

**University of Bielsko-Biala**

**National Security & Innovation Activities:  
Methodology, Policy and Practice**

**Monograph**

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Monograph is devoted to the research of theoretical and practical aspects of the innovation security. Different innovative methodic approaches and economic mechanisms to provide innovation security at the regional, national and international levels are considered. Scientifically grounded recommendations to achieve economic, financial, social and ecological aims of the national security through the strengthening of innovation system are given.

Keywords: national security, innovation activities, innovation security, international economic relations, innovation policy, technology transfer, investment, policy, management, marketing, ecological security, economic mechanisms, “green” economy.

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## INTRODUCTION

In present conditions innovations become a leading factor of economic development, and therefore the economic competition is increasingly defined by scientific and technological competition. Accordingly, innovation component of national security currently is critical component of economic security, which aims to ensure the sustainability of used technologies in some problem situations, which arise due to adverse events or trends in state or abroad. Also in the context of accelerating the pace of scientific and technological progress technological changes become large-scale and multi-dimensional in nature, increasing the mobility of forces balance, discussion of problems of innovation security, its providing and communication with other components of national security in general form of innovation economy development is relevant and timely.

The role of innovations in national security we can define from Harold Brown approach, U.S. Secretary of Defense in 1977-1981, who enlarged the national security definition by including particularly economic and environmental security elements: “National security is the ability to preserve the nation's physical integrity and territory; to maintain its economic relations with the rest of the world on reasonable terms; to preserve its nature, institution, and governance from disruption from outside; and to control its borders”. So the state's ability to engage in complicated innovation activities is a characteristic of scientific, technical and technological level of its development as well as has great impact on economic situation and national security and assists enhance its international prestige.

Monograph is devoted to the research of theoretical and practical aspects of the innovation security. Different innovative methodic approaches and economic mechanisms to provide innovation security at the regional, national and international levels are considered. Scientifically grounded recommendations to achieve economic, social and ecological aims of innovation security are given.

In the first part of the monograph “*Modern paradigm of national security innovation component: macroeconomic dimensions*” the authors consider different aspects of global, national and regional innovative factors formation of competitive potential of economy, including economic security as an incentive for contemporary management development; macroeconomic stability: EU experience and situation assessment for Ukraine; economic security of the state in the information economy: the impact of e-business and digital finance; strategic orientations of the state investment and innovation policy in the recreational sector; spatial potential in the structure of logistic potential in ukrainian regions.

The second part of the monograph “*Microeconomic aspects of national security innovation component management*” deals with key factors of methods of economic security evaluation in the context of enterprises stability identification. Economic mechanism of increase of innovation activity of enterprises on a competitive level to mitigate threats to economic security is considered and trends in small business development in Ukraine and in Dnipropetrovsk region are identified. Also authors consider the issues of personnel – intellectual as a making formations of economic security of travel agencies and mechanisms for optimizing redistribution of profit.

In the third part of the monograph “*Globalization determinants of national security innovation component management*” the mechanisms of managing innovation component of economic security in cross-border space were developed. The issues of world and ukrainian critical infrastructure security and emerging risk-management, free trade and income polarization, branding as an innovative component of Ukraine’s economic security and international aspects of national smart specialization strategy were considered.

The forth part of the monograph “*Conceptual mechanisms of national security innovation providing*” demonstrates conceptual approaches and organizational mechanism for innovation systems development. The authors consider system connections and technological security within the innovative paradigm. Theoretical and methodic approach to manage various directions of innovation development (regional innovation policy, agrarian innovations) is proposed.

The fifth part of the monograph “*Management of financial and investment basis of innovation security*” determines the main features of financial and investment components of national security. A number of financial mechanisms (taxation of innovations, shadow capital withdrawal abroad, investment attractiveness, financial consumer protection, information asymmetry reduction, cryptocurrency market development), oriented to stimulate development of national economy and to fasten involving to global financial system, are investigated.

The sixth part of the monograph “*Green economy and social responsibility as an innovation developemnt drivers*” is focused on achieving the aims of the sustainable development and green growth in different sectors of economy and countries. Actual directions of environmental and economic safety management paradigm, including partnership of stakeholders, portfolio partnership of projects stakeholders, segmentation of resource cycle, socially responsible investment, non-financial reporting, green entrepreneurship, were considered.

The authors of the monograph are scholars and practitioners from 29 universities and research centers from six countries, including the Republic of Kazakhstan (Karaganda Economic University), Lithuania (Šiauliai University), the Republic of Armenia (Armenian State University of Economics in Yerevan), the Republic of Poland (University of Bielsko-Biała; University of Economics and Humanities in Bielsko-Biala; Jan Kochanowski University in Kielce), Russian Federation (Russian Academy of National Economy and Public Administration; Russian Foreign Trade Academy, RF Ministry of Economic Development) and Ukraine (Academician Yuriy Bugay International Scientific and Technical University; Institute for Market Problems and Economic and Ecological Research of National Academy of Sciences of Ukraine in Odessa; Institute of Cross-Border Cooperation and European Integration in Lviv; Ivan Franko National University of Lviv; Kharkiv Petro Vasylenko National Technical University of Agriculture; Kyiv National Economic University named after Vadym Hetman; Kyiv National University of Technology and Design; Kyiv National University of Trade and Economics; Lviv National Agrarian University; National Academy of Agrarian Sciences of Ukraine; National Technical University "Kharkiv Polytechnic institute"; National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute»; Odessa National Economic University; Odessa National University named after I.I. Mechnikov; Poltava National Technical Yuri Kondratyuk University; Poltava State Agrarian Academy; Public Institution «Institute of Environmental Economics and Sustainable Development of the National Academy of Sciences of Ukraine»; Sumy National Agrarian University; Sumy State Pedagogical A.S. Makarenko University; Sumy State University; Ukrainian – American Concordia University; University of Customs and Finance in Dnipro):

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The monograph contains the results of studies, carried out within the framework of fundamental research topic of Sumy State University № 53.15.01-01.18/20.3II “**Innovation management of energy efficient and resource saving technologies in Ukraine**”, and the results of studies within President’s of Ukraine grant of State Fund for Fundamental Researches for research project № 0117U007024 “**The development of the mechanisms for management of an innovative subcomponent of Ukrainian economic security**”.

# **PART 1. MODERN PARADIGM OF NATIONAL SECURITY**

## **INNOVATION COMPONENT: MACROECONOMIC DIMENSIONS**

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### **1.1 GLOBAL, NATIONAL AND REGIONAL INNOVATIVE FACTORS FORMATION OF COMPETITIVE POTENTIAL OF ECONOMY**

Complication of managerial problems in condition of intensification of international and interregional competition and influence on processes of globalization sets tasks before state and regional authorities in order to improve system of management, including mechanism's search and methods of state regulation of territory, focused on its competitiveness. Countries and their regions are in need in modernization of system's management of social and economic development, indicators of efficiency which are not quantitative indexes but qualitative ones in new developments' conditions. The basis contains particular politics, directed to transformation of competitive potential of countries and their regions into a factor of its stable development, providing a transition economic system into qualitatively new level of economic progress. There are actual investigations, which are connected with definition of structure and functions of competitive potential of territory, its influence on national and regional competitiveness.

#### **Innovative factors of competitiveness of a country**

At the present stage of development global competitiveness of a country is determined first of all, the ability to be a leader in the world economic, to develop and implement new technologies and services that meet contemporary needs. The main goal economic development of Ukraine is the actualization of the process of improving the production structure, the development domestic market and manufacturing export-oriented products on the basis of introduction of innovative technologies.

The Global Competitiveness Index (GCI) is a new, more comprehensive tool to assess competitiveness of country. Developed for the World Economic Forum by Professor Xavier Sala-i-Martin of Columbia University, the new index extends and deepens the methodology and concepts country's competitiveness.

Officially launched in September 2006 as part of The Global Competitiveness Report 2006-2007, the GCI has now become our main index of reference. GCI continues to be the most comprehensive assessment of its kind. Analyzing the global competitiveness index of Ukraine in 2014 and 2017 (Fig. 1.1), we can conclude that the economic situation of the country deteriorated substantially. So in 2014 Ukraine occupied the 76th place from 144 countries. However in 2017

Ukraine occupied the 81th place from 137 countries. These facts indicate that every year our country becomes less competitive.

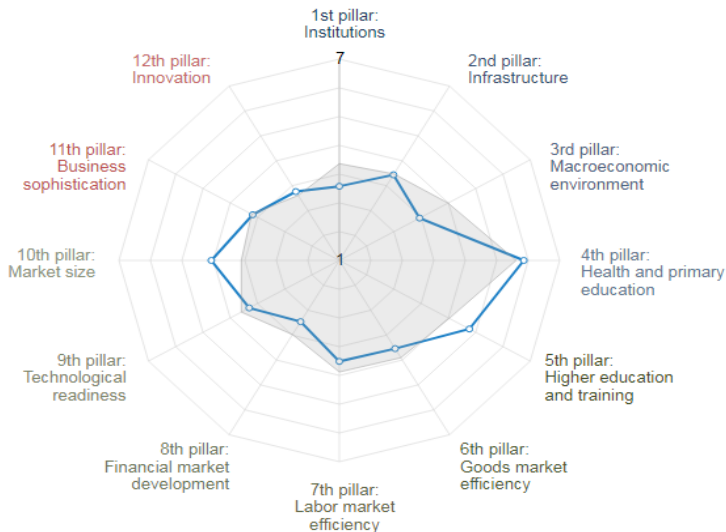


Figure 1.1. Key indicators of Global Competitiveness Index Ukraine 2017-2018 [9]

The global competitiveness index is composed of 113 variables that describe in detail the competitiveness of countries at different levels of economic development. The set of variables on two-thirds of the results of the global survey of CEOs (to cover a wide range of factors influencing business climate in the countries under study), and one third from publicly available sources (statistical data and research results, carried out on a regular basis by international organizations).

All variables combined in 12 benchmarks that determine national competitiveness: The quality of institutions, infrastructure, macroeconomic stability, health and primary education, higher education and training, market efficiency goods and services, the efficiency of the labor market, the development of the financial market, the level of technological development, the size of the domestic market, the competitiveness of companies, the innovative potential.

In the other hand, we can isolate problems that exist in Ukraine and reduce its competitiveness such as: corruption, policy instability, inflation, inefficient government bureaucracy, access to financing, government instability, tax rates, tax regulations, foreign currency regulations, inadequate supply of infrastructure, restrictive labor regulations, insufficient capacity to innovate, crime and theft, poor work ethic in national labor force, poor

public health, inadequately educated workforce (Fig. 1.2). These problems have different impact to our economy.

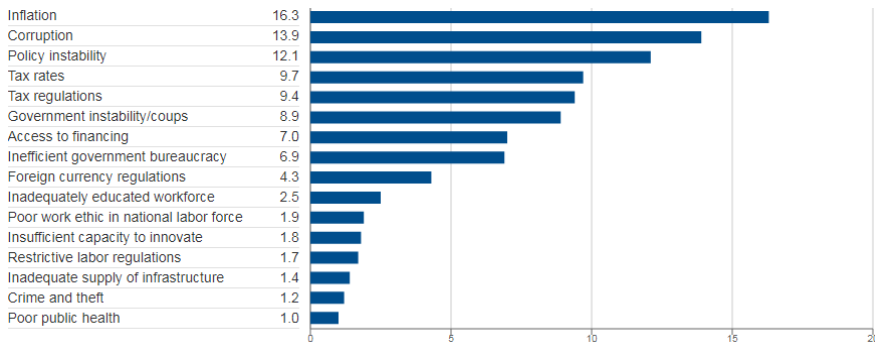


Figure 1.2. Most problematic factors for doing business [10]

It is assumed that the Index should be used by States that aim to eliminate obstacles to economic development and competitiveness, as a tool for analyzing problems in their economic policies and development strategies to achieve sustainable economic progress.

We think one of the most factors that impact to the competitiveness is innovation. Intensification the priority areas for international cooperation of Ukraine in the sphere of innovations will enhance the image of our state in the global dimension. At the modern stage of Ukraine’s integration to the international scientific-technical cooperation are very low and the extent of cooperation does not meet scientific-technical and economic potential our country.

Ways to improve the system of regulation of the innovation sphere are: the efficiency of the legal framework through the reduction of intermediaries when investing in the innovation sphere and increase of responsibility of officials by controlling the spending of budget and finance; economic restructuring due to the increase in the share of high-tech industries, the use of effective financial instruments; strengthening of cooperation between state enterprises and businesses; formation of competitive cooperation forms; monitoring of the innovation sphere; identifying and addressing key negative factors, which require state regulation to improve innovation and institutional factors in the development of international competitiveness of Ukraine.

Competitiveness of the region plays an important role in ensuring country development, therefore it is necessary to constantly monitor internal and global factors that influence the competitiveness of the country.

## **Innovative factors in formation of functional structure of competitive potential of region**

The development of the competitive potential of the regions and the formation of an effective system of regional governance is an important problem of ensuring the competitiveness of Ukraine.

Nowadays in Ukraine regions are different according to the level of economic development, which is a result not only a preservation of differentiation of their industrial, resource and innovative potential, but also its force. Main reason of effective economic politics in national so in regional level has not decided yet. In connection with there is a problem of formation of effective and adequate regional competitive politics, directed to provision of region's competitiveness. From these positions an investigation of competitive potential of region is a primary task, solution of which will allow improving competitive positions of a region on national and international levels.

In economic literature a term "potential" treats as resources, abilities, supplies, measures, which can be used, or as a level of power in any position, complex of means, which are necessary for smth [2, p. 5], «hidden abilities, forces for some activity, which can manifest at definite conditions» [6, p. 1012]. So, there is a contact between total abilities of a region (social and economic potential as a complex of resources and peculiarities, defining opportunities of stable and effective functioning of social and economic system in outer variable conditions) and formation of its competitive potential [7].

Absolute value of resource approach to the definition of competitive potential of region consists in allowing detecting unique resources and abilities and consider them as potential competitive advantages, correct use of which contribute mobilization of objective consumers (investors, entrepreneurs, residents, tourists, etc.), increase of the demand for some of its elements.

It is known competitive potential of region includes variety of components, which is a component of a structure and performing definite functions, which will change according to strategic purposes of development. There will be different a result obtained in the process of realization of competitive potential of region. Basic structural elements of competitive potential of region are economic, human, innovative, investment, infrastructural. Such scientific approach is the most traditional and widely used.

While increasing competition between territories and regions will cause an usage of new resources and abilities, which are situated in the sphere of management, enterprise, and integration and и отображают modern современные organizational and economic relationships of region. That is why the structure of the competitive potential of the region along with other

elements, it is necessary to consider to potential of enterprise, a potential of internationalization, diversification, restructuring and clustering.

Let's consider the functional content of structural elements of the competitive potential of the region.

1. Economic potential. Traditional indexes of economic condition and power of regions is gross (total) regional product (GRP), the level of population's incomes, the volume of industrial manufacturing. GRP analysis can evaluate regional differentiation and suggest hypotheses about the possible causes of regional asymmetry. Changes of GRP show possible development of economic activities in the region. At GRP significantly affects the economic structure of the region, so the correlation of industrial and agricultural production, structure of industrial one. For example, as a rule, in terms of raw materials regions of GRP have potential of development much higher than the regions with non-resource specialization.

2. Human potential. Social and economic development in the XXI century is characterized by the increasing role of the human factor. In the modern world economy, human resources play an important role in order to achieve competitive advantage and ensuring competitiveness, so the development of the economy. At the same prospects of the region which is associated with human resources as carriers of knowledge, creativity, and creative behavior. That person with a high level of knowledge (education), training, business and public activity, initiative becomes a major instrument in the competitive regions.

3. Innovative potential. Innovations as an effective means of technological development, of provision strong market positions and significant competitive advantages are necessary part of the development of the regional economy.

World experience shows that expanding the use of innovations by the regions of the country will achieve high technological independence of companies, provide the growth of their efficiency and competitiveness, promote economic development at both the regional and national levels, and allow to increase an income and quality of life [8, p. 22-26].

4. Investment potential. A regional investor is one aspect of the competition. Ability of mobilization of the region's economy in the form of capital investment opens perspectives for the development of existing and creation of new enterprises, the formation of modern clusters, placement of new technologies, objects of infrastructure, development of transport and movements functions, etc.

5. Infrastructure potential. Regional infrastructure is designed to provide continuous and effective communication between primary and secondary production facilities and the normal functioning of the region's population. Non-formed infrastructure usually affects all economic



activities of the national economy. Infrastructure in the region contributes to the rapid development of natural resources in order to fulfill the national economy and sustainable development of the regional economy.

6. It is necessary to consider an entrepreneurial potential as a multilevel system of resources and real business opportunities in the region, which can be realized through the implementation of high-risk, innovative activity, and an organization of favorable medium with the aim to provide social and economic efficiency of the regional business sphere. Development of entrepreneurial can be possible due to effective management of the enterprises of the region, which can be due to the growth rate of the amount of dynamics for several years. In order to achieve such purposes, objectives should be coordinated by managers at all levels and areas of activity.

7. Potential of an internationalization can be described by such opportunities as interstate migration of population in an inappropriate region and also the volume of goods and services. The growth of number of arrived ones demonstrates the mobilization of the region, the presence of appropriate conditions for work and income, which provides a high standard of living. Smaller level of volume of import of region testifies self-provision by own goods and services, that is why is expressed by profitability of industrial and non-industrial fields of economy.

8. Potential of diversification should be considered as a process which covers organizational, economic and law changes in the activity of economic entities in the region in a result of formation's economy associations (associations, corporations, consortium, concerns), activity of which is aimed to increase an efficiency of production, to reduce a risk of bankruptcy, timely response to changes in economic conditions of the market to ensure profitability. However, the diversification of enterprises is not only an instrument to increase products and services, but also an instrument of interindustrial redistribution of financial resources, by optimizing the structural changes in the economy, helps to reduce the negative effects of the financial and economic risks, and increases the adaptive quality of economic entities on the market. Besides, diversification occurs when there is systemic synergic effect which results from the following properties: a component out of system has smaller potential than in complex.

