forecast; development of consulting network on career building.

It is not frequent to hear the opinion that modern enterprises waste a significant amount of money on additional personnel training and development while discussing the issue of mismatch labour market and education at the meetings of work groups with employees. Taking this into account, the author of this study decided to reveal whether the respondents had undertaken courses, trainings, and internships for the last 5 years and at whose cost (Figure 11).

Figure 11. Have you undertaken additional training (retraining), improving qualification courses, trainings, internships for the last 5 years?



Source: authors' own calculations.

More than half of employees (53,3%) are engaged into additional training (retraining) and improving qualifications courses, among whom 32,4% of questioned studied at the cost of enterprise, 18,6% – at own cost, 2,3% – at the cost of third parties. The rest (46,7 %) of respondents had not renewed their professional skills and undertaken the trainings for the last 5 years, in particular, 39,8% had not received such an offer, 6,9% considered it unreasonable.

The majority of the questioned (54,2%) believe that employers should pay for additional training (retraining), 18,6% regard the state as a payee (including 52,4% of public sector workers), 3,9% would like to study at the cost of the third parties (e.g. international organizations, educational centres, funds etc.) and 23,3% of respondents wish to study at own cost. Every ninth of the questioned wished to spend several days on professional training (retraining) and improving qualifications courses, every third – several weeks, every fifth – -several months.

One of the ways to deal with a problem ofskills mismatch and job requirements is social partnership in the sphere of personnel training. In Ukraine, there is a practice of interaction between employers and establishment of VET and HE. However, both sides often blame each other for disinterest in such partnership. Thus, one of the goals of the survey was to define the degree of interaction between VET and HE establishments and employers taking part in the survey and reveal the most efficient directions in this sphere.

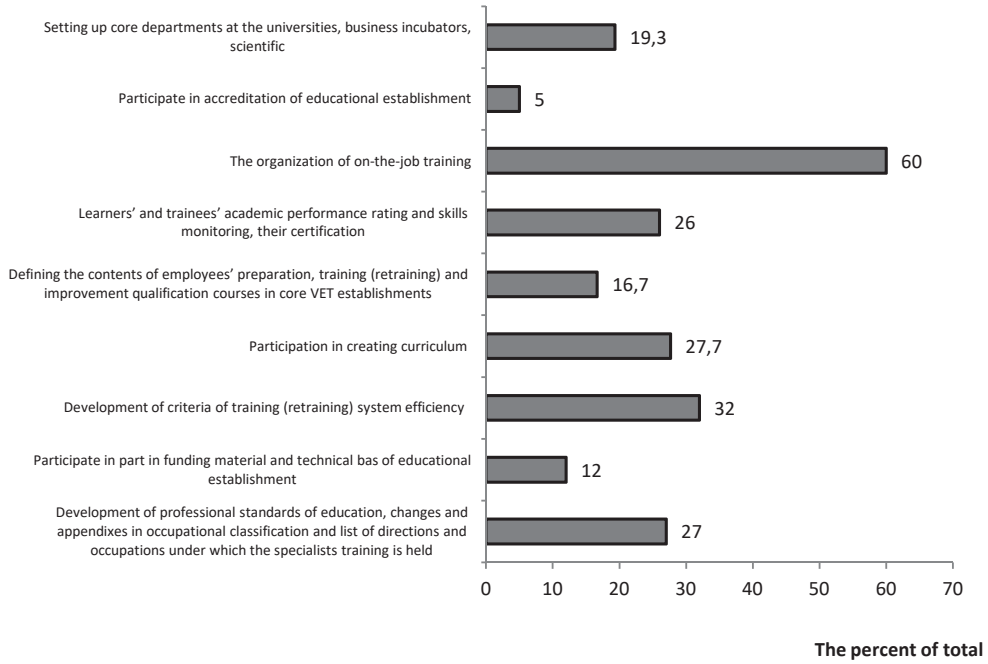
More than half of questioned employers (51,1%) noted that their enterprises (organizations) did not cooperate with educational establishments. But only 9,6% of employers were not interested in such cooperation (presumably businesses with staff up to 50 people). Every fifth of respondents eagerly refused to cooperate than agreed in case of such cooperation being proposed. The rest of respondents in general had positive attitude to such cooperation.

Simultaneously 48,9 % of questioned employers had some experience concerning cooperation with VET and HE establishments. Estimating the level

of cooperation with educational establishments, only 13,2% of the questioned marked it as high, 23,7% considered it above the average, 7,4% – below the average. Every third of them found the cooperation satisfactory (an average level), every fifth – unsatisfactory (a low level).

To reveal the opportunities for improving the interaction between VET and HE establishments and employees the latter was suggested to choose several ways of the most efficient cooperation (Figure 12).

Figure 12. The directions of interaction between enterprises (organizations), VET and HE establishments



Source: authors' own calculations.

Among the directions, employeesmainly singled out organization of on-the-job training (60%), development of criteria of training (retraining) system efficiency (32%), participation in creating curriculum (27,7%); development of professional standards of education, changes and appendixes in occupational classification and a list of directions and occupations under which the

specialists training is held (27%); learners' and trainees' academic performance rating and skills monitoring, their certification (26%); setting up core departments at the universities, business incubators, scientific (19,3%); defining the contents of employees' preparation, training (retraining) and improvement qualification courses in core vocational educational establishments (16,7%). Only 12% of questioned employers are ready to participate partly in funding material and technical base of educational establishment, 5% – in accreditation of educational establishment.

Half of employees think that among the skills to be in demand in future are team-working skills, skills of dealing with consumers' requests, skills of managing projects and processes, skills of working under pressure, a high level of uncertainty and fast changing of tasks, which force the employees to have quick decision-making skills, flexibility of reacting to working conditions changes, resources distributing and time-management skills. Every third of the questioned among the skills of nearest future mentioned intersectoral communication skills providing understanding of technology, processes and a market situation in different related/unrelated sectors, systematic thinking meaning the ability to determine complicated systems and deal with them. Every fifth employer noted a rise in prospective demand for multilingual and multicultural skills, which mean the knowledge of foreign languages, understanding of national and cultural context of partner countries, as well as programming IT-decisions, managing of complicated automatic complexes, coping with artificial intelligence.

Among other competences 26,7% of questioned employers mentioned the following ones: engagement in work requiring the search for production challenges decisions; the ability to work under time pressure and a lack of information; mobility in decision-making process in unconventional situations; skills of technological process rationalization; skills of great database technological processing; an inclination to resist undefined situations.