9. It is necessary to consider potential of restructuring's region in two aspects. Firstly, it describes the possibilities of market transformation of the regional economy through changes in the structure of enterprises, depending on their size (small medium, large), organizational and law forms, the dynamics of their creation. The most important in the potential restructuring there are indicators of the growth of small enterprises that demonstrates the mobilization of formed entrepreneurial medium.

The role of small business in today's economy is quite different. It links economy in unity and forms a foundation on which should be grown more complex and high "levels". It should not forget about large business, which is mainly determined by economic and technological strength of both the region and the country.

Secondly, field specialization of the region determines its competitive advantages and competitive position. Therefore, the depression condition of definite regions requires immediate actions to restructure economics. Restructuring of region includes effective ways of rehabilitation of depressed areas and improvement of the competitiveness of territories with satisfactory development indicators.

10. Potential of clustering. Clustering is a process of combination objects into groups according to certain criteria in order to increase the efficiency of their functioning, an innovative approach to regional economic development. Interdependence and relationship between the processes of clustering, strengthening of competitiveness and acceleration of innovation – is new economic phenomenon that allows resisting the pressure of global competition and properly responding to the requirements of national and regional development. Progresses such productive form of activities, as a cluster should be seen in close connection with the modern laws of competition and based on the territorial aspect of global economics. The concept of clusters is one of the most progressive trends in the development of economic activities, which showed its effectiveness in many countries [5].

Results of evaluation and analysis of the competitive potential of the region can be effectively used to solve many problems of regional management, so quantitative measure of research involves the following tasks:

- development of methods and formation of tools that allow us to identify competitive potential;
- determination of component's weight in the formation of competitive potential of competitive advantages of the region;
- identification of perspectives for competitive potential to improve the region's competitiveness.

Solution of given problem assumes the choice of structural model and the definition of the factors that provide an increase of regional competitiveness. This approach corresponds to valuation of tenth factor model of competitive potential of region.

The advantage of the proposed model consists in selected factors consider general trends of social and economic development of both regions and the country.

The choice of indicators to measure each of the factors (elements of potential) should be substantiated by the following criteria:

- presence of an indicator of official statistical data;
- an ability to measure absolute magnitude of the phenomenon;
- display by indicators abilities and region's resources.

These indexes should not depend on the size of regions and number of population. That is why they convert in comparable relative form. Table 1.1 consists of indexes which characterize competitive potential of region.

A definition of the level of competitive potential of region can be performed due to the basis of experiment:

$$K_i = \sum_{j=1}^m k_{ij} \cdot V_j, \quad (1)$$

where  $K_i$  – general level of competitive potential of  $i$  region;  $k_{ij}$  – competitive potential of  $i$  region according to  $j$  factor;  $V_j$  – specific weight of  $j$  factor in the competitive potential of  $i$  region;  $m$  – number of factors of competitive factors of region's potential ( $m = 10$ );  $i = \overline{1, n}$ ;  $n$  – number of regions.

$$k_{ij} = \sum_{z=1}^{h_j} R_{izj} \cdot W_{zj}, \quad (2)$$

where  $R_{izj}$  – degree of  $i$  region according to  $z$  index of  $j$  factor;  $W_{zj}$  – specific weight of  $z$  index in  $j$  factor;  $z = \overline{1, h_j}$ ;  $h$  – number of indexes of  $j$  factor.

Grounding of the relative importance (specific weight) of each index within a factor advisable to carry out to use the method according to Saati to construct relative value function at final variety [3, p. 44-48].

Competitive potential is a reserve, which can use the region, modifying and adjusting strategic development priorities and implementation High competitive potential of the region allows you to save or increase the rate of development and stop the negative effect of external and internal factors. One of the most important areas of practical application of the proposed approach to measure the competitive potential of the region is the organization of monitoring of the formation of its functional structure, which is important for both local and regional, as well as for government.

Table 1.1

## Indexes of evaluation of competitive potential of region [author's research]

Elements of potential	Indexes of evaluation
Economic	Gross regional product per one person of population. Incomes per one person of population. Volume of realized production per one person of population. Volume of realized production of rural economy per one person of population. Volume of realized services per one person of population. Volume of export of goods and services per one person of population.
Human	Specific weight of population of employable age in the structure of people. Natural increase of population per 1000 people. Unemployment of population (according to International Organization of Work) (% to economically active population at age of 15-70). Number of schoolchildren at educational establishments per 1000 people. Output of qualified specialists by colleges per 1000 people. Number of students at higher educational establishments of I -II levels of accreditation per 1000 people. Number of students at higher educational establishments of III-IV levels of accreditation per 1000 people. Training and promotion of cadres per 1000 people.
Innovative	Number of scientists per 10000 people. Volume of performed scientific and technological works per one person of population. Number of costs on technological innovations per one person of population. Specific weight of enterprises, which fix innovations. Specific weight of realized production in the volume of industrial production.
Investment	Investment in main capital per one person of population. Specific weight of investment in main capital due personal means of enterprises and organization. Direct of foreign investment in region per one person of population.
Infrastructure	Number of subjects of transports and contact per 10000 people. Number of trade institutions, hotels, and institutions of catering per 10000 people. Number of kindergartens, schools per 10000 people. Number of hospital beds per 10000 people. Number of cultural institutions, sport and tourism per 10000 people. Number of financial institutions per 10000 people. Number of institutions which perform operations with tenure per 10000 people.
Entrepreneurial	Absolute growth of enterprise's share, which got an income. Absolute growth of financial result from ordinary activity to taxation per one subject of United State Register of Enterprises and Organizations of Ukraine.
Potential of internationalization	Migratory growth of population (reduction) per 1000 people. Volume of import of goods and services per one person of population.
Potential of diversification	Specific weight of associations, corporations, concerns, consortiums in total number of people of United State Register of Enterprises and Organizations of Ukraine.
Potential of restructuring	Number of small enterprises per 10000 people. Number of subjects of United State Register of Enterprises and Organizations of Ukraine per 10000 people.
Potential of clustering	Competitive stability of fields of economics of region, which expects the base of coefficients of localization, specialization, manufacture per one person of population.

At the local and regional level results of the functional structure of competitive potential can solve the following tasks: to improve the use of competitive advantages of regions, based government funding of regional programs and projects, to optimize the development strategy of competitiveness factors and their use, to mobilize investors, business people and tourists. At the state level, realization of the proposed approach can improve the regulatory politics of steady development of the regions, to determine the direction of optimizing of mechanism between state programs, to evaluate the effectiveness of the regional government; to initiate the adoption of state programs of individual regions.

The proposed approach to assess the functional structure of competitive capacity allows to determine the impact of the innovation component, and this creates the basis for the formation of an effective competitive management system at the national and regional levels. New trends in globalization, integration and at the same time regionalization of the development of countries around the world require the use of an appropriate innovative and investment mechanisms.

#### **Innovative and investment mechanisms to ensure the competitiveness of the economy**

The innovation and investment development of national economy (IIDNE) should be considered as a two-way interdependent process of change that is result of the actions of internal (within the framework of the national economy) and external (within the framework of the world community) mechanisms for the creation and implementation of innovations and their investment assurance, as well as national mechanisms for integration of actions of country, regions, business, and society in order to transform them into a purposeful system of influences to ensure the competitiveness of the national economy [1]. The effectiveness of IIDNE mechanisms is ensured by their systemic action and ability to create a synergistic effect in order to enhance the country's competitiveness.

Methodological approaches to assessing the effectiveness of modern IIDNE mechanisms should take into account national specificity of the organization of innovation and investment activity, level of socio-economic development of the country as a whole, stages of the innovation process. This enables to distinguish the following blocks of the IIDNE mechanisms [4]:

- 1) financing of scientific and technical works with regard to the identified priorities of the state's innovation development;
- 2) financing of education taking into account demand perspectives of labor in innovative sectors of the economy;
- 3) modernization of material and technical support of the economy;
- 4) development of innovative potential of enterprises;

5) socio-economic development;

6) investment attractiveness and efficiency of the business environment.

Research of features of the national market institutes functioning as norms and rules of conducting economic activity, for example, makes it possible to state that it enables subjects of IIDNE to choose the rules of the game in their totality; the main function of this competitive market is stimulating institutional innovation and forms of adaptive behavior.

The current state of the institutional market of Ukraine is characterized by the following features:

1) passive role of the state and the region as subjects of innovation and investment development;

2) low level of influence of public organizations (institutes) as a flexible form of modern society organization;

3) slow implementation of institutional innovations as an indispensable condition for adaptation into environment changes.

From these positions is easily explained the imperfection of the innovation and investment environment in Ukraine, limited activity of business entities for activation of their innovation and investment development, in particular regions, the impossibility of transition to an innovative model of development.

The proposed methodological approaches make it possible to construct integrated national (regional) models of innovative processes and mechanisms of their investment support, create a toolkit for modeling their further development, scientifically determine the perspective trajectory of innovation and investment development of national economies taking into account established goals, priority directions of their overall strategy and available potential.

The competitive potential of the region and its functional structure determine its competitiveness and there is a source of competitive advantage of territory. The complexity and variety of this category is confirmed by its structure and functional purpose.

A determination of the functional structure of the competitive potential of the region is necessary to construct and improve the use of its competitive advantages by choice more efficient rates of development, investors mobilization etc. An analysis of the competitive potential allows identifying regions which have succeeded in the development of a competitive factor. Such information may be useful to create different kinds of formal and informal associations' areas in which the most important goal will be to cooperate through the exchange of experience and transfer of innovation in all spheres of social and economic development of the territory.

Besides, the results of investigation can become competitive potential of the information base for the formation of a regional competition politics and the adoption of regional authorities informed decisions in the management of steady development of the territory.

The modern system for managing the development of the competitive potential of the country and its regions should take into account the impact of global, national and regional innovation factors. The introduction of new management technologies on this basis creates the necessary organizational and economic conditions to increase the level of competitiveness of the country.

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## **1.2 ECONOMIC SECURITY AS AN INCENTIVE FOR CONTEMPORARY MANAGEMENT DEVELOPMENT**

*“We have always known that heedless self-interest is bad morals; we know now that it is bad economics”.*

*Franklyn D. Roosevelt,  
Second Inaugural Address, 20 January 1937*

The socio-economic development changes not only the economical shapes of the world but the social attitudes and cultural background. Now we can state that basic economic security should be a human right, and this should be defined in terms of advancing real freedom. All human beings need a sense of security, to give a sense of belonging, a sense of stability and a

sense of direction. People who lack basic security in themselves, in their families, in their workplaces and in their community tend to become socially irresponsible. They tend to behave opportunistically, and they tend to lose a sense of moderation. Moreover, periods and areas of mass insecurity have, historically, always bred intolerance, extremism and violence. According to International Labor Organization report economic security promotes happiness, and is beneficial for growth and social stability [1]. That is why can state that contemporary managerial approaches could not ignore the security as an essential part of their success and below we grounded this position detailed further.

In the beginning we need to understand the interrelation between security elements and also include the managerial component. The success of long-term development depends on social, economic, environmental and any others components of overall security. The situation could be illustrated by the game Jenga. The first simplification is that we can imagine that blocks represented the elements of security – we can remove (in real life – ignore or not treat properly) them without any visible consequences for some time but in long run perspective it leads to destroying all system. The other assumption that is essential that our hierarchy of needs of society also developed and changed through the time. We can think of extension of Maslow pyramid to the whole society (Fig. 1.3). So the Jenga “tower of security” is also can be presented as a set of security’s elements that build in from basic ones to more complicate. The drawing visualizes that if basic needs didn't satisfy you cannot build an effective security system for a sustainable society and economic progress.

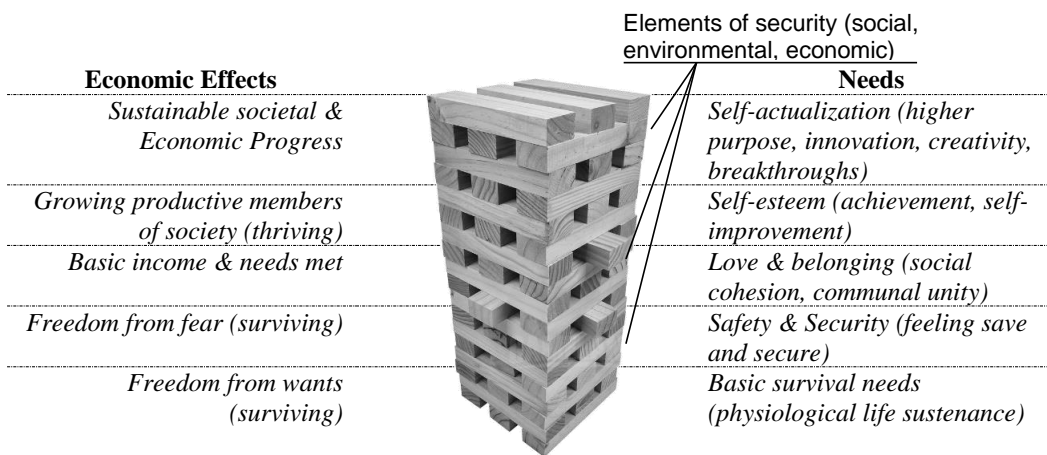


Figure 1.3. Comparison of Maslow hierarchy need and economic development [author’s generalization]



In continuation we concentrate on understanding the economic security. Modern researches focus on one of the most fundamental elements of economic security – the degree to which individuals experience and are protected against large economic losses arising due to income volatility or nondiscretionary spending (Fig. 1.4).

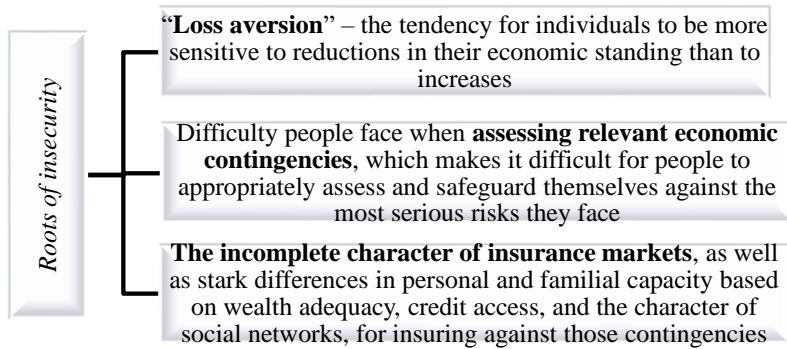


Figure 1.4. Roots of economic insecurity in three basic features of human cognition and market dynamics. Created on base on [2; 6; 9; 11].

In looking at national levels of economic security, countries are divided into four clusters (Fig. 1.5): Pacesetters (with good policies, good institutions and good outcomes), Pragmatists (good outcomes in spite of less impressive policies or institutions), Conventionals (seemingly good policies and institutions but with less impressive outcomes) and Much-to-be-Done countries (weak or non-existent policies and institutions, and poor outcomes).

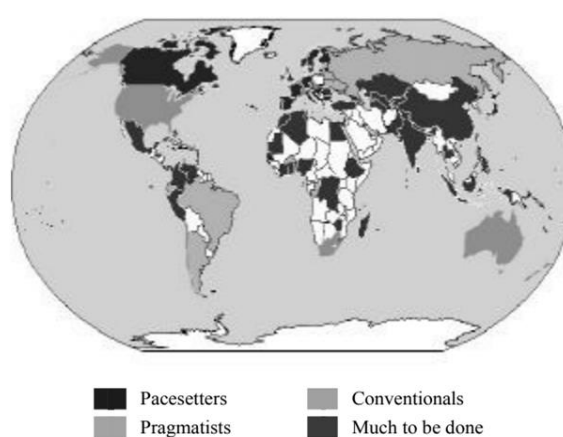


Figure 1.5. Economic security Index: clusters by region. Countries in “white” are not part of the analysis [3]

Let's emphasize that globalization has undermined the traditional definition of economic security that centered on economic vulnerability to other states. At the same time, globalization has produced a redefinition of economic security in light of the risks posed by cross-border networks of non-state actors and by the economic volatility of the new global environment. The relationship between economic globalization and undesirable economic and political outcomes must be specified precisely and assessed carefully, however. Statements about economic security must weigh the effects of increased volatility introduced by globalization against the benefits of improved economic performance in the longer run. Institutions can offset economic insecurity through the provision of insurance, shoring up policy credibility, and guiding adaptation to the new environment. National institutions will remain central to the provision of economic security under conditions of globalization. Regional and global institutions can complement one another (and national institutions) in their alleviation of the new economic insecurity. Although some regional institutions drifted in the wake of the Asian financial crisis, new regional alternatives have emerged that promise to stake out new modalities of economic security [5].

Economic security or financial security is the condition of having stable income or other resources to support a standard of living now and in the foreseeable future. It includes: probable continued solvency, predictability of the future cash flow of a person or other economic entity, such as a country, employment security or job security

Interim result of research makes it understandable that in long run perspective all elements of security are important and should be met from basic to the upper level. This research is concentrated on economic element of security but all generalizations and assumptions still true. All elements can influence the overall situation and format the framework for entrepreneurial activity and so for the management. This research concentrated on economic element of security but all generalizations and assumptions still true.

Thereby the next stage of the study is observation of framework for contemporary theories formation. The background of understanding and shaping the contemporary approaches to security is forming under the pressure of 4<sup>th</sup> industrial revolution (Fig. 1.6) and the shift in common ideology of economic life to sustainable development. The last one could be observed in form of circular economy, green and blue economy etc.

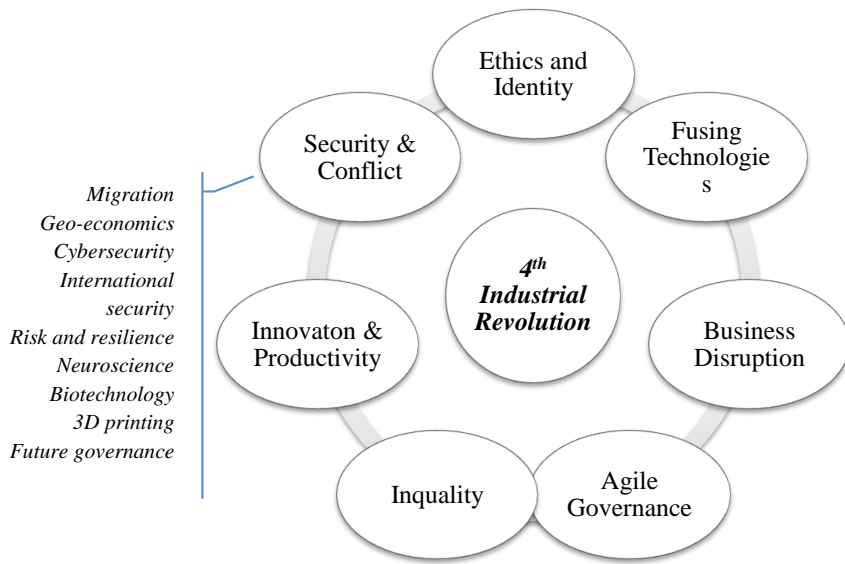


Figure 1.6. The shape of 4<sup>th</sup> industrial revolution  
 [author's interpretation on base on materials of World economic forum]

Dimensions of international security system could be presented in such way:

*Strategic stability* is including the answering a wide range of questions as what should be done to ensure technological capabilities are used in ways that maintain stability and promote a better level of international security as a global common good; what can be done to achieve better mutual understanding and transparency, reducing the risks of miscalculation; how can a future where technology favors the offensive, or emboldens aggression can be avoided; what opportunities exist to use technology to solve familiar and new security challenges.

*A shift in the public / private balance:* much of the enabling technology for the 4th Industrial Revolution is originated, developed and exchanged in the private sector, where R&D budgets far exceed those of many industrialized countries. The scope for "dual purpose" technologies is increasing too. The understanding of affect this issues like arms control regimes, proliferation, and the balance of power between state actors and non-state actors is important.

*New domains:* powerful, cheap and freely available technology is lowering barriers to entry in new domains such as cyber, space and the ocean depths. Where regimes of governance lag behind, this can tempt security actors to explore new operational courses of action, and prompt new arms races. It's vitally necessary to realize if the most pressing areas for action on governance, and what other approaches can be considered for preservation of global security.

In continuation of logical structure of the paper should be noted that in general management can be observed as a way to communicate with people; as a power and art of governing; as special abilities and administrative skills; governing body, administrative unit [7]. However, no matter which definition has to be used as a main feature of management, as an activity, there is cooperation with people, and thus, necessity to respond to the modern changes in the socio-ecological and economic environment. Management is a result of the economic development [10]. The environment, which defines it, is economically centered and depended on social and ecological factors at the same time

The constantly continuing development of society and technologies, extension of globalization processes and international integration makes researches of management rethinking very important (the information is given in detail in previous publication [12; 13, p. 50]). The choice of the management is caused by the fact that its aim is to form, to develop and to use competitive advantages of the firm owing to ability to run business in different countries and to the proper use of economic, social, demographic, cultural and other peculiarities of these countries and international cooperation. It means that on the one hand, international management efficiency depends on socio-ecological and economic constituents effective use, and on the other hand, it can form preconditions to improve socio-ecological and economic state, and at the level of transnational corporations to be on the forefront of changes.

The general economic principles that influence entrepreneurial activities can be divided on three interrelated groups. 1<sup>st</sup> group connected with how people make decisions and contains principles 1) people face tradeoffs, 2) the cost of something is what you give up to get it, 3) rational people think at the margin, 4) people respond to incentives). 2<sup>nd</sup> group is about how people interact with each other – 5) trade can make everyone better off, 6) markets are usually a good way to organize economic activity, 7) governments can sometimes improve economic outcomes. 3<sup>rd</sup> group displays forces and trends that affect how the economy as a whole works – 8) the standard of living depends on a country's production, 9) prices rise when the government prints too much money, 10) society faces a short-run tradeoff between inflation and unemployment.

Understandable that mentioned principles influenced by economic security in different way and from different intensively and time lag. The Understandable that mentioned principles influenced by economic security in different way and from different intensively and time lag. The more safety people feel themselves the more rational they behave and more ready to face the tradeoffs. The feeling of security or insecurity has essential incentive effect on behavior of all consumers on the market (both individual and business). We explained this phenomenon above.

On the other hand, the evolving of societies and economics increase the importance of the role of local and global governance in building of secure environment. Today this include a lot of elements and all of them formatting the style of entrepreneurship. Below we try to customize contemporary managerial theories from the perspective of economic security mutual influence.

First block of theories can be described as sustainable and include all that is connected with sustainable development goals. Sustainable development has long evolved from a philosophical and scientific theory into an ideological imperative that determines the direction of the development of states throughout the world. It is not only “green” and climate aspects of economic development and management, but also covered the problems of poverty, equality, discrimination and others. The general framework of sustainable development which understands as the kind of development that meets the needs of the present without compromising the ability of future generations to meet their own needs default pay more attention to security issues and forced to rethink the management. The implementation of the postulates of sustainable development can take place at different levels – from interstate to local, as well as at enterprise level, especially if their activities are international or transnational. So, this block more influence the external management manifestation. Management at the level of international organizations and enterprises cannot remain the main goals of sustainable development, in particular its environmental component, for a number of reasons [13, p. 49-51]:

Technical – impossibility to ignore the environmental requirements and standards of the countries in which the economic activity of the company takes place. Involving an increasing number of countries in international agreements on regulating the use of natural resources or aspects of the environmental impact of production/sales/consumption reduces the efficiency of diversification of production by country or region depending on the particularities of the legal climate in them;

Economic – constantly increasing prices for fossil fuels and other resources in context of growing competition leads to a reduction in resource and energy intensity of production. Despite powerful world oil lobby development of alternative energy sources and opportunities for their widespread use is gaining momentum;

Social – raising public awareness about environmental problems and their consequences has led to a revision of consumption priorities towards environmentally friendly, safe for health, suitable for processing or further use, etc. (for example, a promotion from H & M stores "Close the loop" on clothing sales, created from raw materials);

Reputational – the intensification of competition while the simultaneous trend towards standardization of needs and products highlights the new cutting edge of the competitive edge – environmental friendliness and environmental care (for example, the Volkswagen corporation's depreciation after the scandal of counterfeiting of data on emissions of cars of the same name, after which the Toyota corporation is substantially improved its position on the market, including as a result of the presentation of a hybrid car that used electricity and gasoline as a fuel);

Technological – the development of technologies, which in particular is actively financed by transnational corporations (60-80% of applied developments in the USA and European countries), leads to the emergence of new technologies / models that are more energy efficient and resource efficient, aimed at creating modern materials and fitting in the concept of a green economy (this phenomenon is partly explained by the effect of the environmental curve of S. Kuznets). Fundamental research that is prerogative of the state is also aimed at ensuring sustainable growth (see the main scientific directions and major problems of fundamental research in the field of natural sciences, technical sciences and the humanities);

Societal – the problem of sustainable (non-exhausting) use of shared resources ("Tragedy of the common") can be solved within the theories of R. Coase – that is, through the establishment of a clear regime of the use of such resources. The problem of the deterioration of environmental attractiveness due to plaster clogging forces many countries, regardless of their level of economic development, to impose restrictions on the import or use of certain types of plastic (for example, the use of plastic bags is limited in Mexico, Bangladesh, Rwanda, USA, England). The lack of environmental restrictions for production by 2014 in China has led to a catastrophic increase in the number of deaths due to environmental factors.

This list may be extended and concretized, but it is now clear that international companies cannot stay away from current trends and ignore the requirements for sustainable development. Moreover, large multinational and multinational corporations and strategic alliances have sufficient resources to fund and implement research activities of this kind, and also have a sufficient impact on the market and public opinion to raise awareness of environmental issues and demand for goods and services. At the same time, one should not forget that sustainable development involves three dimensions – economic, environmental and social.

Next block is concerned the internal display of management. It's more concentrated on behavioral aspects of the organization as a logical development of classical, neo-classical and modern managerial theories. It's more human-oriented and considers personnel not only the resource for profitable and efficient development and treat it as a source of long-run prosperity

on basis of equality and non-discrimination. Transparency, information exchange and communications become more valuable. It became more obvious that “by defining our goal more clearly, by making it seem more manageable and less remote, we can help all people to see it, to draw hope from it and to move irresistibly towards it” [4] and gave the possibility to confront the economic instability and insecurity. Setting goals is important for many reasons: they are essential for social mobilization; create peer pressure; to spur epistemic communities – networks of expertise, knowledge, and practice – into action around sustainable-development challenges; mobilize nonofficial networks and interactions. There are too many factors that should be taken into consideration and that boost development such managerial theories as chaos and contingency theories.

New approaches states that companies or individuals that subscribe to the contingency school of management do so because they believe there is no one process, system or approach to running a business. The thought here is planning, organizing, leading and controlling must be tailored to the specific issues or circumstances a company might face or is facing. Contingency planning is an approach that believes if you want to run a business effectively for any period of time, you must be prepared for emergencies or disruptions that relate to how your business runs. The goal or thought process is that you need to make sure that your company can still run or operate despite anything that might come up that could stop it from doing so. In continuation chaos theory is a promising framework that accounts for the dynamic evolution of industries and the complex interactions among industry actors. By conceptualizing industries as chaotic systems, a number of managerial implications can be developed. Long-term forecasting is almost impossible for chaotic systems, and dramatic change can occur unexpectedly; as a result, flexibility and adaptability are essential for organizations to survive. Nevertheless, chaotic systems exhibit a degree of order, enabling short-term forecasting to be undertaken and underlying patterns can be discerned.

New challenges also raise questions about combining leadership with traditional management, macro and micro levels of management, rethinking the human capabilities (Garr Hamel pyramid) etc. McKinsey’s 7-S framework also should be rethink with the positions of sustainable development and economic security (Table 1.2).

In conclusion should be mentioned that contemporary management could not be studied isolated from economic, social and environmental changes. Inclusiveness and interconnection of all processes and events are essential for rethinking and rebuilding the management systems of organizations. The economic security is not only the one component of external environment of indirect influence, it’s also the one of incentives for changes in management.

Table 1.2

## Rethinking the McKinsey's 7-S framework [author interpretation]

<b>McKinsey's 7-S framework</b>	<b>New incentives</b>
Strategy – to determine allocation of scarce resources and to commit the organization to a specific course of action	Sustainable development framework and necessity of security as a bases for a strategy
Structure – to determine the number of levels (in hierarchy) and authority centers	Development of organic organization is one that is very flexible and is able to adapt well to changes. Its structure is identified as having little job specialization, few layers of management, decentralized decision-making, and not much direct supervision.
Systems – to determine organizational processes, procedures, reports, and routines	Decentralized processes and modern communication channels which change the routine and should be updated in order to survive
Staff – to determine key human resource groups in an organization and describe them demographically	Transparency in human-relations and interconnection on indiscrimination and inclusive basis is a fundamental for development
Style – to determine the manner in which managers should behave for achieving organizational goals	The communications should be rethought and modernized essentially (more in [8])
Super-ordinate goals (shared vision) – to determine the guiding concepts that an organization needs to instill in its members	Revising the concepts should be more dynamic process in modern life in order to meet all challenges and efficient react to incentives.
Skills – to determine the abilities of people in an organization	Inclusiveness and lifelong learning is a clue concepts for skill development

We should to emphasize that the success of long-term development depends on social, economic, environmental and any others components of overall security and this was illustrated by Maslow pyramid interpretation of the game Jenga. The tow assumptions were made. The first simplification is that we can imagine that blocks represented the elements of security – we can remove (in real life – ignore or not treat properly) them without any visible consequences for some time but in long run perspective it leads to destroying all system. The other assumption that is essential that our hierarchy of needs of society also developed and changed through the time. The Jenga “tower of security” was presented as a set of security’s elements that build in from basic ones to more complicate and gave a possibility to explain the importance of all elements.

The concentration on economic security gave us a possibility to rethink the contemporary management development and separate the clue issues for which development the economic security is one of the incentives:

- sustainable development as parity of social, economic and environmental components, where security play important role. This ideology formatting modern background of both local and global development;



– changes in world market and its globalization that is facilitated the spreading technologies, information and approaches to build of internal policies. This also applies to social guarantees inside the organizations and providing the economic security for all members independently from the country or social class;

– moving from effectiveness to efficiency in management which is connected with behavioral studies and rethinking the role of human resources in organization. The last one directly influenced by feeling of security;

– the growing standards of living change the overall situation because its accompanied by growing incomes and possibilities to spend the free time, and receive more information from different sources, and rise the mobility of the people etc. That is coursed changes in needs structure (moving up to the Maslow pyramid) and made security issues more important. The last in its turn influence the management.

Summarizing statei that economic security is an incentive for contemporary management development that could not be ignored.

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### **1.3 MACROECONOMIC STABILITY: EU EXPERIENCE AND SITUATION ASSESSMENT FOR UKRAINE**

The financial crisis in 2007 was caused by increasing of countries' economic development levels disproportions and their competitiveness. As a result of GDP growth in the world richest countries in 2007, which are included to G7 (Canada – 2.06%, France – 2.36%, Japan – 1.65%, Germany – 3.26%, Italy – 1.47%, Great Britain – 2.55%, the USA – 1.8%) (World Bank, 2017), only four of them (United States, Japan, United Kingdom, Germany), in average by 2%, are included to ten best countries by the competitiveness index, published in the annual Report about global competitiveness by World Economic Forum [11].

Among the EU countries the highest annual rate of GDP growth in 2007 was fixed in the Baltics (Estonia – 7.75%, Latvia – 9.95%, Lithuania – 11.08%), Slovak Republic (10.8%) and Luxemburg (8.4%), however after financial and debt crisis impact in 2009 all EU countries demonstrated negative tendency of the economic growth, total GDP was reduced by 4%. It should be noticed that economies of those countries suffered from the deepest recession, which demonstrated the highest rates of the pre-crisis GDP growth, particularly in Estonia (-14.72%), Latvia (-14.33%), Lithuania (-14.81%) and Finland (-8.27%) [12]. Such falling lead to the losses of mentioned economic positions in the rating of global competitiveness index in comparison with 2004-2005 by 0.52 points in Finland (1 place (5.95) in 2004-2005, 6 place (5.43) in 2009-2010) and Estonia (20 place (5.08) in 2004-2005, 35 place (4.56) in 2009-2010), 0.37 points – Latvia (44 place (4.43) in 2004-2005, 68 place (4.06) in 2009-2010), 0.27 points – Lithuania (36 place (4.57) in 2004-2005, 53 place (4.30) in 2009-2010) [11].

Since 2010 in order to avoid above misbalances, appeared after crisis, the European committee within the EU took measures oriented to reduce its impact and risk in the future. One of such measures was acceptance of European Parliament and Council Regulations (EU) № 1176/2011 and № 1174/2011, November 16, 2011, the first of which concerns prevention and correction of macroeconomic misbalances, and the second – correction of excessive macroeconomic tendencies misbalances in the euro-zone countries [8; 9]. According to Regulation (EU) No 1176/2011 the macroeconomic misbalance is defined as «any trend giving rise to macroeconomic developments which are adversely affecting, or have the potential to adversely affect, the proper functioning of the economy of a Member State or of the Economic and Monetary Union, or of the Union as a whole» [9]. In this context Scoreboard plays significant role. It consists of fourteen macroeconomic indices (Table 1.3) monitoring of which is oriented to prevent, reveal and check macroeconomic misbalances and deviations from desired level of competitiveness.

Table 1.3

## Macroeconomic Imbalance Procedure Scoreboard [7]

	<b>Indicators</b>	<b>Threshold</b>
External imbalances and competitiveness	Current account balance – % of GDP (3 year average)	> -4% ; < +6%
	Net international investment position (% of GDP)	> -35%
	Real effective exchange rate – 42 trading partners(1) (3 year % change)	> -5% ; < +5% (EA) > -11% ; < +11% (Non-EA)
	Export market share – % of world exports (5 year % change)	> -6%
	Nominal unit labour cost index (2010=100) (3 year % change)	< 9% (EA) < 12% (Non-EA)
Internal imbalances	House price index (2010=100), deflated (1 year % change)	< 6%
	Private sector credit flow, consolidated (% of GDP)	< 14%
	Private sector debt, consolidated (% of GDP)	< 133%
	General government gross debt (% of GDP)	< 60%
	Unemployment rate (3 year average)	< 10%
	Total financial sector liabilities, nonconsolidated (1 year % change)	< 16.5%
Employment indicators	Activity rate – % of total population aged 15-64 (3 year change in pp)	> -0.2%
	Long-term unemployment rate – % of active population aged 15-74 (3 year change in pp)	< 0.5%
	Youth unemployment rate – % of active population aged 15-24 (3 year change in pp)	< 2.0%

However, despite introduction of the proper policy to prevent macroeconomic misbalance in the countries, according to data of World Bank in 2014, 3 from 28 EU countries had negative tendency to the economic growing (Cyprus – 1.53%, Finland – 0.63%, Croatia – 0.35%), and in 2015 – Greece (-0.22%). At the same time, global competitiveness index gap between European economies which take the highest (Netherlands – 5.57) position in rating of The Global Competitiveness Report in 2016 and the worst (Greece – 4) was 1.57 points [11].