According to employers skills matching job requirements can be achieved by the ways of personnel training system approximation to the real life, i.e. involvement into obligatory on-the-job training at the enterprises

(67,7% of respondents), involving teachers with the practical experience into educational process (training) (46,3 %), harmonization curriculums with production demands in all spheres of economic activity (41,0 %), introduction forecast of skills demands according to the economy. Among the ways of drawing near labour force skills and public demand matching 13,3 % of respondents noted the following: reinforcement of educational establishments social responsibility for personnel training; employers' participation in professional standards development; providing publicity of information concerning prospective socio-economic development and results of personnel demands forecast; development of consulting network on career building.

Conclusions. The conducted research revealed that the modern structure of labour force knowledge and skills in Ukraine differs from the appropriate structure of demand for them. It is identified that in spite of specialists' oversaturation in the national labour market, employees have become more and more aware of complications concerning staff recruiting which are stipulated by the lack of skilled personnel, a low level of labour remuneration, applicants' skills mismatch to job requirements, steep demands of job applicants, negative appeal of job contents and conditions, changes in job requirements, fast obsolescence of skills. Every fourth of respondents named other reasons such as low motivation for efficient work, a lack of skills, low professional mobility, a lack of funds for additional material incentives, a low level of job applicants' professional ethics, a reduction of social guarantees, the absence of inner assessment system of applicants' skills matching the job. The discrepancies in employers' and employees' subjective estimates of educational training are revealed. Both groups of respondents admit the existence of correlation between overeducation (undereducation) and labour efficiency. The author's prospective research will be made into the development ways of harmonization between labour force skills and labour market demands.

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ECONOMIC CAUSES AND CONSEQUENCES OF ARMED CONFLICT IN THE CONTEXT OF DONBASS REINTEGRATION

Abstract. The post-bipolar system of the international relations is a factor of the emergence and the spread of the asymmetric conflicts of all types and kinds. In a globalized world, the number of the asymmetric armed conflicts is decreasing but the destructive impact of the short-term conflicts is increasing. Terrorism, as one of the types of the modern asymmetric conflicts, has become a global problem of the 21st century.

The purpose of this article is to identify new types of the modern armed conflicts and their economic impact on the economy and the security of states.

The methodology for studying the problems of the modern armed conflicts is a dialectical, geopolitical approach, a systematic, comparative analysis, the method of generalization, analogy, a statistical analysis methodology, the information and analytical method, the documentary methods, the synergetic methodology (homeostaticity, hierarchy, definition of bifurcation points), the methods of the expert assessments, the complex approaches of a research that includes a historical retrospective.

The article studies the issues of the classification of the modern armed conflicts, the problems of its origin. The analysis of the economic consequences of the armed conflicts is presented through the historical retrospective. Some economic indicators of the consequences of the armed conflicts for the recent years have been investigated. The parameters of the damages of the modern armed conflict in Ukraine have been analyzed. The typical problems of the threats to a country's economic security during the period of increasing the armed conflicts have been specified considering the example of Ukraine.

JEL Classification System: F51, F52
Key words: asymmetry of modern conflicts, armed conflicts, armed conflict in Ukraine, national security

Introduction. The historical retrospective of the global transformations allows us to state that during the existence of the humanity there is an

attempt of its one part to conquer its other componental parts. Therefore, wars were the means of the global transformations. Their result was the division of the transformed global territories and empires into a center and a province. However, World Wars I and II, as well as the emergence of the weapons of the mass destruction made impossible the use of wars as the means of making the global transformations. The strengthening of the economic interrelations between the countries of the world took their place. And if, during the era of the military redistribution of the world the interests of the winners did not require the justification by the losers, in the era of the global transformations its expediency should be proved to both parties by means of strengthening the economic interaction. That is, in the era of the armed global transformations the problem of their paradox didn't appear. For all their participants it was obvious that as a result of the global transformations winners receive certain benefits or profits from the economic point of view, and the losers - the corresponding losses.

In fact, in the case of the global transformations using the armed means, any country cannot fail to respond to an aggression and had to resist, that is to say, to fight or to recognize a defeat and surrender at discretion. That is, the external circumstances require the country to make certain decisions. A country cannot fail but respond to these circumstances.

The modern era of the global transformations unlike the previous military era, proclaims, on the one hand, the voluntary participation of all the countries of the world in globalization and, on the other, the objective need to participate in it. However, at the same time there appears the paradox of the situation: if globalization is positive for all the countries participating in it, then it is logical to assert its voluntary nature. Such a choice is characterized by the presence of contradictions.

The structure of the post-bipolar system of the international relations causes the emergence and spread of asymmetric conflicts of all types and kinds. The existence of one superpower, a number of economically developed countries and most of the weakly derdeveloped ones; the weakness of a systemformation relations - these factors cause the strategic asymmetry.

The long-term asymmetric conflicts in the globalized world tend to decrease while the number and the impact of more devastating, short-term conflicts are increasing. As a result, the existing structure continues to experience more pressure. In the existing world structure the use of the asymmetric strategies with a high degree of risk, such as terrorism, is increasing. On the one hand, this is explained by the limited access of some states to more expensive strategies and, on the other hand, by the destructive nature of the conflicts with such participants involved. The constructive potential of asymmetry in such conflicts disappears. Globalization and glocalization intensify the asymmetric tendencies of the modern world. In particular, the effect of "blurring" a state sovereignty leads to an increase in non-state actors who are more inclined to use asymmetry in comparison with the states. The asymmetric conflict is a consequence of the structural changes and a catalyst for further transformations. It cancause the eppearance of the structure of bifurcation and negatively affect the safety of its elements.

Bifurcation of the international structure in the era of globalization and the systemic instability of the world in the twenty-first century intensified and gave a new meaning to the security asymmetry, in particular, asymmetric conflicts.

I.Todorov[195] defines an "asymmetric conflict" as the one in which the goals of the participants or means of achieving them are qualitatively different. Ukrainian contemporary scholars of asymmetric conflicts Yavorska H. M.,O. I. Yizhak[196] in the classification of military conflicts specify the new types of the modern asymmetric conflicts as the types of the armed conflicts: cyberwar, net and centric war, irregular wars, mostly related to terrorism and hybrid wars.

[195] Potyekhin, O., Todorov, I. (2011). Globalization of the security system. Donetsk: Donetsk National University,111-120.
[196] Gorbulin, V. (2017). World hybrid war:Ukrainian front. Kiev: K.: NISS, 496, 21-31.

Asymmetric military conflicts were investigated by such scholars as Dominic D.P. Johnson and Monica Duffy Toft[197], Michael J. Mazarr[198], A. Paulusand M. Vashakmadze[199], Eliav Lieblich with Owen Alterman[200], J. Otomar, Bartos, Wehr and Paul[201], Gorbulin V.[2], Potyekhin and Todorov[202]. For better monitoring, the study of the effects of the armed conflicts to the economy and the security of a state at present, there appeared a need to update the classification of the armed conflicts and the methodology of their research.