Director of Finance Institute in Warsaw, Professor of Economics Grzegorz W. Kolodko [4] suggests a model of the macroeconomic stabilization pentagon (MSP), based on the study of dynamics and interconnection between five key macroeconomic indices GDP growth rate ( $r$ ), unemployment rate ( $U$ ), inflation rate (CPI), state budget balance to GDP ( $G$ ), balance of current turnovers to GDP (CA). This model provides economy review, considering internal and external misbalances. Essence of the MSP model is to assess the situation when the country reaches five aims of the macroeconomic stability:

- 1) stable economic growth, measured by speed of GDP growth;
- 2) increase of employment rate, i.e. unemployment rate reduction;
- 3) increase of the internal balance, considered as inflation rates,
- 4) balanced state budget, with which internal state debt financing will be supported without inflation effects;
- 5) balance of the current account has to be supported at the level, which lets to reduce an external debt.

Each of five above indices is a pentagon vertex (Fig. 1.7), based on ratio of which MSP synthetic index is calculated, that is a measure of the surface square, calculated by the formula:

$$\begin{aligned} \text{MSP} &= a + b + c + d + e = \\ &= [(r \times U) + (U \times \text{CPI}) + (\text{CPI} \times G) + (G \times \text{CA}) + (\text{CA} \times r)] \times k, \end{aligned} \quad (1)$$

where  $a = r \times U \times k$  presents triangle area called real sphere triangle that characterizes the relation between unemployment and the dynamic inflation, it grows whenever the unemployment rate falls;  $b = U \times \text{CPI} \times k$  defined as the shortageinflation triangle which is dependent on the unemployment rate and the dynamics of inflation;  $c = \text{CPI} \times G \times k$  is called the budget and inflation triangle;  $d = G \times \text{CA} \times k$  which is defined as the financial equilibrium triangle and is showed as a result from amount of the budget and current balances;  $e = \text{CA} \times r \times k$  is defined by the variability of the current account balance and the dynamics of the global product and called as external sector triangle; and the value of coefficient  $k$  is determined as  $k = 1/2 \sin 72^\circ$ .

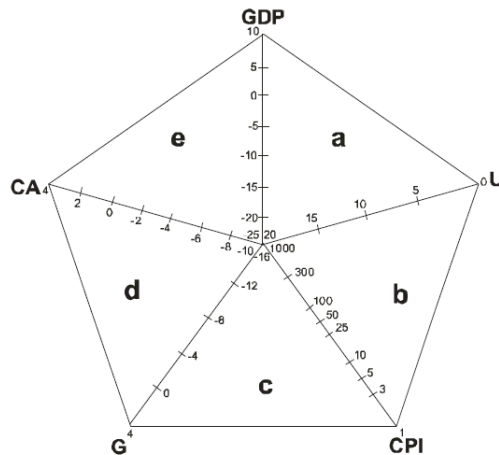


Figure 1.7. The macroeconomic stability pentagon [4]

We have an optimal situation in economy, when MSP is equal to 1 or 100%, and each of triangle fields, formed as a result of pentagon vertexes correlation is 20% of its total square.

Realization of macroeconomic stability tasks is to support a relative balance between internal and external factors:

$$\text{MSP} = \text{MSP1} + \text{MSP2} \quad (2)$$

where  $MSP1 = a + b + c$  – indicator, which characterizes impact of internal factors on the macroeconomic stability in the given country;  $MSP2 = d + e$  – indicator, which characterizes external factors' impact.

Balance of subindices  $MSP1$  and  $MSP2$  means that country's economy does not depend on the international markets and currency exchange rates, but at the same time is a closed economy with old technologies and lack of investment. It is supposed that level of country's general economic efficiency is directly proportional to the pentagon surface. At the same time, the balanced form of pentagon shows more balanced growing of economy. From the viewpoint of economy growing and stability,  $MSP$  is preferable to be supported at highest degree. High rates of  $MSP$  may assist strengthening of the government control, particularly, increasing available financial resources, and thus, creation of the concrete system or sectoral policy in this country. On the other hand, low rate of  $MSP$  has to play a significant role to achieve an effective realization of public interests, implemented in the managerial processes of state institutions and economic processes support.

Extensive research with  $MSP$  model use for potential analysis of growing and stabilization in many countries is considered in works of scientists-economists [1-3; 5; 6; 13]. The research of macroeconomic stabilization based on  $MSP$  Model was further developed in studies by [13] for the countries of Central and Eastern Europe (CEE). Mentioned paper presented the comparison of macroeconomic situation between countries and revealed that Czech Republic and Slovenia showed the highest  $MSP$  level in the period of 2008-2009, and Poland happened to be also among the countries with the highest  $MSP$ . The deepest declines in GDP took place in the Baltic States (Latvia had the lowest  $MSP$  level in 2008-2010). What is more interesting among the research findings, none of the countries in 2010 reached the level of 2007 (pre-crisis period).  $MSP$  indicator showed the positive changes in the economic conditions only in 2010 for the CEE countries. Another research on macroeconomic stability was replicated by the scientists G. Hurduzeu, M.-I. Lazăr [2] where data were collected for Southern Area Countries (Portugal, Ireland, Italy, Greece, Spain) for the time period 2009-2013. The research revealed the similarities and differences between Italy, Portugal and Spain and showed the difference between Greece and Ireland. The high unemployment was observed in these countries and identified as the main problem and source of macroeconomic instability. Authors assumed that  $MPS$  Model is applicable tool for comparative analysis for countries of EU and its usage creates the preconditions for adequate policy design in a sphere of economic stabilization.

Peculiarities of Ukraine's main key indices during 1997-2016, on the basis of which  $MSP$  is calculated, are shown in the Table 1.4.

Table 1.4

Descriptive statistics of the MSP model main key indices (based on our own calculations)

<b>Constant</b>	<b>Average value</b>	<b>Standard fluctuations</b>	<b>Minimum value</b>	<b>Maximum value</b>
r	1.89275	6.738748	-14.8	12.1
U	8.77	1.628076	6.4	11.6
CPI	13.51007	10.53562	-0.6	43.3
G	-1.52011	2.984758	-6.5419	6.8
CA	-0.6803156	5.407193	-9.2	10.3

GDP average growth in 1997-2016 was 1.89% per year. During 1999-2007 real GDP growth was observed from 102.5 billion UAH to 587.392 billion UAH, caused mostly by government's anti-inflation policy, in average consumer price index was 12%, in 2002 deflation at the level of 0.6% was fixed in Ukraine. In its turn, the unemployment average rate between 1999 and 2007 was 8.4%, besides, the least value of this index was fixed in 2005 at the level of 7.2%. Balance of current turnovers during the analyzed period was also fixed at the high level to 10.3% of GDP in 2004. Despite positive tendencies of nominal and real GDP growth from 1999-2007, since 2000 there was adverse consolidated state budget in Ukraine, justified first by the state debt stability. Determination coefficient of the state debt dependence on state budget deficit is 77%. During 2000-2007 ratio of state budget deficit to GDP was gradually reduced to 0.89%, and did not exceed 3%. On the one hand, it proves the non-destabilizing character of this index impact on country's economy, and on the other hand, essential misbalance policy concerning the financial provision of state's development.

The largest falling of main macroeconomic indices was in Ukraine during 2008-2013, influenced by the global financial and economic crisis. At first since 2000, both in absolute and in relative terms GDP was decreased in 2009 in comparison with previous period (34.7 billion UAH or 14.8%), and average falling of economy during that period was 0.44%. State budget deficit of Ukraine was increased to 64.7 billion UAH in 2013 (or 4.3% of GDP) and almost seven times exceeded its amount in 2007.

During the next 2014-2016, in absolute term amount of GDP was being increased demonstrating a positive tendency, however rates of index growing were characterized with tendency to slowdown in 2014 and 2015 and were -6.55 and -9.87% accordingly, and only in 2016 fastened growing by 2.3%. Investigating factors of macroeconomic instability in the economic model development system, authors of the work [10] point out that only economic growth over 5% per year, will allow to escape beyond the existing restrictions of economy development in Ukraine. Therefore such growth is based on the following directions: withdrawal of non-economic and exhausted capacities; generating of new technologies and their introduction

into the production; reduction of irrational budget costs and minimization of corruption schemes to steal budget [10]. Average growth of GDP in Ukraine during 2000-2015 at the level 4.03% of annual growth can signal about appearance of economy's recessions prerequisites in the perspective period. The increasing tendency in the absolute terms of the country's GDP volume contradicts the unemployment rate increase during the last three years of the investigated period to 9,3%, that while keeping the proper tendency may have a negative impact on social and economic indices of inhabitants' lives. It should be noticed that the consumer price index was greatly reduced in 2016 in comparison with previous year (43.3% in 2015, 13.9% in 2016). It is explained with moderate fiscal and monetary policy of the country, with reduction of military conflict intensity in the east.

Analysis of the macroeconomic stability in Ukraine during 1997-2016 considering structure of internal (sum of surfaces of triangles a, b and c) and external factors' (sum of surfaces of triangles d and e) impact at different stages of the economic cycle: establishment of the post-Soviet economic system (1991-1998), pre-crisis period (1999-2007), crisis period (2008-2013) and post-crisis period (2014-2016) demonstrates chaotic process of economy stabilization and different orientation of the country's macroeconomic proportion (Fig. 1.8).

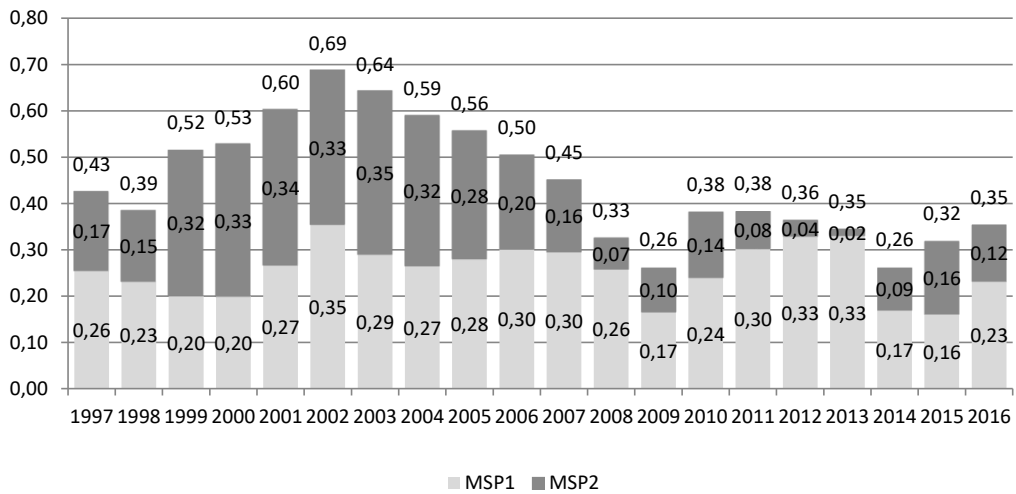


Figure 1.8. Indicators of internal and external factors impact on the macroeconomic stability in Ukraine in 1997-2016 (own calculations based on World Bank data)

The computing was done taking into account the scale of MSP sub-indices dynamic as follows: index of changes in the GDP level,  $r$  has a diapason from 25% to 10%; unemployment

rate U range is from 0% to 20%; rate of inflation or consumer price index (CPI) range is 1% till 1000%; ratio of budget balance to GDP in percent, G changes are assumed to be from -15% to 4%; ratio of current account balance to GDP in percent, CA has a range from -10% to 4%.

If the values of indices that are larger or smaller than boundary values, then they are taken as minimum or maximum values.

Maximum value of MSP (0.69) was achieved by Ukraine in 2002 when there was a relative balance between MSP1 (0.35) and MSP2 (0.33). Since 1997 till 2003 triangles of financial balance and external sector were constantly growing (Fig. 1.9) and in 2003 index MSP2 was the highest among all analyzed years (level of subindex MSP2 grew from 0.17 in 1997 to 0.35 in 2003, or by 105%). It should be noticed that during the whole time from 1997 till 2016 sufficient rate of the macroeconomic stability, higher than 0.5, was demonstrated by the country only in the pre-crisis period from 1999 till 2007. During the mentioned period, except 1999 and 2000, internal factors (fields of triangle a, b and c), had large specific weight in the MSP structure during the analyzed period and were within the range of 38% (1999) and 65% (2007).

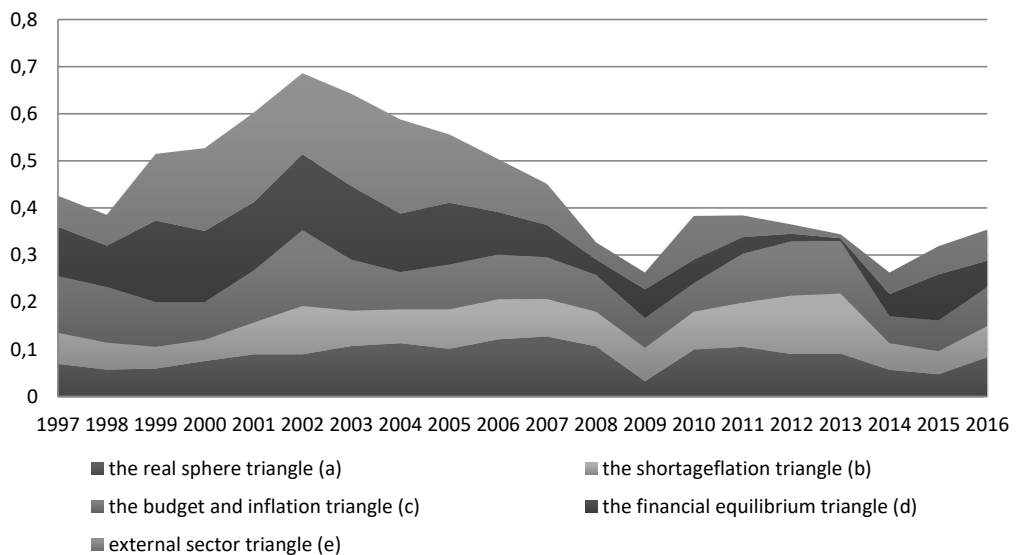


Figure 1.9. Distribution of MSP for Ukraine in 1997-2016

(own calculations based on World Bank data)

In 2008 the situation was worsened mainly due to external factors (MSP2 level was 0.07), and, first of all, it was a consequence of the global financial and economic crisis impact. During the whole crisis period in 2008-2013 subindex MSP2 was decreased and had



minimum value in 2013 (0.02 or 5% of MSP). A large specific weight of the subindex MSP1 in 2008-2013 proves that macroeconomic situation in the country depends firstly on the native production.

During the stabilization process after post-crisis period both external and internal factors assisted the increasing of the macroeconomic stability level. Four of five triangles (a, b and d, e) described positive dynamics (Figure 1.10); however large specific weight of internal factors (in 2016 about 66%) shows the gradual policy of the markets openness and GDP growth increase. In 2016 MSP rate (0.353) was 0.027 points higher in comparison with 2008 (0.326) and 0.09 points higher than in 2009. Whereas fields of economy real field, stagflation, budget and inflation triangle in comparison with 2013 were decreased by 0.008, 0.061 and 0.029 points respectively. It should be pointed out that MSP rate in 2014-2016 did not reach minimum value during pre-crisis period since 1999 to 2007 (0.451 in 2007).

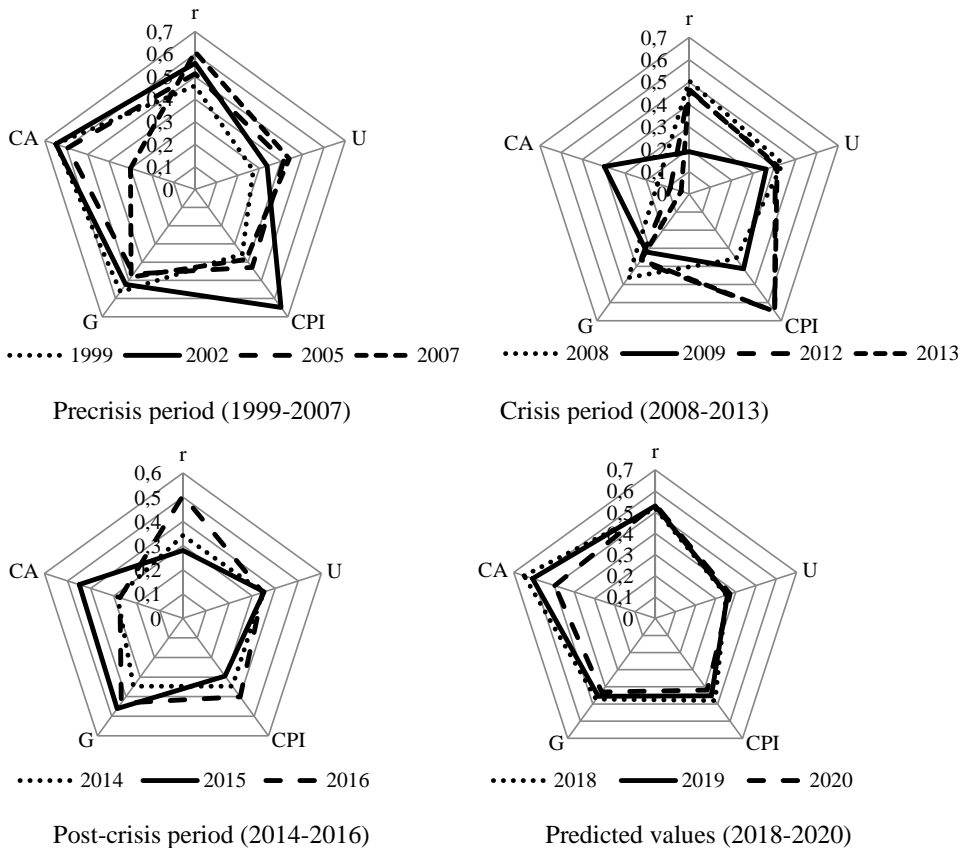


Figure 1.10. Comparison of MSP profiles in Ukraine at different stages of the economic cycle (formed on the basis of own calculations)

Average value of triangles squares of the synthetic index MSP during the whole analyzed period did not exceed an optimal value 0.1 (a – 0.086, b – 0.076, c – 0.094, d – 0.089 and e – 0.098).