The purpose of this article is to identify new types of the modern armed conflicts and their economic impact on the economy and the security of states.

The structure of the paper is as follows: Section 2 provides a brief review of the approaches to the classification of the asymmetric conflicts with the specification of the modern armed conflicts; Section 3 describes the data of the economic consequences of the armed conflicts and terrorism in the hystoric retrospective; Section 4 provides a brief review of the damages analysis as a result of the modern war in the Donbas; Section 5 encluding remarks connected with the conclusions as to the possible methodology of the economy research of the modern armed conflicts within the period of the global transformations.

Classification of international conflicts. Systems of values that have been formed over the centuries served as a kind of the "genetic codes" of different cultures

[197] Johnson, D., Toft, M. (2014). Grounds for War: The Evolution of Territorial Conflict. International Security, 7-38.
[198] Mazarr, M. J. (2008). The Folly of 'Asymmetric War'. Washington: Taylor & Francis.
[199] Paulus, A.,Vashakmadze, M. (2009). Asymmetrical war and the notion of armed conflict: a tentative conceptualization. Cambridge University Press: International Reviev of te Red Cross.91, 7–22.
[200] Lieblich, E., Alterman, O. (2015). Transnational Asymmetric Armed Conflict under International Humanitarian Law:Key Contemporary Challenges. Tel Aviv: Institute for National Security Studies, 191.
[201] Otomar, J. Bartos, Wehr, Paul (2002). Using Conflict Theory. Cambridge: Cambridge University Press.
[202] Potyekhin, O., Todorov, I. (2011). Globalization of the security system. Donetsk: Donetsk National University,111-120.

and civilizations under the pressure of the natural processes of globalization, begin to collapse and degrade.

Moreover, it does not mean the replacing of some dominant values by the others, which facilitate the adaptation of the ethnos or superethnos to changing conditions, which is a normal process and namely, degradation, loss of basic values. The most vivid processes of degradation are manifested in the destruction of the religious values. The destruction of the systems of values of the main ethnic groups and superethnos leads to the discrepancy of the processes initiated by globalization, the mutual incomprehencion of civilizations, the escalation of ethnic and inter-civilizational conflicts.

Such gaps and inconsistencies in the processes and phenomena of globalization cause the deepening of the global social and ecological crisis. If earlier there were local social and environmental crises, the current crisis covers all the countries. The social and environmental crisis means the simultaneous, synchronized, interconnected and mutually reinforced drastic changes in nature and society. The modern social and ecological crisis, which began in the second half of the XX century, acquires the global systemic characteristics[203]. Moreover, the struggle for resources becomes a factor in the asymmetries of the global conflicts, including armed conflicts.

Bifurcations of the international security at the present stage of the development of the globalized economy in the twenty-first century are intensified and provided a new quality to the asymmetry of the security, in particular, to the asymmetric conflicts. The asymmetry in its various manifestations has become almost the most severe challenge for the global economy.The international conflicts are not similar and are always characterized by the peculiarities, both by the causes of the emergence, the means, the composition of the conflicting parties and by the specific features of the conflict. That is why, any classification diagrams are obviously rather artificial which, however, does not deny the necessity to have them. The

[203] Radzievska, S. (2015). Global economy: Course lecture . Kiev : SIC GROUP Ukraina, 344, p.73-77.

Ukrainian scholars propose to consider the following criteria for a conflict: a subjectivity, a sphere of relations between the parties, a scale[204].

There are different classifications of international conflicts in the scientific environment but they are based predominantly on such common and proven criteria as: the means, the composition of the parties involved in the conflict, the geographical scales, duration (Figure 1).

By means the conflicts are traditionally divided into armed and unarmed ones as the use of the armed forces in resolving the international contradictions determines the most important features of the conflict.

Armed conflicts, in other words, the wars mean the deliberately organized actions of the armed forces of the conflicting parties in order to maximize the possible damage and to destroy the military and economic potential of an enemy. By causing the great devastating damage, the military means in the international relations are the most effective way of realizing the foreign policy interests of the states that have repeatedly caused wars.

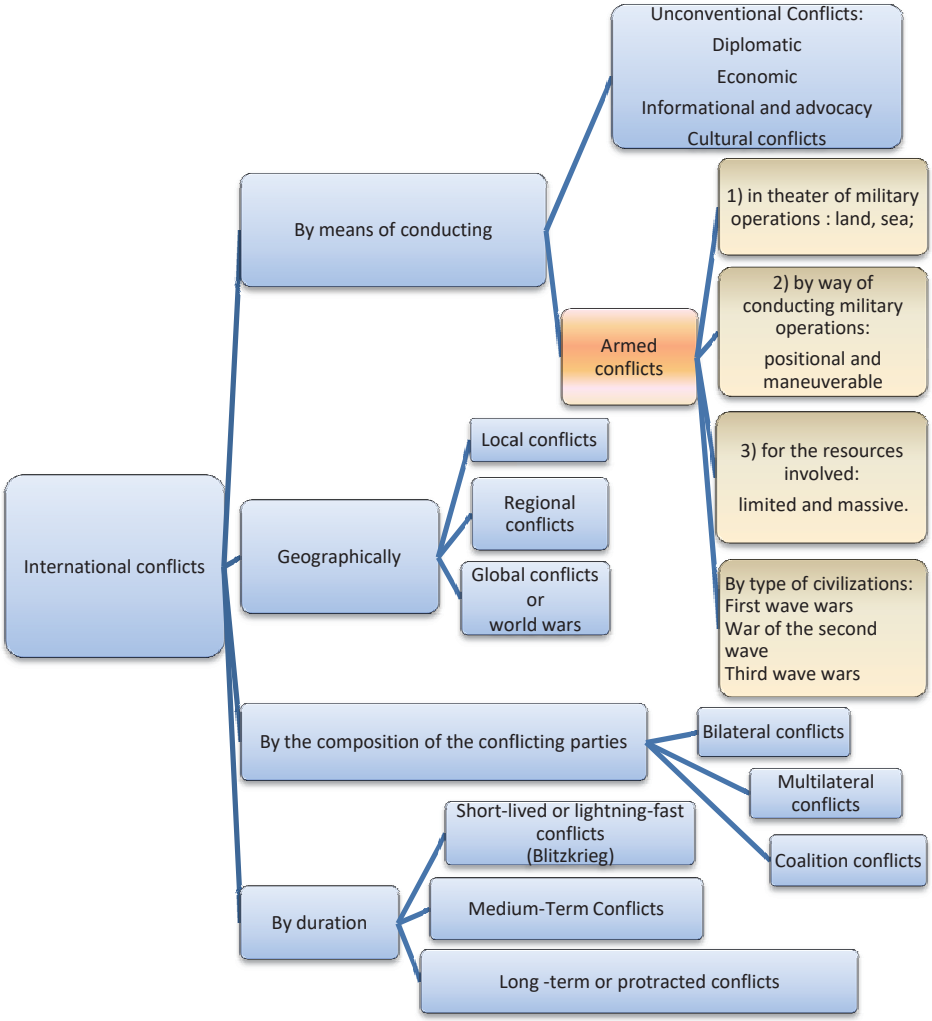
The initiation of a war is justified by the protection of its citizens, the need to stop genocide, the fight against totalitarism, terrorism, etc.