Given the macroeconomic predictions for Ukraine of GDP rate growth, unemployment rate approved on May 31 at the meeting of Cabinet of Ministers of Ukraine and based on data extrapolation concerning consumer price index, state budget balance, current account balance, one may state (Fig. 1.10) that gradual improvement of the macroeconomic stability in 2018-2020 will be mainly by means of external and internal factors balance increase.

The data analysis (see Table 1.5) showed different velocities of macroeconomic stabilization changes of national economic of target countries. Under conditions of the crises 2007-2010 Belarus was the most stabilized country due to endogenous factors (triangle areas a, b and c). Romania and Croatia have the best values of the level of macroeconomic stabilization, but it worth mentioning that these countries became the members of EU in 2007 and 2013 respectively. It is necessary to admit that both Croatia and Romania demonstrated one of the lowest levels of macroeconomic stabilization: in 2002 Croatia had MSP=0.176 but after EU integration the value grew rapidly – in 2015 it is 0.255. The same tendencies were observed for economy of Romania: from 0.203 in 2000 to 0.381 in 2015, in totals the stabilization of endogenous factors increased in 87%.

Table 1.5

Sub-indices and the MSP index in the for the lower-middle-income economies of EU countries for time period 2000-2015 [own calculations based on Eurostat data]

Country	Indices	2000	2002	2004	2006	2008	2010	2012	2014	2015
1	2	3	4	5	6	7	8	9	10	11
Latvia	MSP1	0.213	0.268	0.238	0.335	0.231	<b>0.039</b>	0.226	0.300	0.314
	MSP2	0.111	0.080	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	0.135	0.144	0.167	0.192
	MSP	0.324	0.348	0.238	0.335	0.231	0.173	0.370	0.467	0.506
Lithuania	MSP1	0.199	0.272	0.289	0.364	0.312	0.146	0.236	0.323	0.347
	MSP2	0.094	0.117	0.057	<b>0.000</b>	<b>0.000</b>	<b>0.200</b>	<b>0.197</b>	<b>0.309</b>	0.170
	MSP	0.293	0.388	0.346	0.364	0.312	0.346	0.433	<b>0.632</b>	0.517
Poland	MSP1	0.147	<b>0.108</b>	<b>0.099</b>	0.231	0.314	0.249	0.267	0.321	0.358
	MSP2	0.084	0.134	0.089	0.129	0.066	0.084	0.123	0.161	0.199
	MSP	0.231	0.243	0.188	0.360	0.380	0.334	0.390	0.482	0.557
Armenia	MSP1	0.118	0.118	0.137	0.117	0.175	0.087	0.167	0.146	<b>0.135</b>
	MSP2	<b>0.000</b>	0.092	0.194	0.192	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	0.052	0.140
	MSP	<b>0.118</b>	0.210	0.332	0.309	0.175	<b>0.087</b>	0.167	0.198	0.275

Table 1.5 (cont'd)

1	2	3	4	5	6	7	8	9	10	11
Belarus	MSP1	<b>0.265</b>	0.314	<b>0.377</b>	<b>0.445</b>	<b>0.423</b>	<b>0.401</b>	<b>0.342</b>	0.361	0.353
	MSP2	0.155	0.192	0.127	0.170	0.057	<b>0.000</b>	0.160	0.076	0.138
	MSP	0.420	0.506	0.504	<b>0.616</b>	<b>0.480</b>	<b>0.401</b>	<b>0.502</b>	0.437	0.491
Croatia	MSP1	<b>0.078</b>	0.115	0.141	0.187	0.239	0.146	0.115	0.128	0.154
	MSP2	0.149	<b>0.062</b>	0.124	0.078	0.026	0.155	0.178	0.222	<b>0.255</b>
	MSP	0.226	<b>0.176</b>	0.265	0.265	0.265	0.301	0.294	0.349	0.409
Georgia	MSP1	0.259	0.224	0.233	0.225	<b>0.157</b>	0.129	0.247	0.252	0.236
	MSP2	0.088	0.078	0.073	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
	MSP	0.347	0.302	0.305	0.225	<b>0.157</b>	0.129	0.247	0.252	<b>0.236</b>
Moldova	MSP1	0.237	<b>0.364</b>	0.286	0.283	0.372	0.293	0.323	0.370	0.284
	MSP2	0.053	0.228	0.202	0.000	<b>0.000</b>	0.056	0.049	0.104	0.099
	MSP	0.290	0.592	0.489	0.283	0.372	0.350	0.372	0.474	0.383
Bulgaria	MSP1	0.127	0.166	0.271	0.322	0.359	0.237	0.249	0.268	0.323
	MSP2	0.159	0.220	0.144	<b>0.000</b>	<b>0.000</b>	0.154	0.192	0.195	0.206
	MSP	0.286	0.386	0.416	0.322	0.359	0.392	0.441	0.462	0.529
Romania	MSP1	0.203	0.249	0.295	0.324	0.325	0.242	0.292	<b>0.380</b>	<b>0.381</b>
	MSP2	0.139	0.162	0.060	<b>0.000</b>	<b>0.000</b>	0.079	0.100	0.202	0.192
	MSP	0.342	0.411	0.356	0.324	0.325	0.320	0.392	0.582	<b>0.573</b>

- bold font – the best values, bold and italic font – the worst values among the data per same year

We should notice some unusual findings, thus, economy of Belarus has one of the highest levels of macroeconomic stabilization, and above all Belarus became the leader among all the countries in 2005 when its stabilization level was 0,711.

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## **1.4 ECONOMIC SECURITY OF THE STATE IN THE INFORMATION ECONOMY: THE IMPACT OF E-BUSINESS AND DIGITAL FINANCE**

An analysis of the level of economic security of the state and the construction of an appropriate management system can not be separated from the understanding of the general tendencies in the society development, the modes of the social division of labor, the corresponding basic production resources, forms of ownership, sources of growth in value, structure and interconnections (coordination) of elements of the economic system. At the present stage of functioning the economic systems and society as a whole are under the influence of information technologies, which dynamic development has already led to changes in the management of most business processes and is one of the main factors of further economic transformation.

Informatization of public life covers all aspects of the economy functioning, therefore the transition to the information economy should be taken into account also in the methodology of assessment and analysis of the level of economic security of the country, and information and communication technologies should be considered as important components for economic growth and economic security. Therefore, there is a need to research the essence of the information economy and consider possible directions for revision of the methodology for evaluating the level of economic security of the state to take into account the impact of informatization of the economy.

Information economy is formed within the information society, in which the main productive resource is information. It should be noted that scientists have different points of view

regarding the place of the information society in the formation and development of economic systems. For example, D. Layon considers information society as a new stage in the historical development of society, which is the result of a second industrial revolution and is based largely on microelectronic technology [9]. D. Bell, E. Toffler, S.S. Grinkwich and O.I. Ilyash [4, p. 57] consider that the information society is the highest stage in the development of post-industrial society. W. Martin does not distinguish a separate process of formation of a post-industrial society, and considers the information society is the highest level of development of an industrial society. Such researchers as L.G. Melnyk [14, p. 111], Yu.M. Bajal [1, p. 33-34] believe that the concepts of the post-industrial and informational society are identical to each other.

Interpretation of the definition "information economy" is also characterized by a variety of approaches by different researchers. In the narrow sense, the essence of the information economy is often interpreted as e-commerce, information infrastructure, the use and commercialization of the Internet [1, p. 33]. For example, S.V. Mocheryn believes that the information economy is a characteristic of the modern economy from the point of view of its material content, and where information technologies are spreading in the spheres of tangible and intangible production and transform the information into one of the important factors of social and economic progress of society and individuals [16]. S.S. Grinkevich interprets the informational economy in the narrow sense as "a separate sector of the national economy where the intellectual product is created" [4, p. 60]. Also S.S. Grinkevich defines the informational economy in a broad sense as "a type of economic system in which the central place is given to the industries that create the intellectual product and decisively influence the functioning of all other branches" [4, p. 60].

In most approaches to the definition of the category "information economy", the authors emphasize the widespread using the information and communication technologies, the knowledge-oriented information in the processes of social production, the creation of a competitive product, distribution and consumption of public goods [4, p. 60; 13, p. 93-94; 1, p. 33,51]. In particular, A.O. Maslov defines the informational economy as being formed on the combination of elements of the traditional, network and knowledge economy, which has its own special content elements and is based on information and knowledge [12, p. 115]. V.L. Pleskach pays attention to the use of information and communication technologies, defining the informational economy as electronic economic activity, in which the economic activity in the field of information services, their production and exchange prevails, and where the main resources are information and knowledge [18, p. 14-15].

Yu.M. Bazhal believes that the use of knowledge-based information is a system-forming idea of the concept of information economy and information society [1, p. 34], which in turn is

the result of the development of the concept of Mahlup F. in relation to the "knowledge industry" [10, p. 44-45], which substantiates the growing role of information and knowledge in creating GNP. According to this interpretation [13, p. 94], the information economy is defined as a type of economy, where the predominant share of the gross domestic product is provided by the activity of production, processing, storage and transfer of information and knowledge.

The transition to the information type of society and the information economy significantly changes economic relations, processes of production, exchange, distribution and consumption, having an influence on the government's economic policy, formulation of economic development strategy of the state and its economic security [13, p. 94]. The role of information in the information economy lies in the proliferation of electronic communications and increasing speed of communications and transmitting messages, more effective dissemination of large data sets, and the enhancement of automating the labour activity [4, p. 59]. In addition, cheaper and better access to knowledge provides a reduction in cost, increasing the economic benefits of consumers [11, p. 27].

Summarizing the research of scientists on the formation and functioning of the information economy, it is possible to distinguish the following its characteristic features [4, 11, 12, 1]:

- development and diffusion of information and communication technologies, which are the basis of the information economy;
- increasing the role of information and knowledge in the life of society;
- creation of network infrastructure, which helps to achieve the saving effect on the use of commercial and storage facilities, reduce the time of production and sales of products, create a single competitive economic space;
- increasing the scale of economic activity through the transfer of various types of economic activity to the global digital environment;
- increasing the share of information communications and products (information goods and services) in GDP;
- creation of a global information space in which there is an effective information interaction of people through their access to worldwide information resources and the consumption of relevant information products and services;
- ability of economic entities to work as a single commercial environment in real time on a worldwide scale using the global information space;
- free movement of capital between countries and the possibility of its real-time use in any country;

- increase of economic productivity due to the use of all kinds of resources without time limitations and territorial restrictions;
- increasing number of employees in the sphere of information technologies;
- changing ways of profit-making by moving from generating profit by the scale effect to the use of higher rates of innovation development and the ability to attract and retain customers;
- rapid rates of obsolescence and updating of information products and technologies;
- increasing the significance of the management and regulation of the information sphere.

Informatization of the economy, which began in the 1960s, has now reached a level where the use of information and communication technologies in entrepreneurial activity is an infrastructure standard. The development of information technologies and, in particular, the expansion of the Internet has significantly changed the approaches to doing business and the ways of implementing many business processes. Among the main changes in economic activity caused by the informatization of society, it is worth noting the higher speed of transactions, the reduction of technical barriers to the movement of capital between countries, the transformation of interconnections and structural changes in the economy with a reorientation to the network business organization, the growth of the role of small and medium enterprises. With the use of the Internet and information technologies, more than half of business processes are being implemented nowadays [7, p. 14].

The greatest role of the Internet in business activities is related to the search, exchange and distribution of information (through the conduct of the site, electronic correspondence, on-line obtaining information about goods and services); placing and receiving orders, customer service, financial and banking services, interaction with authorities. Significance of Internet technologies for the modern business process is confirmed by high indicators of the level of penetration of information and communication technologies in various spheres of the economy. According to Internet World Stats, about 3885.6 million people or 51.7% of the world's population use the Internet worldwide [5]. Indicators of the Internet penetration level by regions of the world in the first half of 2017 are presented in Fig. 1.11.

The number of Internet users and their share in the total population in all countries of the world is increasing yearly. The share of Internet users in the total population of some developed countries already reaches almost 100% (Iceland – 100%, Norway – 99.6%, Denmark – 96.9%, United Kingdom – 94.8%). Unfortunately, among the European countries, Ukraine has the lowest percentage of Internet users in the total population, namely 52.5%.

In most current research on development issues of information technology and the country's economic growth rate, a positive correlation between these indicators is noted. Given

the increase in volumes of goods and services that are implemented online, the importance of information and communication technologies in entrepreneurship and the GDP growth ensuring becomes evident. Thus, an important element of the information economy is the electronic business, and in particular, such an essential component as electronic commerce. In the global economy, the active diffusion of e-commerce was driven by its undeniable advantages over traditional approaches to doing business, the main of which are the convenience and speed of operations, as well as a significant reduction in costs [13, p. 94].

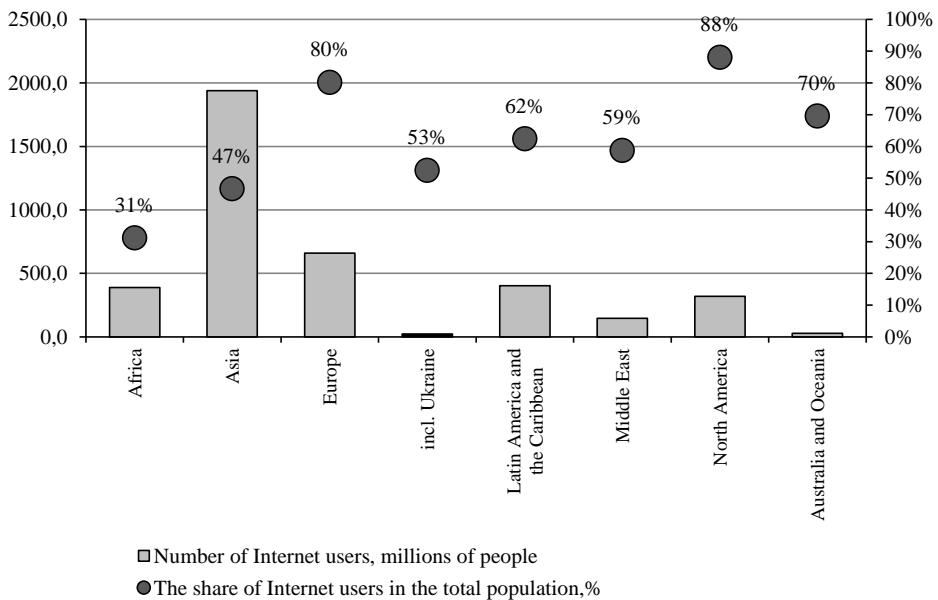


Figure 1.11. The level of Internet usage by regions of the world as at June 30, 2017 [5]

According to Eurostat, the share of European enterprises that sell their products through e-commerce, in 2016 reached 20%. At the same time, this indicator considerably varies depending on the size of countries and the types of enterprises. Thus, in 2016, the share of companies involved in e-commerce in Ireland, Denmark, Germany, Belgium, the Netherlands, Sweden and the Czech Republic was the highest (above 25%), and the lowest in Latvia, Bulgaria and Romania (less than 10%). With regard to the size differences between enterprises, the most active e-commerce participants are large companies (42% of large enterprises sell products online); the share of participation in the electronic commerce of medium-sized enterprises is smaller (28%), and small businesses have the smallest share (18%) [2].



Similar trends in the popularity of e-commerce in the EU countries can be seen by the share in the total volume of sales of products sold through e-commerce in 2016 (Fig. 1.12).

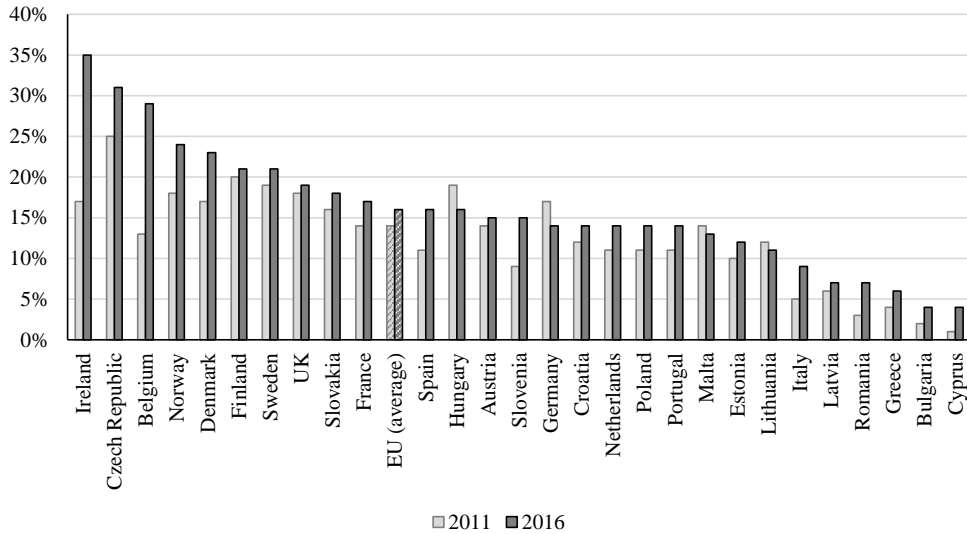


Figure 1.12. Share of e-commerce in the total volume of sales of European enterprises (excluding the financial sector) [2]

The average share of electronic sales in the EU countries in 2016 amounted to 16%, which is 2 percentage points higher than the same indicator in 2014. Leading countries in e-commerce on this indicator in 2016 were Ireland (35%), Czech Republic (31%) and Belgium (29%), while the countries with the lowest values of this indicator are Cyprus (4%), Bulgaria (4%) and Greece (6%).

Particular attention should be paid to providing financial services to the population using information and communication technologies. In fact, all types of financial services may be provided through the Internet, including intermediary services in securities and currency trading, lending services, insurance services, etc. Analyzing statistical data on the volume of financial services sold in Europe through the Internet, it should be noted that the largest share of electronic services is characteristic for Insurance (Fig. 1.13). Thus, the average European indicator of the share of insurance products which were sold online in 2016 reached to 11%, investment products and services in the securities trade – 4%, credit products – 2%.