A rather original classification is proposed in the work "War and Antiwar" by E. Tofler and H. Tofler[205] as to the wars and the types of civilizations:

1. First wave wars correspond to agricultural societies and are characterized by a primitive technological level involving the irregular units, the small scale and the attracted resources.
2. Second wave wars are carried out by the high-tech industrial societies with the participation of the mass regular armies, the considerable resources and the scale used in the armed conflict.
3. Wars of the third wave are carried out by the post-industrial (informational) societies or the societies in transit with a super-technological level.

[204] Madison, V., Shakhov, V. (1997). Political science of international relations. Kiev: Lybid, 176.
[205] Toffler, A., Toffler, H. (1995). War and anti-war. New York: Warner Books, 370.

Figure 1. Classification of international conflicts



Source: compiled by the authors on the basis of Gorbulin & et al.(2017)[206], Potyekhin & Todorov (2011)[207], Malskyi & Maktsah (2007)[208].

[206] Gorbulin, V. (2017). World hybrid war:Ukrainian front. Kiev: K.: NISS, 496, 21-31.
[207] Potyekhin, O., Todorov, I. (2011). Globalization of the security system. Donetsk: Donetsk National University,111-120
[208] Malskyi, M., Maktsah, M. (2007). The theory of international relations: Textbook. - 3rd form. Kiev: Knowledge, 461.

The Global conflictsor the world wars cover almost the whole world because they are either directly or indirectly related to all regions of the countries even if they do not directly participate in the warfare. The similar conflicts are characterized by the territorial and resource scales of a struggle between the opposing coalitions. They are, basically, also medium-term conflicts. An example is World War I, which lasted for 4 years, World War II which lasted for 6 years due to the interregional character of the theater of military actions, which included land, sea and ocean areas with the total area of several million square kilometers.

The World wars predominantly arise in a multipolar international system and are primarily related to the imbalance of power of the leading world powers and the coalitions governed by them.

As to the composition of the conflicting parties, the international conflicts are clearly divided into bilateral, multilateral and coalition ones.

The bilateral conflicts arise as a result of the territorial, ethnic and religious contradictions between the adjacent states, and, in fact, they have predominantly the local and protracted character. In some cases, the bilateral conflicts may also take place at the interregional level, such as the Japanese-American "trade war" of the 1970s - 80s or the war between Spain and the United States at the beginning of the 20th century.

The multilateral conflicts are characterized by the chaotic or gradual involvement of states in the struggle between one and the other groupings caused mainly by the contradictions of the political, economic and military character. Such conflicts are mostly of a regional scale and of medium-term duration.

The coalition conflicts are planned beforehand, by one-time involvement of the states in a confrontation. That is, the coalition of the states set up in advance, begins to act in accordance with the so-called casus foederis, on the basis of the pre-made alliance agreements on the military and political guarantees of the mutual security. Such agreements are of a confrontational nature since they are always directed against a particular state or a confronting coalition. The coalition conflicts in the XX century, as a rule,

were global by nature and characterized by the average (4-6 years) duration and huge resources, which were involved in the confrontation.

By duration, the international conflicts are divided into short-term (lightning), medium-term, and long-term (protracted).

Short-term or lightning conflicts are generally local and are characterized by the insignificant volumes of the attracted resources with a duration that can range from a few days to several months. They take place mainly on a bilateral basis and rarely on a multilateral basis, such as Suez conflict where the conflicting parties were the United Kingdom, France and Israel on the one hand and the Arab Republic of Egypt, on the other.

Medium-term conflicts take place within 4-6 years and are characterized mainly by the regional and the global spatial scale. They occur on a coalition basis and are characterized by a huge amount of the resources involved. In the XX century, the both world wars were the example of such international conflicts which significantly changed the international relations having become the "catalysts" of the process of the transformation of the international system.

The long-term or protracted conflicts last from 6-7 to 10 years or more. They are characterized by both regional and local geographic boundaries and the significant scale of the resources used. Such a conflict is, for example, the Iran-Iraq conflict which lasted for about 10 years or, as an exception, the Japanese-American trade warfare which being of the interregional character lasted almost twenty years[209] .

The asymmetric conflicts. If we expand the concept of an "inequality" and draw attention not only to the quantitative but also to the qualitative parameters and to interalate it with the specific social processes, there appear the concept of the "asymmetric" conflict.

The asymmetric conflicts in the post-bipolar system of the international relations tend to intensify not only in terms of quantity but also intensity. The explanation for this is the changes that have undergone the regulatory

[209] Malskyi, M., Maktsah, M. (2007). *The theory of international relations: Textbook. - 3rd form.* Kiev: Knowledge, 461.

mechanisms of the international relations, as well as the new groups of the contemporary contradictions. The formation of a "three-layer" structure with a single military superpower, several centers of the economic power and force centers with the advantages in the individual components creates the preconditions for the emergenceof the asymmetry, the specific manifestations of which, for example, terrorism is capable of creating strong catalyzing challenges for the global megasystem while the meaningful manifestations of the asymmetry change this structure evolutionary, gradually.

I. Todorov defines the "asymmetric conflict" as the one where the goals of the participants or the means of their achievement are qualitatively manifested at the time of using the "force" (or rather, the advantages) of one of the participants against the "weakness" of another one[210]. It is clear that both of these factors are relative and are relatively asymmetric. The external environment of the conflict does not create asymmetry but it can stimulate it. The asymmetric conflicts can be monitored at different stages of the development of the international relations, as there are differences between different participants as to their resources, the technology used or ethical and religious values. In this sense, the asymmetry of the conflicts of Ancient Rome against the barbarians or the current interstate anti-terrorist coalition against the non-state net of terrorism is similar. Both the impact of the conflict on the environment and the impact of the the environment on the conflict are different.

The asymmetric armed conflicts were studied by such scholars as Dominic D.P. Johnson and Monica Duffy Toft[211], Michae lJ. Mazarr[212], A. Paulusand M. Vashakmadze[213], Eliav Lieblichwith Owen Alterman[214],

[210] Potyekhin, O., Todorov, I. (2011). Globalization of the security system. Donetsk: Donetsk National University,111-120

[211] Johnson, D., Toft, M. (2014). Grounds for War: The Evolution of Territorial Conflict. International Security , 7-38.

[212] Mazarr, M. J. (2008). The Folly of 'Asymmetric War'. Washington: Taylor & Francis.

[213] Paulus, A.,Vashakmadze, M. (2009). Asymmetrical war and the notion of armed conflict: a tentative conceptualization. Cambridge University Press: International Reviev of te Red Cross.91, 7–22.

V. Gorbulin[215], Potyekhinand Todorov[216]. Based on the results of the literature studied,wedetermine the following asymmetric conflicts.

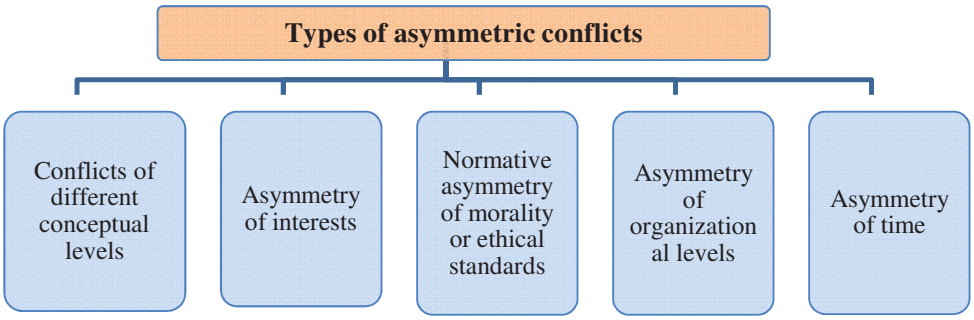
1. *Short-term and long-term asymmetric conflicts.*

2. Planned and "random" asymmetry.

3. An asymmetric conflict can be *high or low risk for each of the parties.*

A high degree of risk is inherent in short-term conflicts where one party applies a "cheap" strategy such as terrorism. The likelihood of success in a terrorist act is too casual to be reliable. Thus, a terrorist act may not guarantee the achievement of the goals but, on the contrary, complicates, for example, mobilizing or combining attack to objects and in any case its impact is temporary.Depending on the level of the system hierarchy, the essential characteristics of the asymmetric conflict, there can also be distinguished certain types of the asymmetric conflicts (Figure 2).

Figure2. Types of asymmetric conflicts



Source: compiled by the authors on the basis of Potyekhin, O., Todorov, I.[217]

H. Yavorska, O. Yizhak[218], the scholars who studied the asymmetric conflicts made the classification of the military conflicts specifying the new

[214] Lieblich, E., Alterman, O. (2015). Transnational Asymmetric Armed Conflict under International Humanitarian Law:Key Contemporary Challenges. Tel Aviv: Institute for National Security Studies, 191.
[215] Gorbulin, V. (2017). World hybrid war:Ukrainian front. Kiev: K.: NISS, 496, 21-31.
[216] Potyekhin, O., Todorov, I. (2011). Globalization of the security system. Donetsk: Donetsk National University,111-120.
[217] The same.
[218] See 215.

types of the modern asymmetric conflicts: cyberwar, network centric war, irregular wars, mostly related to terrorism and hybrid wars.

The authors state that in order to understand the specifics of the hybrid war, there is an important idea of the functional transformation to the traditional non-armed means of the force influence and its combination with the actually military methods.

The military analyst F. Hoffman[219], the theorist of the concept of a hybrid war who introduced this term to a broad circle, proceeded from the position of heredity in the wars of all times, the relevance of the historical lessons and methods of the warfare and the behaviour of enemies which was also earlier described by Fukidid. At the same time, F. Hoffman[25]tried to formulate the fundamentally new generalized characteristics of the contemporary conflicts. Central to its concept is the thesis of strengthening the tendency towards a convergence in modern conflicts which manifests itself in the rapprochement and mutual penetration (combining) of the aspects of the war which are usually separated: physical and psychological measurements, kinetic and non-kinetic weapons, participants and non-participants in the warfare.

Convergence covers, in his opinion, regular military forces and proxy groups, it blurs the distinction between the state and non-state actors of the military actions and the unequal armed potentials. A similar tendency changes the forms (modality) of the war, and the traditional categorical distinction between terrorism, conventional military actions, a crime, and irregular wars lose its practical significance, according to Hoffman.

In general, a hybrid war is understoodas a militaryactions carried out by a combination of militaristic, quasi-militaristic, diplomatic, informational, economic and other means to achieve the strategic political goals. The specificfeature of the combination is that each of the military and non-military methods of conducting a hybrid conflict is used both for the military purposes and as a weapon. The transformation to weapons (English- "weaponization") occurs not only in the media sphere. Similarly, other non-military means of

[219] Hoffman, F. (2007). Conf lict in the 21st Century: The Rise of Hybrid Wars. Arlington, VA: Potomac Institute for Policy Studies,14.

conducting a hybrid warfare are used as the weapon that inflict the damages to various systems of an enemy.

As you can see, almost all definitions of the types of a war are given on the basis of the main method or a set of means to conduct a war. The method defines the essential characteristics: the war in which it is used, an enemy who uses it and the threat. It is important that most definitions of the types of wars that are given do not exclude the probability of a methodological error. Absolutization of the method enables the understanding of a particular type of war. In addition, there is a situation where the military actions, types of threats and the enemy-aggressor are united by a common definition of the name of the method (for example, hybrid war, hybrid threat, hybrid enemy) and under certain conditions can act as the undifferentiated entities.

There is another methodological problem of specifying a war based on the method of its conducting which reflects the causes and the goals of the war. In addition, the method of a war does not reveal its strategy. The understanding of it does not answer the question of why a war is being conducted what a victory or a defeat mean and what the price of a war is.

Historical retrospective study of the economy of armed conflicts. The war as a way of solving the international problemswhich is followed bythemass destruction and the death of many people, generates the desire for the violence and the spirit of aggression, was condemned by the thinkers-humanists of all historical epochs. However, many of them following the French socialist utopian T. Fourier, could bitterly state that wars are a constant companion of the mankind. "Wars, revolutions continuously overspredto all parts of the globe; the storms, hardlystopped are revived from their ashes just as the heads of the hydra multiplied under the Hercules's blows: peace is only a glimpse, only a dream for some moments<...>" [220].