It should be noted that the largest development of electronic financial products were in Scandinavian countries, such as Norway, Finland, Sweden. In particular, these countries are leaders in the EU leaders in terms of the share of investment products and services traded through

the Internet (Sweden – 19% Finland – 12%, Norway – 10%), as well as credit products of banks and non-bank financial and credit institutions (Norway – 16%, Sweden – 11%, Finland – 9%). On-line sales numbers of insurance products in these countries are also high, but the EU's leaders in this type of electronic financial products in 2016 were UK (34%), the Netherlands (31%) and Estonia (30%).

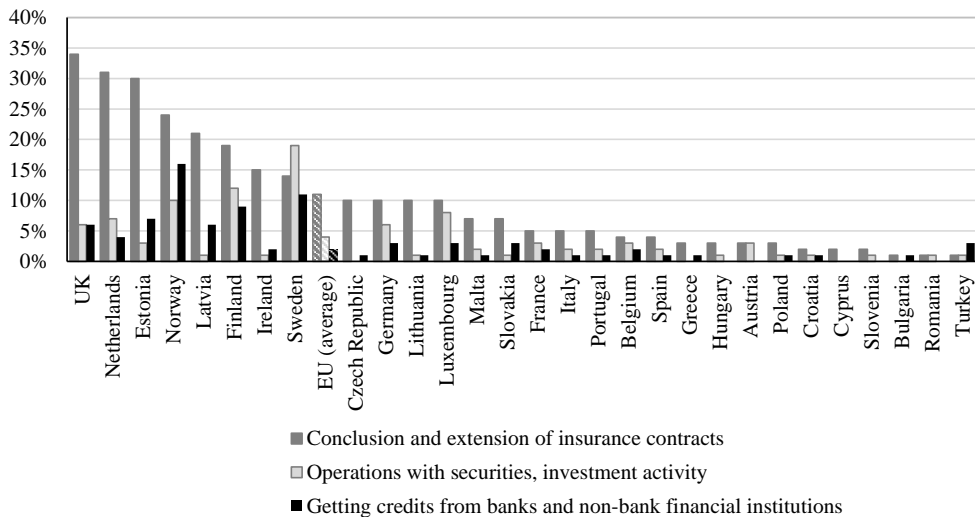


Figure 1.13. Share of financial services provided via the Internet in European countries in 2016 [2]

In addition to traditional financial services implemented with the use of information and communication technologies, it is worth paying attention to a financial phenomenon such as the development of innovative financial technologies and relevant financial and technological start-ups that provide consumers with a range of online financial services without the involvement of traditional financial intermediaries.

One of the most significant results of financial and technological innovation was the development of alternative online financing, which includes: peer-to-peer loans (peer-to-peer consumer loans, peer-to-peer business loans, balance sheet business loans), crowdfunding (equity-based crowdfunding, crowdfunding with non-financial rewards, real estate crowdfunding, profit sharing crowdfunding, donation-based crowdfunding) and others [21].

Peer-to-peer loans are distributed predominantly in the form of consumer lending, in which individuals receive a loan to meet their consumer goals directly from other individuals as well as institutional investors (lenders) without the participation of a traditional financial

intermediary (bank, credit union, etc.). Implementation of this mechanism is considerably simplified with the use of online platforms, which ensure not only the "meeting" between the borrower and the creditor, but also credit scoring based on the tools of this platform entity for checking borrowers' creditworthiness, providing services on settlement of disputes and collection of overdue debts [22, p. 89].

Another alternative financing model, namely crowdfunding, is focused on financing startups, enterprises and ideas at an early stage in the development of the project through the voluntary pooling of financial or other resources of a large number of individual and institutional investors through the online platform.

Summarizing the results of the conducted research on the level of informatization of the economy and the level of implementation of information and communication technologies in various spheres of economic activity, we can conclude that the information technology sector plays an important role in the modern economy, promotes the introduction of innovative solutions in the financial and industrial spheres, influences the change of business processes organization, and therefore it should be considered as a component of ensuring economic growth.

At the same time, the impact on the economic security of information factors may be both positive (thus contributing to the strengthening of economic security) and negative (creating new risks and threats to economic security). In particular, the positive impact of information technology on the level of economic security of the state can be manifested through the promotion of innovative development, the introduction of fundamentally new advanced technologies, increased production of high-tech products, inflow of investments, including foreign direct investments, in key industries, improving organizational structures, applying progressive approaches in management [19, p. 304].

On the other hand, the information technology sector may be a source of new threats to business, including cyberattacks, unauthorized access and use of information [6, p. 126; 17, p. 140]. Violation of the confidentiality, integrity, availability and reliability of information in relation to individual economic entities may cause disclosure of information constituting commercial secrecy, violation of the reliability of financial documentation, unauthorized access to personal data of individuals, financial and other losses.

Analysis of the above-mentioned threats and opportunities that arise for the economic security of the state as a result of the introduction and diffusion of information and communication technologies, gives grounds to assert that there is an obvious dependence of the general level of the state's economic security on its information component, that is, on information security.

As an independent concept and economic category, information security can be considered as a state of protection of the information environment of society, in which it is ensured its formation, use and development in the interests of citizens, enterprises and the state [17, p. 139]. Information security interlinked with economic security can be considered as a separate equivalent component of national security or as a subordinate component in the structure of other types of security of the state, in particular, economic dimension. Taking into account the complications of interconnections in economic systems and the rooting of information technologies in business processes, it is advisable to apply a second approach, that is, to consider information technologies and information security of the state not as isolated and separated from other components of national security, but as an important and influential part of them.

The purpose of securing the country's economic security must be to counteract the potential and real threats, to create an economic, political, legal and informational environment that would stimulate investment and innovation processes, the production of competitive goods and services, etc. [8, p. 43; 17, p. 137]. Thus, in the information economy, economic security can not be considered separately from information security. However, the modern approach to understanding the state's economic security is rather one-sided, since it is limited to financial categories and does not take into account any aspects of information security [17, p. 137].

Determination of the level of economic security of Ukraine is carried out using Methodological Recommendations approved by the Order of the Ministry of Economic Development and Trade of Ukraine dated October 29, 2013, No. 1277 [15]. This methodology is based on a comprehensive analysis of indicators of economic security with the identification of potentially possible threats to Ukraine's economic security. The indicators of economic security are real statistical indicators of the country's economic development, which most fully characterize the phenomena and trends in the economic sphere.

The methodology for determining the level of economic security of Ukraine states that the main components of the economic security of the state are: macroeconomic, financial, foreign economic, investment-innovation, energy, industrial, demographic, social and food security [15].

Taking into account the significance of the impact of information security on economic development and economic security of the state in the conditions of formation of the information economy, separate indicators of information security should be included in the calculation of indicators of economic security, in particular:

- the share of the information and communication sector in GDP,%;
- the weight of e-commerce in the volume of sales,%;
- the weight of enterprises that sell products via the Internet,%;

- the share of the population that has made at least 1 purchase via the Internet during the reporting period;
- the share of insurance contracts concluded online;
- the ratio of the volume of alternative loans (peer-to-peer) to the total amount of loans granted by banking and non-bank financial and credit institutions;
- the ratio of volumes of investment resources attracted from alternative sources (kraudfandings) to the volumes of investments provided from traditional sources;
- the ratio of the number of neutralized (warned) cyber attacks to the total number during the period.

Thus, the present stage of development of society is determined by the emergence of a new type of economic system – the information economy, which is characterized by a significant impact of information technology on the pace of economic growth and on all spheres of economic life of society. This trend should be taken into account in assessing the level of economic security of the state. The methodology for assessing the level of economic security which is used in Ukraine almost does not take into account any aspects of information security. Accordingly, it is suggested to use a number of indicators characterizing the level of financial, industrial and investment-innovation security of the state, taking into account the growth of the informatization of the economy and the development of information and communication technologies.

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## **1.5 STRATEGIC ORIENTATIONS OF THE STATE INVESTMENT AND INNOVATION POLICY IN THE RECREATIONAL SECTOR**

The recreation is one of the key directions that lead to relevance and is a humanistic imperative to the concept of sustainable development. Given this a delineation of strategic orientations of state investment and innovation policy in the recreational sector, taking into account the relevant economic factors are the actual topic of research. It is necessary to analyze weaknesses and develop the strategic orientations of state investment and innovation policy in the recreational sector in Ukraine. In particularly, we need to propose a approach to the creation of a mechanism of state support for investment projects aimed at the development of health, sports, tourism and recreational activities in Ukraine, that included subjects of investment recreational

activities, granting proposals, assessment and selection of projects, realization of state support, financing investment projects and crediting from the state budgets.

So, investing in the recreation sector of countries with transitive economy traditionally depends primarily on the interest of potential foreign investors see new opportunities for deploying their business. Addition to this state policy does not use all chances for the development of the field of leisure, resort treatment and internal tourism as its main focus is on the production sphere as well as those directions of services that give fast economic effect and in which the weight of socio-cultural aspects is negligible. However, in the long term development of the country on the principles of sustainability and social responsibility can not be without taking into account in the economic strategy such social directions as recreation. Moreover, the recreation is one of the key directions that lead to relevance and is a humanistic imperative to the concept of sustainable development. Given this a delineation of strategic orientations of state investment policy in the recreational sector, taking into account the relevant legal and economic factors are the actual topic of research.

The strategic and operational issues of the state investment policy in the recreational and tourism sectors, in their economic aspects are developed in the works of I. Ya. Antonenko, and A. G. Okhrimenko (2010) [2], C. Driver, and P. Temple (1999) [6], and R. V. Slavik (2015) [18]. The legal issues of this are investigated in works of S. O. Blyumina (2008) [3] and V. La Placa, and J. Corlyon (2014) [11]. The article by T. A. FaladeObalade, and S. Dubey (2014) [5] analyses a strategically management approach of tourism as a source of foreign direct investment inflow in developing countries. The impact of the strategically oriented state policy on the economic development of the tourism on the example of Jordan find its resolution in the work of A. Mahafzah (2015) [9]. Sustainable tourism as the investment object and thus the future of economic development of a destination is considered in the work of R. Brokaj (2014) [4]. A strategically perspective of local government in tourism development through its investment is written in the work of M. C. Shone, D. G. Simmons, and P. Dalziel (2016) [19] etc.

At the same time issues of state investment policy in the recreational sector of the economy require an additional justification for creating clear strategic orientations that increase the role of tourism, recreational and other free-time activities in the implementation of the concept of sustainable development in Ukraine. Along with this special attention and additional analysis deserve legal aspects of the state investment policy aimed at ensuring conditions for satisfaction recreational needs of the population and individuals.

Thus, *the purpose* of the work is analysis and development of the strategic orientations of state investment and innovation policy in the recreational sector in Ukrainian national economy.

The state investment policy in the recreational sector in the context of the relatively stable economy had a number of significant disadvantages:

- lack of investment in recreation and tourism sector (Table 1.6: Ukraine has less than 0.1 percent of the world investment [20; 21]) as a socio-economic development direction, when compared with other economic sectors with less pronounced social component. This is evidenced by the fact that the recreational, as well as any other socially significant and socially oriented projects, were not of primary importance when determining the Ukraine’s investment priorities;

Table 1.6

Investment in recreation and tourism in world and Ukraine

Regions	Investment, USDbn				
	2011	2012	2013	2014	2015
Ukraine	0,608	0,388	0,186	0,141	0,117
World	667,0	695,0	706,0	744,0	775,0

- in internal relations of the recreational-tourism sector and, consequently, in the structure of health, recreational and tourist complex, the recreational subsystem, as compared to the tourism subsystem, was paid much less attention during the allocation of financial and investment resources. Thus, the assessment of investment projects, which represented the aspects of recreation, leisure and travel, in our opinion, did not fully consider the possibility of obtaining positive synergy effects;

- traditionally, investment flows were directed mainly to the areas with already relatively developed infrastructure, in combination with favorable climatic and resource recreational conditions, especially in Crimea and the Carpathians. Herewith, the potential of the majority of areas that have historical, cultural, natural reserve, social and demographic and other development factors of the recreational area did not get a chance for their use, with some exceptions, such as the Shatsky Lakes in Volyn or Buymervka in Sumy Oblast, etc.

Currently, it is necessary to consider if it is reasonable to develop recreation in the country with the military conflict and the neglected value of human life. Given this tragic and serious situation, and hoping for the optimistic forecast in the near future, we offer the steps for the formation and implementation of the investment and innovation policy in the recreational sector of the economy:

- the state of the economy in terms of political and financial-economic crisis;
- possibilities of stabilization and development;



- forecasting of balanced socio-economic development;
- development of anti-crisis investment and innovation programs;
- development of investment and innovation programs for the recreation development;
- evaluation of investment and innovation programs for the recreation development;
- considering social and environmental factors of recreational services, along with economic factors;
- selection and preliminary adjustment of investment programs according to the balance of social and economic interests;
- realization of the investment and innovation policy for the balanced development of the recreation;
- financial and economic, scientific and technical, political and other impact factors;
- the set of organizational and economic tools and activities of the state aimed at favorable investment climate, structural transformation and improvement of economic, social, environmental and other indicators of the recreational sector in the functioning and development of the national economy.

The main strategic goals are as follows:

- creating an image of the state where recreation is among the main vital areas, and improvement of the quality of life and rights, including through the provision of qualitative recreational and related tourism and health services, are the main purposes of the state social and economic policy;
- formation of reliable preconditions and factors that create favorable investment climate in the economy, in general, and in the recreational sector, in particular; with a focus on leading international standards and taking into account mental peculiarities and traditions of hospitality in Ukraine;
- transformation of ineffective recreational and tourist facilities in the appropriate regional cluster formations that allow using competitive mechanisms as a catalyst for the development of tourism and recreational businesses and organizations, as well as general socio-economic development at the regional and national levels;
- creation of motivational tools to attract investment in innovative, socially responsible and environmentally effective recreational projects, along with the assistance within the framework of restoration of economically viable environment and damaged facilities by traditional methods;
- the use of an integrated approach in the development of the recreational sector, which would take into account the whole range of needs of the population regarding the recreation using

the criteria of time, distance, duration, etc., as well as wide cross-cultural, historical, patriotic, natural environmental and other possibilities;

- establishment of rules that are regulatory fair and form the basis for further motivation of all participants involved in the production, provision and use of recreational services while minimizing the probability of future conflict and, above all, antagonistic socioeconomic situations and providing maximum expansion of conditions for the cooperation and equilibrium development.

The understanding how to find the so-called contact points, such as in the segments ‘tourism – recreation’ or ‘recreation – health resort treatment’, and comprehensive understanding and systematic approach in the development of those trends, which potentially provide the greatest value of the synergy effect, play a special role in the development of internal connections in the sector of the economy, which traditionally combines recreation, tourism, health resort treatment. In this context, international experience and traditions of the Soviet era confirm the relevance of the sports, the fourth component, together with the triad of ‘tourism – resorts – recreation’.

It should be noted that without the adequate mechanism of state support of investment projects aimed at the development of recreational, sports and tourism activities, in accordance with the laws of Ukraine (“On investment activity” [16]; “On public-private partnership” [12]), in our country both in the medium term, and in the long term, it is impossible to achieve significant progress in these economic sectors. This mechanism includes the follows:

- ideas, aims and objectives of comprehensive recreational activities;
- subjects of investment and innovation recreational activities, and other initiators;
- granting proposals, registration of projects;
- development projects of sports and recreational activities;
- development projects of tourism and recreational activities;
- development projects of health and recreational activities;
- complex projects of recreational development;
- assessment and selection of projects, taking into account indicators: actuality and social dimension of the project, ratio of costs and expected results of the project, result of analysis of effectiveness of the use budget funds, thoroughness of technical and economic calculations and justification for the amount and form of state support, innovativeness of the project, influence on the environment due to the project, level source of the project;
- bodies of state and local authorities;
- realization of state support (primarily in the form of public-private partnership): financing and co-financing investment projects and crediting from the state or local budgets, granting state and local guarantees to ensure compliance with debt by borrowings of recreational

business entities, full or partial compensation of interest on credits of business entities from the state or local budgets.

However, this statement is based primarily on the prognostic assessment of possible conflicts, which probability increases due to complications of organizational and economic aspects of recreation due to social, environmental and other components that finally, on the one hand, can essentially strengthen the synergy of various directions of the recreation development that are united by a common purpose (providing quality comprehensive recreational services in accordance with the needs of modern people, given their purchasing power). On the other hand, the creation of a certain ‘chaos’, even in the distribution of corresponding powers and responsibilities under the cluster principle, will make the urgent development of this service sector impossible. However, that development would bring the standards of living in Ukraine to international and European standards.

Nevertheless, the state’s role should not be limited to the maintenance and promotion of state-private partnership in the recreational sector. Attracting domestic and, above all, foreign investment in the development of social and economic sphere ‘sports – treatment – tourism – recreation’ requires clear and transparent rules, such as optimal resource allocation mechanisms (M. M. Petrushenko, and H. M. Shevchenko, 2013) [10]. Thus, in the context of the study of recreational processes in the broad sense of these mechanisms, the issue involves both the natural recreational resources, and the formation of human and social capital in this sector, which eventually should become a basis for the search for optimal directions of investment attraction.

Also the particular attention should be paid to environmental issues within this research. Thus, the stimulation of effective ecological and economic interactions in the process of business environment creation, such as recreation and tourism, is analyzed in the work of A. Ishchenko (2017) [7]. The local development through investment in ecotourism in South Africa, namely opportunities for botanical gardens, game reserves and national parks, are developed in the work by S. M. Seeletse (2015) [17]. In the work of C. Aall, R. Dodds, I. Saelensminde, and E. Brendehaug (2015) [1] the concept of environmental policy integration into the discourse on sustainable tourism is analyzed. The paper by T. H Lee, F.-H. Jan, and G. W. Huang (2015) [8] gives a scientific understanding of the relationships between recreation experience and environmentally responsible behavior of nature-based tourists.