The comparative analysis of the wars by P. Sorokin proves that some historical periods are characterized by two, five or even thirty years of the continuous warfare. There are several years of peaceful life in other periods.

[220] Fourier, Charles (1808). Theory of the four movements and the general destinies. Lyon: appeared anonymously.

However, it is important to state that the periods of the continuous peaceful life without a war for a quarter of a century ia an extremely rare event in the history of the countries, and the periods of about a hundred years of peace are simply unique as it was in the history of the Netherlands, for example. "In the past almost each generation (25- 30 years) with a rare exception waseither a witness or a participant in the phenomenonof a war"[221] (Table 1).

Table1. The amount of yearswhen the countries were not in a state of a war within the period of XIV - XX century (per cent)

Country	Number of years without a war within the period studied, per cent
Greece	57
Austria	40
Germany	28
Netherlands	44
Spain	67
Italy	36
France	50
England	56
Russia	46
Poland and Lithuania	58

Source: compiled on the basis ofP. Sorokin

P. Sorokin[222], a well-known researcher of the world wars developed a system of the indicators that provided the most accurate analysis and the conclusions based on the data rather than on the subjective judgmentswhich characterisedthe historical and sociological works of the military subjects. Among the main indicators of the war, the scholar distinguishes the absolute figures of the size of the armed forces and the size of the human losses as well

[221] Sorokin, P. (1937- 1941). Social and Cultural Dynamics : In 4 vol. N. Y.: American Book Co., 337-352.

as the relative indicators that can specifythe changes in the dynamics of the military burden on a society and compare the states with different population size.In addition, the data were calculated based on the population of both specific countries and the whole Europe instead of thedata that are difficult to quantify according to the historical and statistical sources and these calculated minimum and maximum figures allow us to speak of the objectivity of the further calculations as to the burden of militarization and the burden of the human losses. He presented three variants of the calculationsdepending on the maximum, minimum and average calculated population sizethrough the centuries, when the accuracy of thestatistical data is doubtful (Table 2).

Table 2. Common figures for France, England, Austria-Hungary and Russiafor the period of 1101 – 1925.

Years	Size of army (number of military)	Losses (number of people)
1101–1200	1 161 000	29 940
1201–1300	2 372 000	68 440
1301–1400	3 867 000	166 729
1401–1500	5 000 000	285 000
1501–1600	9 758 000	573 020
1601–1700	15 865 000	2 497 170
1701–1800	24 849 000	3 622 140
1801–1900	17 869 800	2 912 771
1901–1925	41 465 000	16 147 550

Source: compiled on the basis of P. Sorokin[223]

As we see from the Table 2, over the centuries there is not a straightforward trend: after increasing the size of the armies and the combat losses within the period from XII - XVIII century, in the XIX century both indicators go down; in the case of the absolute numbers, there is not any hint of the disappearance or decreasing the number of wars. Regardless of the size

[223] Sorokin, P. (1937- 1941). Social and Cultural Dynamics : In 4 vol. N. Y.: American Book Co., 337-352

of the armies, modern wars are becoming more and more homicidal; despite the increase of both indicators, the growth of losses is higher than the increase in the size of armies (the size of armies - 36 times, the level of losses - 539 times). As to the relative indicator of losses, the most important indicator of the war, they indicate that "the curse or privilege of becoming the most devastating or most bloodiest military century is the 20th century"[224]. Moreover, the percentage of losses as a result of the army size increases significantly (Table 3).

Table3. Dynamics of losses as a result of the armed conflicts

Century	Per cent of losses as a result of the armed conflicts
XII	2,5
XIII	2,9
XIV	4,6
XV	5,7
XVI	5,9
XVII	15,7
XVIII	14,6
XIX	16,3
XX	38,9

Source: calculated by the authors according to the P. Sorokin[28]

During the First World War, the losses in the battlefields amounted to about 10 million people, in particular, in Russia - 2.5 million, France - 1.4 million, Great Britain - 900 thousand, Belgium - 100 thousand, Germany – 2 million, Austria- Hungary - 1.5 million, Italy - 600 thousand people. Many people died in theinternment camps. For the military purposes, about 180 thousand tons of poisonous substances were produced. At the end of the war

[224] Sorokin, P. (1937- 1941). Social and Cultural Dynamics : In 4 vol. N. Y.: American Book Co., 337-352

the population of the Earth exhausted by shortcomings and sufferings, was stricken by the severe epidemic desease of the flue ("Spanish influenza") which killed about 20 million people.

World War II became the most devastating in the history of the mankind. 61 states and more than 80per cent of the Earth's population participated in it. Only in Europe, this war (taking into account the USSR) took away the lives of 40 million people of which 27 million - the lives of the Soviet people; the losses of Poland amounted to 6 million people, Yugoslavia - 1.7 million people, France - 600 thousand people, the USA - 400 thousand people, England - 370 thousand people. Germany lost 13.6 million people in this war. In addition, the states of other parts of the world have lost approximately 7.6 million souldiers and 6 million civilians[225]. The total irretrievable loss during the Second World War was about 55 million people (Table 6).

Table 6. The scale of the last two world wars

Parameters	World war I (1914–1918)	World war II (1939–1945)
Number of states participated in the war	38	61
Number of people involved in the war, million people	1552	2019
Number of people mobilized in the armed forces, million people	73	107
Total number of armed forces, million people	45,3	61,2
Number of states on the territory of which military operations took place	14	40
Area covered by military actions, thousand km²	4,07	22,1
Duration of war, days	1564	2194
Wounded, million people	20	35

[225] Gofman, V. (2001). Ecological and social aspects of the economics of nature management: textbook. Chelyabinsk: YuUrGU, 631, 38.

Killed, million people	10	30
Died from disease and wounds, million people	20	26

Source: calculated by the authors according to the Sorokin, P.[226]

The data showed that during the history there are no sTable "peaceful" or sTable "militant" nations. The widespread view that democratic regimes are less aggressive than autocratic one does not find any confirmation in history. At the beginning of the twentieth century the relative militarization of England was higher than that of Spain; of France - higher than that of Austria or Russia. In the XIX century Democratic France was not more peaceful than the autocratic Germany, Russia or Spain. During the XVII century England had approximately the same state as Russia had.

In the twentieth century after the Second World War, according to various estimates, there were recorded from 225 to 232 military conflicts in 148 regions on the planet[227]. And the wars remain a sorrowful sign of the existence of mankind in the new millennium. According to the University of UPPSALA, the highest concentration of terrorist attacks is observed in the Asian region, Africa takes the second place and the countries of the Middle East – the third place.

According to the Department of Peace and Conflict Research, UCDP[228] (Figure 3), in 2016the dynamics of the armed conflicts in the world including bilateral onesremained at the level of 1991.

According to the Stockholm International Peace Research Institute, more than 30 armed conflicts are recorded annually on the planet, which resulted in killing in the course of the military actions of more than 1 thousand peopleduring 2016. For example, in 2008 and 2011 their number reached the highest figure - 37 conflicts. Over the past 10 years the total amount of deaths

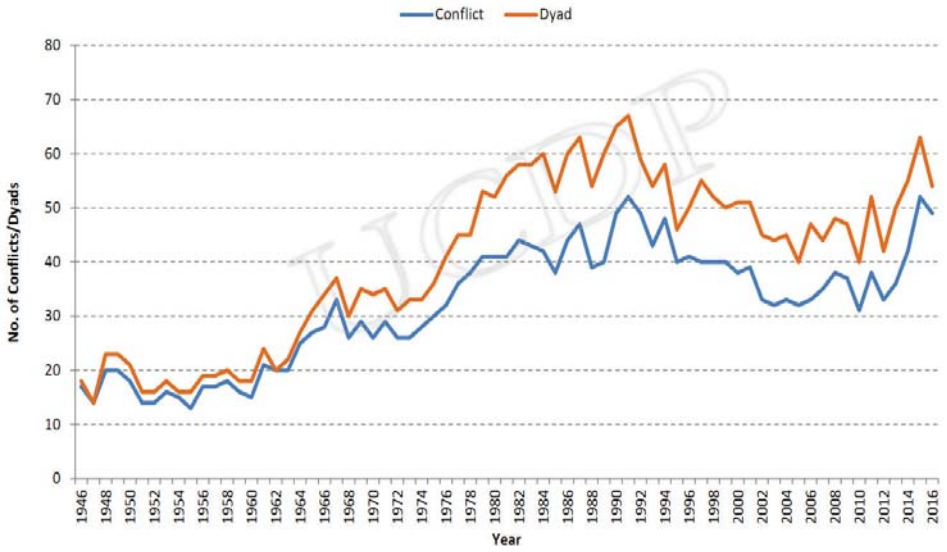
[226] Sorokin, P. (1937- 1941). Social and Cultural Dynamics : In 4 vol. N. Y.: American Book Co., 337-352

[227] Khoma, N., Denisenko, N., Sorba, O., Ugrin, L. (2014). Polytology: educational encyclopedic dictionary-directory. Lviv: New World-2000, 779, 75.

[228] Allansson, Marie, Melander E. and Themnér, L. (2017). Organized violence, 1989-2016. Journal of Peace Research. 54(4), 574-587.

as a result of the military actions in such conflicts has increased: from more than 17 thousand in 2002 to more than 22.5 thousand people in 2011[229]. A great tragedy came to Ukraine. According to the UN,from the outbreak of the conflict in the Donbas, 22,137 people were injured, 9553 were killed, of which about 2,000 were civilians[230].

Figure 3. Armed Conflicts and Dyads, 1946-2016



Source: compiled by the authors on the basis of Allansson, Marie, Melander & Themnér (2017)[231].

Economic consequences of the armed conflict in the Donbass. As of August 2017, according to the UN as it was recorded 10,225 were killed and 24,541 were injured as a result of the military actions since the beginning of the conflict in the Donbas in April 2014. These figures include the Ukrainian

[229] SIPRI. (2014). Order SIPRI Yearbook 2013. Solna, Sweden: Oxford University Press.
[230] Korrespondent.net. (2016, August 15). Chyslo zhertv na Donbasse dostyhlo novoho maksymuma. Kiev, Ukraine. Retrieved fromhttps://korrespondent.net/ukraine/ 3732073-chyslo-zhertv-na-donbasse-dostyhlo-novoho-maksymuma
[231] Allansson, Marie, Melander E. and Themnér, L. (2017). Organized violence, 1989-2016. Journal of Peace Research.54(4), 574-587.

servicemen, members of the pro-Russian armed groups and the civilian population[232].

According to the General Staff of the Armed Forces of Ukraine, as of October 2017, all Ukrainian power wielding agencies (the Armed Forces, the NGU, the Ministry of Internal Affairs, the SSU, the Border Guard Service) lost 10,710 people who died in the conflict zone: 2,652 of them are combat losses and 935 - non-battle ones. As of October 28, 2017, according to the General Staff of the Armed Forces, the combat losses of the Armed Forces of Ukraine amounted to 2,333 deaths and 8,377 wounded.

The civilian losses of August 2017 amounted to 2,803 people including those killed in the MH17 flight[233].

With the beginning of the military actions, peaceful residents began to leave their homes in the area of the military actions and the area occupied by the pro-Russian enemy combatants saving their lives and their families. In March 2015 the total number of people who left their homes was almost 2 million people of which the number of the internally displaced persons in Ukraine reached 1 million 177 thousand people, and abroad there were more than 760 thousand refugees. According to the International organization "International Children's Initiative", andas of 2016 Ukraine is among the TOP-10 countries of the world according to the number of migrants [234].

As of September 7, 2017 during the armed conflict in the Donbass 3,138 people were released from the captivity as a result of the militant actions. On the occupied territories of Donetsk and Luhansk oblasts, there are 144 people as the hostagesand 410 people considered to have a missing status. Also, 44 Ukrainians are held in Russia and the occupied Crimea.

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[232] Office of the United Nations High Commissioner. (2017). Report on the human rights situation in Ukraine. United Nations Human Rights.

[233] Wikipedia. (2018). Civilian casualties due to Russia's invasion of Ukraine (2014 - till now). Retrieved 03/ 11/ 2018, from https://shop.wikimedia.org/: https://en.wikipedia.org/wiki/ Russian_military_intervention_ in_Ukraine_(2014%E2%80%93present)

[234] Wikipedia. (2018). Civilian casualties due to Russia's invasion of Ukraine (2014 - till now). Retrieved 03/ 11/ 2018, from https://shop.wikimedia.org/: https://en.wikipedia.org/wiki/ Russian_military_intervention_ in_Ukraine_ (2014%E2%80%93present)

The targeted destruction by terrorists a number of objects of the real economy sector, objects in the Donbas significantly worsens the social and economic situation of the eastern regions and strikes the entireeconomy of Ukraine causing a critical rise in the level of threats to Ukraine's economic security. The main threats are the following.

1. The destruction of the production capacities of the country which causes the violation of the cooperation of the enterprises connected with a single production or technological cycle, the weakening of the economic and social ties between some regions can result in the isolation of some eastern regions from the rest part of Ukraine.

2. The reduction of the export potential of Ukraine as a result of the deterioration of the performance of themain export-oriented industries located in the Donbass as well as the introduction of a number of the restrictions on the Russian market. In 2016 the reduction of the Ukrainian markeTable exports was 57.4 per cent compared to 2013[235].