We note that there are legal basis for the formation of these rules in Ukraine; they are clearly stated and thoroughly reasoned. Certain improvement in this context, in our opinion, should be a combination of some legal issues according to different activities (tourism, sports, recreation, etc.) that are relevant to this research, to obtain a new strategic vision for the

recreation development in Ukraine by attracting investment under appropriate public policy.

According to the domestic law, including the Law of Ukraine “On resorts”, articles 3, 4, 14 [14], the Law of Ukraine “On tourism”, articles 6, 13 [15], the Law of Ukraine “On physical culture and sports”, articles 4, 27 [13], the strategic goals, including those that determine the direction of future investments in the recreation and resort activities, are characterized as follows:

- contribution of the government authorities to the transformation of recreation and resort complex in highly competitive sector of the economy;
- promotion of the tourism as one of the priorities of social and economic development and creation of favorable conditions and infrastructure for tourism; upon social and ecologically orientation of tourism as a highly profitable economic sector;
- definition of sports as an important factor in achieving physical and spiritual perfection of a human; providing humanistic orientation and the priority of human values and justice;
- consideration of recreational needs of the population for specific types of health resort services in the formation of national and regional development programs of resorts;
- ensuring the availability of services in recreational sector that have particularly valuable and unique (national importance) and common (local) natural therapeutic resources for everyone, especially diseased and socially vulnerable citizens;
- allocation of budget funds for the development and implementation of tourism development programs upon simplification and harmonization of tax, currency, customs, border and other types of regulation;
- providing the program for the development of resorts based on objective indicators of the effectiveness of treatment, rehabilitation and prevention of diseases, results of special research and design works, financial and economic performance indicators of the resorts; subject to the compliance with the mode of use of natural curative resources, taking into account environmental and sanitary restrictions;
- ensuring the security in tourism, particularly in the context of citizens’ rights to safe and healthy environment; unimpeded opportunities to obtain medical, legal and other emergency assistance; protection of tourism and recreation resources, establishing maximum permissible loads on the cultural heritage and environment;
- ensuring conditions for sports and recreational activities of citizens through the creation of physical health centers, sports facilities and cooperation with relevant public organizations.

So, as a result of this research we can draw the following conclusions. Firstly, the analysis of public investment and innovation policy in the recreational sector of the economy in Ukraine

revealed its disadvantages such as lack of investment in the recreational sector as a development direction of socio-economic processes; in internal relations of the recreational-tourism sector and, consequently, in the structure of health, recreational and tourist complex; the potential of the majority of areas in Ukraine that have historical, cultural, social and natural reserve did not get a chance for their use. Secondly, the strategic orientations of the investment and innovation policy in the recreational sector are analyzed and identified, namely creating an image of the state where recreation is among the main vital areas, formation of reliable preconditions and factors that create favorable investment climate in the recreational sector, transformation of ineffective recreational and tourist facilities in the appropriate regional cluster formations etc. Thirdly, the approach to the state support for investment health, sports, tourism and recreational projects is proposed, based on public-private partnership under the laws of Ukraine and included the next components: subjects of investment recreational activities, and other initiators; granting proposals, registration of projects; assessment and selection of projects; realization of state support; financing and co-financing investment projects and crediting from the state or local budgets; granting state and local guarantees to ensure compliance with debt by borrowings of recreational business entities; full or partial compensation of interest on credits of business entities from the state or local budgets.

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## **1.6 SPATIAL POTENTIAL IN THE STRUCTURE OF LOGISTIC POTENTIAL IN UKRAINIAN REGIONS\***

World experience convincingly shows that one of the main preconditions for the development of commodity markets and integration into the global supply chain is the rational use of the existing potential of not only producers of products but also regions. Indeed, the effective growth of economic activity, the development of innovations, and the increase of investment attractiveness, both at the level of the individual organization and the industry, the region or the state as a whole, depend on the effective use of the existing advantages or the levelling of the disadvantages of the economic and geographical situation, the efficiency of export-import operations, transportation, etc.

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\*The publication contains the results of studies conducted by President’s of Ukraine grant for competitive projects F70 of the State Fund for Fundamental Research (“Formation of the management mechanism of products’ distribution at the industrial enterprises on the innovative basis”, № SR 0117U001682)

Rationally built regional system taking into account the features of its economic and geographical position in the structure of logistics potential (proposed by the author in work [2]) improves the flow of business processes and quality of life of the population, provides sustainable development of the territory. Accordingly, the definition of indicators and their assessment in terms of making sound decisions in the system of regional development management are important.

The potential of the attractiveness of the economic and geographical location (spatial potential) is an integrated indicator that combines the convenience and features of the climatic and geographical location (population, export and import of goods and services, the length of the state border, the distance to the largest industrial cities, and the provision of territories). The dynamics of indicators of this potential by regions of Ukraine in 2010-2015 is shown in Fig. 1.14-1.20.

So, according to Fig. 1.14 the population according to the regions of Ukraine remains almost unchanged.

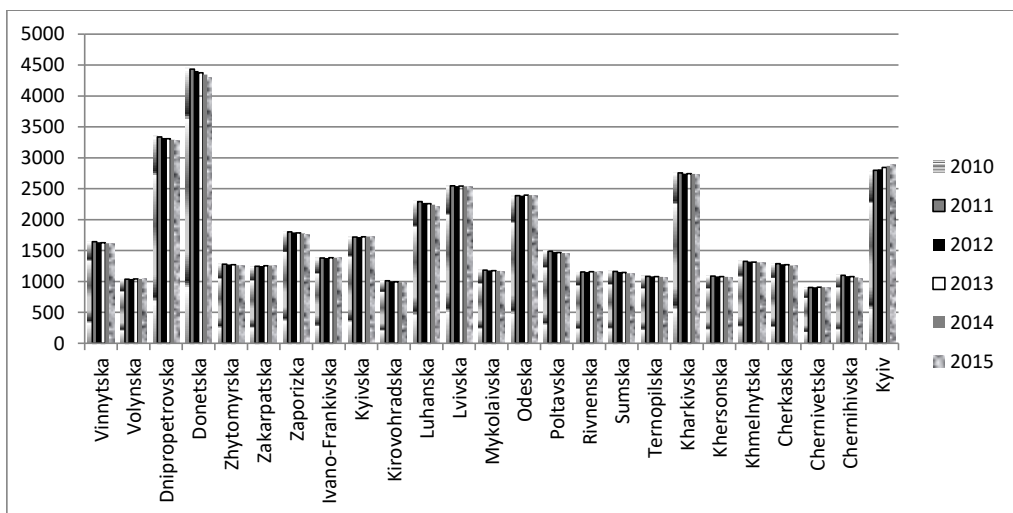


Figure 1.14. The population in Ukrainian regions, thousand people, 2010-2015 (based on [31])

Indicators of exports of goods and services by regions of Ukraine from 2010 to 2015 fluctuate. However, comparing volumes of export of goods at the beginning and the end of the analyzed period, we observe an increase in the indicators only in Vinnytsya, Volyn, Zhytomyr, Kyiv, Kirovohrad, Lviv, Odesa, Ternopil, Khmelnytsky, Chernivtsi, Chernihiv regions and Kyiv (Fig 1.15), while exports of services is growing in Vinnytsya, Volyn, Zhytomyr, Zakarpattia,

Kirovohrad, Lviv, Mykolaiv, Poltava, Ternopil, Kharkiv, Khmelnytskyi, Cherkasy, Chernivtsi and Chernihiv regions (Fig. 1.16).

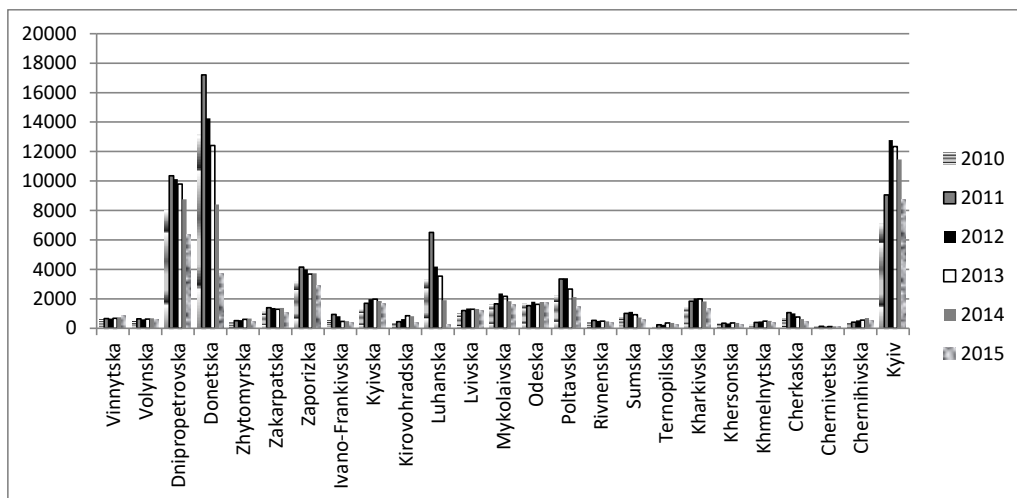


Figure 1.15. Export of goods in Ukrainian regions, USD mln., 2010-2015 (based on [30])

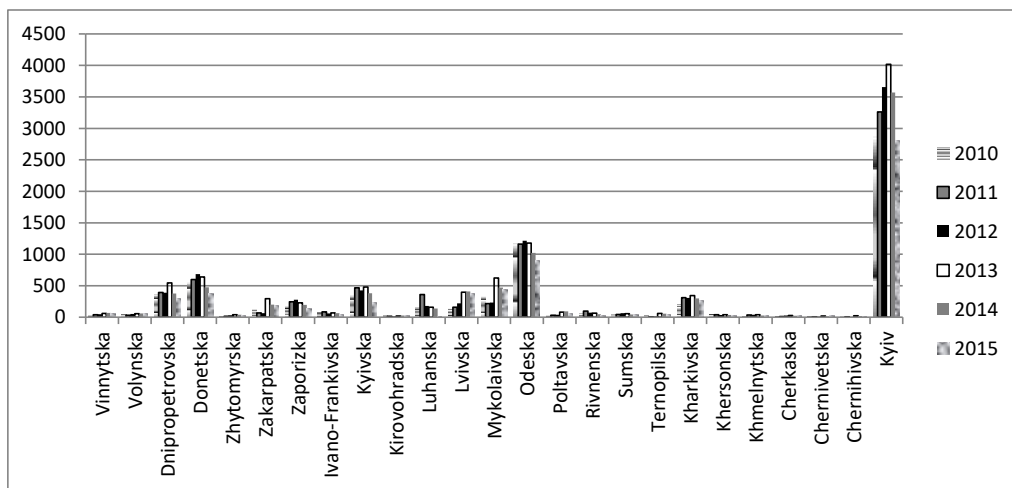


Figure 1.16. Export of services in Ukrainian regions, USD mln., 2010-2015 (based on [30])

Analyzing volumes of import of goods across all regions of Ukraine, we find that only by 2012-2013 this indicator was growing, and then there are steady downward trends (Fig. 1.17). However, in the market of services for this indicator there is no such dynamics. However,



this indicator is increasing again in Dnipropetrovsk, Sumy, Ternopil, Kherson and Chernivtsi regions in 2015 (Fig. 1.18).

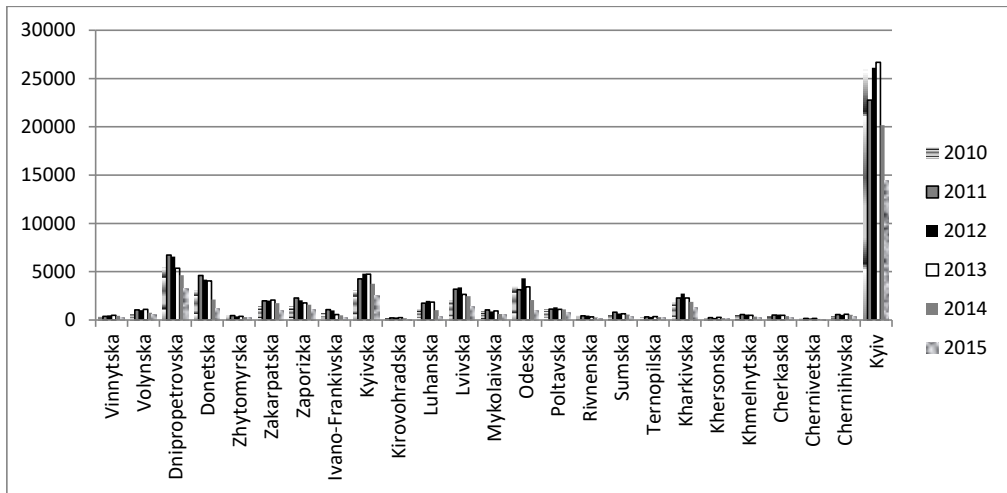


Figure 1.17. Import of goods in Ukrainian regions, USD mln., 2010-2015 (based on [30])

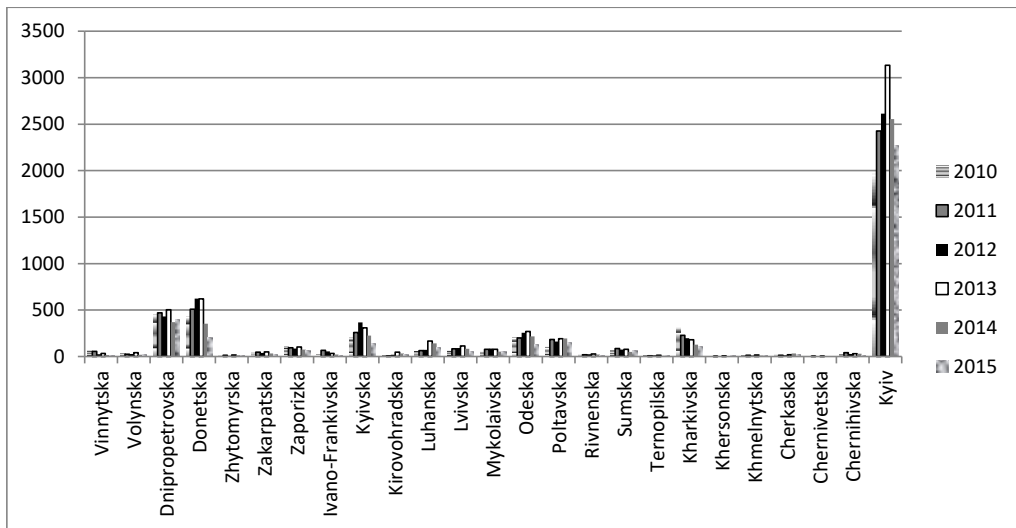


Figure 1.18. Import of services in Ukrainian regions, USD mln., 2010-2015 (based on [30])

In addition to the Donetsk and Luhansk regions, the number of enterprises of export and import trade in the regions of Ukraine from 2010 to 2015 is increasing. However, in the Kirovohrad region, the situation with the export trade enterprises is the opposite, and in the Zakarpattia, Luhansk, Odesa and Chernihiv regions the import is decreasing (Fig. 1.19-1.20).

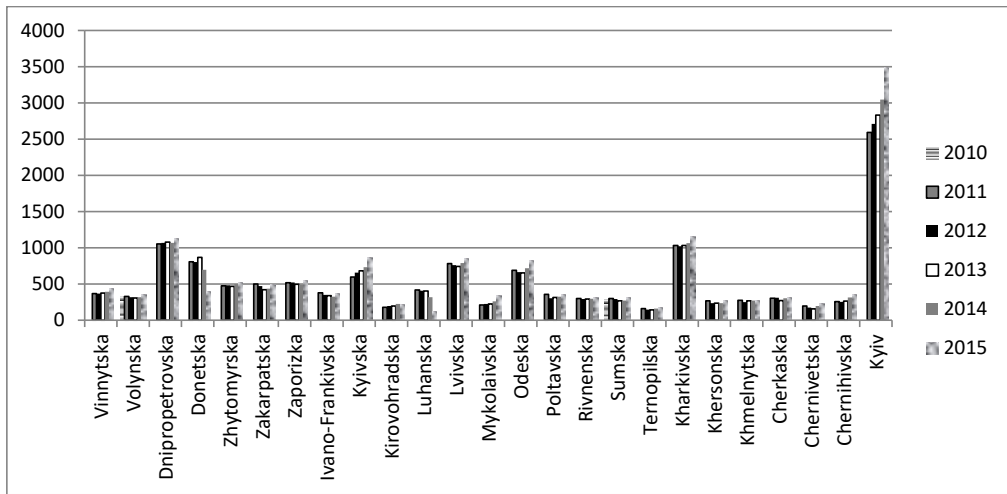


Figure 1.19. Number of enterprises engaged in export trade of goods in Ukrainian regions, units, 2010-2015 (based on [6])

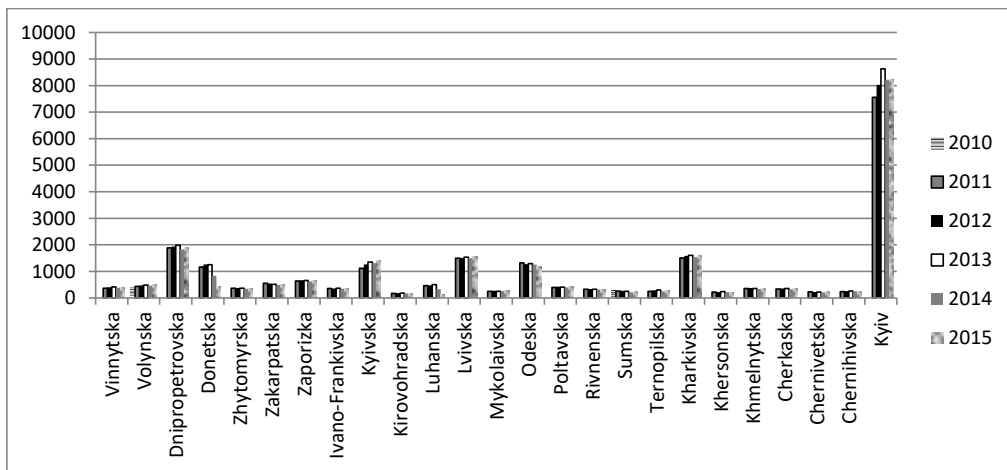


Figure 1.20. Number of enterprises engaged in import trade of goods in Ukrainian regions, units, 2010-2015 (based on [30])

According to the results of ranking of regions of Ukraine in terms of the development of transport and geographical position in the structure of spatial potential, Poltava, Kyiv and Chernihiv regions are leaders (highlighted in the bold cell borders in Table 1.7), and Ternopil, Mykolayiv and Ivano-Frankivsk regions are outsiders (highlighted by shading in Table 1.7).