3. The sharp worsening of the investment attractiveness of Ukraine's economy and, as a consequence, the actual cessation of the foreign investment inflow and the shortening of the domestic investment.

4. The reduction of the internal resources and raw material base of the fuel and energy complex. The reduction of the coal production in the Donbasswhth about 80 per cent of coal mining reserves in Ukraine results in a shortage of its reserves at the thermal generation enterprises which threatens the stability of the operation of the entire energy system of Ukraine provoking a significant deficit of the generating capacity.

5. As a result of the annexation of the Crimea by the RF, Ukraine has lost the access to the offshore areas where energy production was carried out or planned. Thus, 2279.2 million tons or 24.5 per cent, of the initial potential

[235] Official online representation of the Donetsk regional state administration. (2017). Stan zovnishnioekonomichnoyi torgovli tovarami 2016. Retrieved from http://donoda.gov.ua/en/: http://dn.gov.ua/stan-zovnishnoekonomichnoyi-torgivli-tovaramy-u-2016-rotsi/

resources of Ukraine's hydrocarbons of the total amount are on the shelf of the Black and Azov Seas[236].

6. Reducing the competitiveness of the national transport system and the rapid loss of the transit potential of Ukraine. In the area of military actions in the east of the country there were destroyed 1561 km of the public roads including 740.3 km in the Donetsk region and 820.7 km in the Lugansk region. 33 bridges and overpasses with a total length of more than 2800 running meters were destroyed. The estimated amount of the losses to the road economy management is estimated as 4696.4 million hrn. As a result of the military actions in the zone of ATO, the sections of the highways of the state significance M-03 Kiev-Kharkiv-Dovzhansky, M-04 Znamenka-Lugansk-Izvaryne, H-15 Zaporozhye-Donetsk, H-20 Slavyansk-Donetsk-Mariupol have been partially blocked[237].

Ukraine has lost 5 sea trade ports caused by the occupation of the Crimea by the Russian Federationas as well as the property, enterprises, material and financial assets belonging to Ukraine. The Donetsk airport named after S. Prokofiev (more than $ 1.5 billion was spent for for the preparation of Euro 2012 there) and the airport "Lugansk" were completely destroyed in the Donbass. 28 objects of air traffic control have been damaged or destroyed.

A full assessment of the cost of the destroyed transport infrastructure will be made after the access to them, many of which are now under the control of militants.

7. The growth of the social tension and protest attitudes in the society caused by large-scale staff cuts due to the closure of many industrial enterprises, the sending of workers for the unpaid leave and the non-payment

[236] Ministry of Foreign Affairs of Ukraine. (2015). Kremlin's Black Book: Russian War Against Ukraine. Kiev, Ukraine: MFAU.

[237] Official online representation of the Donetsk regional state administration. (2017). Stan zovnishnioekonomichnoyi torgovli tovarami 2016. Retrieved from http://donoda.gov.ua/en/: http://dn.gov.ua/stan-zovnishnoekonomichnoyi-torgivli-tovaramy-u-2016-rotsi/

of the wages. The total number of employed people in Ukraine in 2016 decreased by 8.3 per cent compared to the figues of 2013[238].

Consequently, due to military aggression in the Donbass, Ukraine has lost approximately 20 per cent of the economy without the consideration of the human losses, which are impossible to evaluate.

Conclusions. For a future system of international relations,a new hierarchy of the values is needed. Previously, states sought to control the territory, population, industrial potential, etc., at present basic geopolitical characteristics lose some of their content. At the forefront, there arises the ability to make the coherent strategic decisions, to use information and communication tools. Under the globalization conditions and the growth of the mutual dependence, the nature of contradictions changes. Instead of antagonisms, which found their solutions only when one of the participants was destroyed, there appear the contradictions of a non-antagonistic nature and their number significantly increases. Such contradictions are more difficult to control, precisely because of their number and multidimensionality.The destruction of the vertical of the conflicts has resulted in their regionalization and it is the regional factors, which significantly affect the development of the conflicts. At the same time, the main potential threat is the loss of the system's dynamic stability. The system necessarily collapses if it is not able to evolve reacting to the changes as to the forces ratio.

On the other hand, under the conditions of the uncontrolled or radical nature of such changes, the result remains the same. Consequently, the changes in the force potentials of the certain states and their groupings can take place but the global power balance must be maintained. The uneven development may be the threat to the existence of such a balance, in particular, the North and the South, which gives the rise to the system of the conflict nature. The conflict variability becomes particularly threatening if a number of the southern states acquire a nuclear status state. The guarantee

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of the inviolability of the territories of the northern allies together with the military hegemony is being lost. Under these conditions, the northern developed countries face the challenge of developing and implementing a "southern strategy" aimed at deterring the threatening tendencies of the southern origin. The organizational formation of such a strategy should be to identify the southern borders of the international organizations and blocs, in particular NATO.

Another potential threat to the existence of the system is the growth of the contradictions of civilizational and religious nature. In some cases, this may aggravate the conflict of the future systemif the unions are exclusively temporary, tactical. On the other hand, the threat of a furioscivilizational interstate confrontation remains rather eventual than obligatory.

Bifurcation of the international structure in the era of globalization and the systemic instability of the world in the twenty-first century intensified and gave a new value to the security asymmetry, in particular, to the asymmetric conflicts. The study of the types of the armed conflicts has allowed us to identify the new types of the asymmetric conflicts of the present: cyberwar, networkcentric warfare, irregular wars, mostly related to terrorism, and hybrid wars. Considering that the consequences and losses of the hybrid wars have a different effect on the security and economies of the countries involved in the conflicts, their research suggests scrutinizing a wider range of indicators in comparison with the absolute numbers of the armed forces and the size of human losses, as well as the relative indicators that will allow us to determine the changes in the dynamics of the military burden influenced the society and to compare the states with different population size.The author considers that in studying the military conflicts of the modern world and especially the parameters of the pre-conflict state of the countries, a significant indicator is the temporal factor of developing the unfavourable events that result in such conflicts. Therefore, one of the best models for studying such states may be the use of the multifractal analysis,which over the recent decades has proved that the implementation of most part of the dynamic processes in nature, technology, economics and security has a fractal geometry. It is necessary to

state the absence of a universal model that could be used to describe the fractal processes of different applied nature. However,the analysis of the time set and the determination of the character of the subsystem studied - persistent (antipersistent), that is, when it functions under the deterministic nonlinear law or by random, it will allow identifying the probability of the development of the entire set of the unfavorable course of the future military conflict andminimizing the threats to the national and international security.

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