Table 1.7

Components of transport and geographical position in the structure of spatial potential in Ukrainian regions\* (developed by the author on the basis of [1, 3-29, 31, 32-40])

Regions of Ukraine	The length of the state border on the land, km									Distance by highway to the largest industrial cities, km				Provision of territories (area)			General ranking**	Integral ranking			
	Ranking	Total, incl.	Poland	Slovakia	Hungary	Romania	Moldova	Belarus	Russia	Ranking	Kyiv	Ranking	Kharkiv	Ranking	Land, thsd hect	Ranking			Water, thsd, hect	Ranking	
Vynnytska	13	202	0	0	0	0	202	0	0	1-20	268	5	744	17	2649,2	12	11834,9	4	52-71	5	
Volynska	6	395	190	0	0	0	0	205	0	1-20	888	12	876	20	2014,4	19	3384,2	19	77-96	16-17	
Dnipropetrovska	16-25	0	0	0	0	0	0	0	0	1-20	447	15	234	4	3192,3	2	7594,2	14	52-80	8	
Donetska	7	312	0	0	0	0	0	0	0	812	24	693	24	290	6	2651,7	11	2501,5	22	94	21
Zhytomyrska	11	280	0	0	0	0	0	280	0	1-20	131	3	616	15	2982,7	5	2861,1	21	56-75	7	
Zakarpatska	3	467,3	33,4	98,5	130	205,4	0	0	0	1-20	782	25	1285	25	1275,3	23	9439,0	7	84-103	19	
Zaporizka	16-25	0	0	0	0	0	0	0	0	1-20	544	21	296	7	2718,3	9	1170,8	24	78-106	20	
Ivano-Frankivska	15	50	0	0	0	50	0	0	0	1-20	552	22	1079	24	1392,7	21	15688,7	2	85-104	23	
Kyiv	16-25	0	0	0	0	0	0	0	0	1-20	0	1-2	478	10-11	83,6	25	1992,4	23	76-106	18	
Kyivska	14	137	0	0	0	0	0	137	0	1-20	0	1-2	478	10-11	2812,1	8	9013,6	8	42-63	2	
Kirovohradska	16-25	0	0	0	0	0	0	0	0	1-20	802	9	379	9	2458,8	13	10100,8	5	53-81	9	
Luhanska	2	776	0	0	0	0	0	776	25	711	23	254	5	2668,3	10	3376,4	20	85	14		
Lvivska	10	280	280	0	0	0	0	0	0	1-20	537	17	1016	23	2183,1	16	16434,1	1	68-87	11	
Mykolaiivska	16-25	0	0	0	0	0	0	0	0	1-20	472	19	559	14	2458,5	14	3399,6	18	82-110	24	
Odeska	1	1362	0	0	0	572	790	0	0	1-20	489	20	704	16	3331,4	1	8106,8	12	51-70	4	
Poltavska	16-25	0	0	0	0	0	0	0	0	1-20	839	7	144	2	2875,0	6	13286,4	3	35-63	1	
Rivnenska	12	234	0	0	0	0	0	234	0	1-20	818	11	805	19	2005,1	20	7719,0	13	76-95	15	
Sumska	9	298	0	0	0	0	0	298	22	333	8	183	3	2383,2	15	8490,0	11	68	10		
Terнопil'ska	16-25	0	0	0	0	0	0	0	0	1-20	438	13	896	21	1382,4	22	6125,6	17	90-118	25	
Kharkivska	8	307,5	0	0	0	0	0	307,5	23	479	14	0	1	3141,8	4	6552,6	15	65	6		
Khersonska	16-25	0	0	0	0	0	0	0	0	1-20	538	18	548	13	2846,1	7	990,2	25	80-108	22	
Khmelnytska	16-25	0	0	0	0	0	0	0	0	1-20	806	10	800	18	2062,9	18	9697,2	6	69-97	13	
Cherkaska	16-25	0	0	0	0	0	0	0	0	1-20	189	6	371	8	2091,6	17	6129,2	16	64-92	12	
Chernivetska	5	404,4	0	0	0	226,4	178	225	0	1-20	540	16	1003	22	809,6	24	9007,4	9	77-96	16-17	
Chernihivska	4	408	0	0	0	0	0	408	21	41	4	542	12	3190,3	3	8584,4	10	54	3		

\* – the cell's bold boundaries highlighted the best integral values of the region's indicators, and shading is the worst;

\*\* – calculated as the sum of the values of ratings for each indicator

As we see, the leaders in terms of population and volumes of export of goods are Donetsk, Dnipropetrovsk regions and Kyiv, according to the volume of import of goods – Kyiv, Dnipropetrovsk and Kyiv regions, the volume of export and import of services – Kyiv, Odesa and Donetsk regions, according to the number of enterprises engaged in export and import trade in goods – Kyiv, Dnipropetrovsk and Kharkiv regions. Among the leaders of the total length of the state border on the land are Odesa, Luhansk and Zakarpattia regions, but considering the military aggression of Russia, Lugansk, Donetsk and Kharkiv regions are outsiders because they have the longest length of the adjacent border. According to the distance of the highways to the largest industrial cities as to Kyiv, the leaders are Kyiv, Kyiv and Zhytomyr

regions, to the city of Kharkiv – Kharkiv, Poltava and Sumy regions, with the provision of land plots – Odessa, Dnipropetrovsk and Chernihiv regions, and water objects – Lviv, Ivano-Frankivsk and Poltava regions.

We propose to determine the rating of the regions of Ukraine for the spatial potential by the average values for the analyzed period of each indicator (Table 1.8).

Table 1.8

Average values of spatial potential indicators (without taking into account transport and geographical position) in Ukrainian regions for 2010-2015 and their ranking\* [developed by the author]

Regions of Ukraine	Population, thsd	Ranking	Export of goods, USD mln	Ranking	Import of goods, USD mln	Ranking	Export of services, USD mln	Ranking	Import of services, USD mln	Ranking	Enterprises, export, units	Ranking	Enterprises, import, units	Ranking	General ranking**	Integral ranking
Vinnyska	1630,3	10	691,5	15	403	19	51,5	16	34,7	16	388	11	393	12	99	15
Volynska	1039,5	23	605,5	16	853,8	12	50,5	17	26,8	17	327	15	469	10	110	16
Dnipropetrovska	3314,9	2	8909,7	3	5315,8	2	393,0	4	437,5	4	1079	2	1908	2	19	2
Donetska	4386,6	1	11513,9	1	3206,9	4	555,6	3	455,4	3	713	5	988	7	24	3
Zhytomyrska	1270,9	15	528,5	19	364,9	20	364,9	7	12,7	7	488	9	363	14	91	13
Zakarpatska	1252,3	16	1286,1	11	1694,0	8	157,3	12	37,9	12	463	10	518	9	78	10
Zaporizka	1788,6	8	3614,4	4	1682,2	9	211	10	89,1	10	513	8	647	8	57	8
Ivano-Frankivska	1381,2	12	600,6	17	676,5	14	66,7	13	35,3	13	351	12	356	15	96	14
Kyiv	2833,4	3	10248,4	2	22698,2	1	3363,6	1	2495,3	1	2934	1	8136	1	10	1
Kyivska	1722,6	9	1749,9	8	3859,1	3	389,0	5	249,9	5	706	7	1295	5	42	5-6
Kirovohradska	998,9	24	582,8	18	208,3	23	21,5	22	22,6	22	204	23	177	25	157	24
Luhanska	2265,3	7	3287,7	5	1339,2	10	167,4	11	98,8	11	333	13	377	13	70	9
Lvivska	2542,0	5	1220,3	12	2530,1	6	283,9	9	81,8	9	786	4	1518	4	49	7
Mykolaiivska	1176,2	17	1872,9	7	823,0	13	387,2	6	67,6	6	251	21	261	20	90	12
Odeska	2392,7	6	1694,3	10	2909,2	5	1106,0	2	212,6	2	709	6	1267	6	37	4
Poltavska	1473,3	11	2540,1	6	1090,7	11	56,1	15	166,0	15	330	14	410	11	83	11
Rivnenska	1155,9	18	462,9	21	356,9	21	61,6	14	22,4	14	299	17	329	18	123	17
Sumska	1147,6	19	859,3	13	594,2	15	48,6	18	69,8	18	289	18-19	248	22	123-124	18
Ternopil'ska	1079,0	22	270,8	24	297,3	22	34,4	20	9,8	20	158	25	271	19	152	22
Kharkivska	2746,6	4	1736,9	9	2050,6	7	287,1	8	192,9	8	1061	3	1562	3	42	5-6
Khersonska	1080,6	21	330,5	23	201,5	24	38,0	19	5,0	19	247	22	223	23-24	151-152	23
Khmelnitska	1317,2	13	423,7	22	445,3	17	30,5	21	12,6	21	268	20	352	16	130	20
Cherkaska	1273,1	14	761,3	14	434,3	18	20,1	23	20,2	23	302	16	346	17	125	19
Chernivetska	906,6	25	121,4	25	133,2	25	13,8	25	1,7	25	190	24	223	23-24	172-173	25
Chernihivska	1082,8	20	515,5	20	497,2	16	14,3	24	26,8	24	289	18-19	250	21	143-144	21

\* – the cell's bold boundaries highlighted the best integral values of the region's indicators, and shading is the worst;

\*\* – calculated as the sum of the values of ratings for each indicator

Thus, according to the results of rating of the regions of Ukraine according to the level of development of spatial potential (without taking into account transport and geographical position), Kyiv, Dnipropetrovsk and Donetsk regions are leaders (highlighted in the bold cell

borders in Table 1.8), while Chernivtsi, Kirovohrad and Kherson regions are outsiders (highlighted by shading in Table 1.8).

For the results, we identify leaders by the level of development of spatial potential in the logistic providing (Table 1.9):

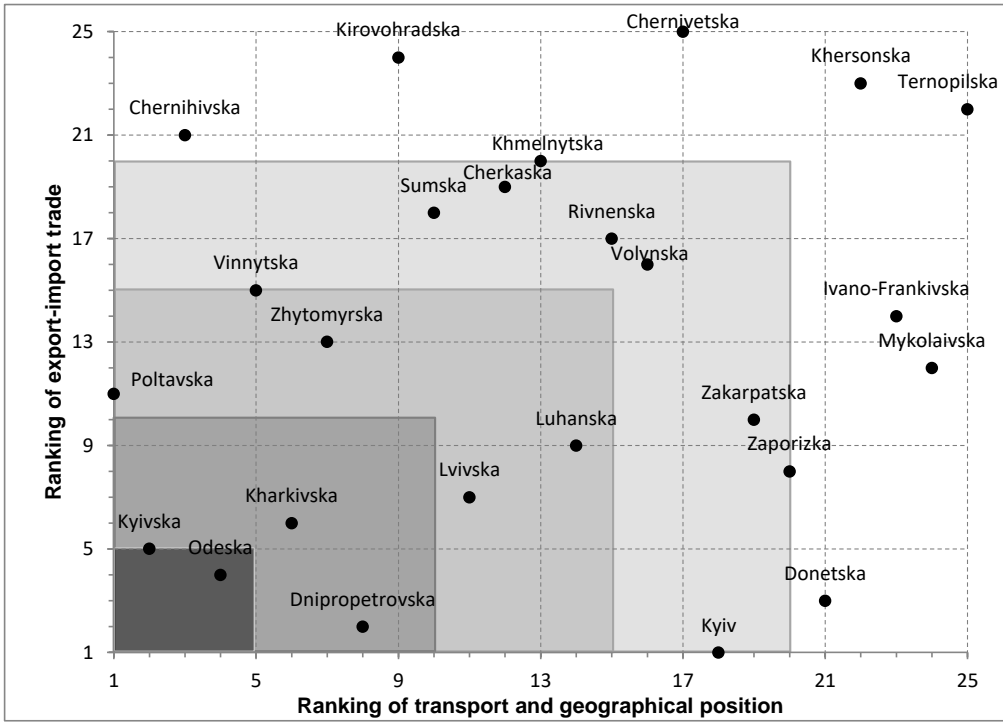
Table 1.9

Ranking of regions in Ukraine by the level of spatial potential

Regions of Ukraine	Ranking of transport and geographical position	Ranking of export-import trade	General ranking	Integral ranking
Vynnytska	5	15	20	8-9
Volynska	16-17	16	32-33	18
<b>Dnipropetrovska</b>	<b>8</b>	<b>2</b>	<b>10</b>	<b>3</b>
Donetska	21	3	24	11-12
Zhytomyrska	7	13	20	8-9
Zakarpatska	19	10	29	15
Zaporizka	20	8	28	13-14
Ivano-Frankivska	23	14	37	22
Kyiv	18	1	19	7
<b>Kyivska</b>	<b>2</b>	<b>5-6</b>	<b>7-8</b>	<b>1</b>
Kirovohradska	9	24	33	19-20
Luhanska	14	9	23	10
Lvivska	11	7	18	6
Mykolaivska	24	12	36	21
<b>Odeska</b>	<b>4</b>	<b>4</b>	<b>8</b>	<b>2</b>
Poltavska	1	11	12	5
Rivnenska	15	17	32	17
Sumska	10	18	28	13-14
Ternopil'ska	25	22	47	25
Kharkivska	6	5-6	11-12	4
<b>Khersonska</b>	<b>22</b>	<b>23</b>	<b>45</b>	<b>24</b>
Khmelnyska	13	20	33	19-20
Cherkaska	12	19	31	16
<b>Chernivetska</b>	<b>16-17</b>	<b>25</b>	<b>41-42</b>	<b>23</b>
Chernihivska	3	21	24	11-12

Thus, the analysis of the spatial potential in the regions of Ukraine according to the proposed set of indicators showed that the best support is provided by Kyiv, Odesa and Dnipropetrovsk regions (highlighted in the bold cell borders in Table 1.9), and the lowest is Ternopil, Kherson and Chernivtsi regions (highlighted by shading in Table 1.9).

Using the rating results (see Table 1.9) the matrix of potentials was formed (Figure 1.21). Five zones have been allocated on the matrix. Zone 1 combines the best rating indices; it consolidates the leaders of the rating assessments. The zone is determined by the coordinates [1; 5] on the X axis (transport and geographical position) and the [1; 5] on the Y axis (export-import trade). Accordingly, Zone 2 is limited to the coordinates (5; 10] on both axes; Zone 3 - (10; 15] on both axes; Zone 4 - (15; 20] on both axes; Zone 5 - (20; 25] on both axes.








-  - very low level of spatial potential (20-25 position in the ranking);
-  - low level of spatial potential (15-19 position in the ranking);
-  - average level of spatial potential (10-14 position in the ranking);
-  - high level of spatial potential (6-9 position in the ranking);
-  - very high level of spatial potential (1-5 position in the ranking).

Figure 1.21. Ukrainian regions on the matrix of spatial potential

According to the fact that Sumy region does not have the worst values for any of the indicators, and takes with the Zaporizhzhya region the 13th-14th place, and it is among the leaders in terms of distance to the largest industrial cities, we can approve that in this region there are resources for its logistical support, further development and introduction of innovative approaches to effective management.

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## **PART 2. MICROECONOMIC ASPECTS OF NATIONAL SECURITY INNOVATION COMPONENT MANAGEMENT**

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### **2.1 METHODS OF ECONOMIC SECURITY EVALUATION IN THE CONTEXT OF ENTERPRISES' STABILITY IDENTIFICATION**

Under conditions of speedy economic development and constant implications in objective realities of business, oversupply of an enterprise activity information space, enhancement of security efficiency becomes an essential condition for viability not only at a national level, but also at regional and enterprise levels, and acquires vital meaning.

Current conditions of national economic environment functioning are characterized by the high level of uncertainty resulted from significant fluctuations in the world economy. The debt crisis issue of the Euro zone, possible changes in the policy of BRIK countries, uncertainty about the balance of structural correlations of the USA's and China's economies, risk tolerance reduction amidst international investment institutions against declining investment trends in the world economy can significantly affect the conditions of the national business environment undermining its stability not only by internal political and economic issues but also by external interferences that are multiplied in the national economy.

Under conditions of current structural correlations, the national business is still vulnerable to external interferences due to a low level of producibility, investment activity and correspondingly the investment appeal for strategic investors. Scales of negative results caused by the low level of business entities' economic security and stability motivate economic theorists and practitioners to search for mechanisms of its providing, and the key methodological issue which is highly debated [1].

Studies of theoretical and practical aspects of business entities' secure development are presented in works of V.M. Heyets, L.I. Abalkin, M.A. Bendikov, N.V. Vashchenko, B.Z. Milner, O.I. Mohyl'ny, O.M. Bandurka, V.Ye. Dukhov, Ya.A. Zhalilo, M.P. Kapustin, A.V. Kyriyenko, H.V. Kozachenko, V.A. Lipkin, O.M. Lyashenko, V.I. Muntiyany, and others.

Nevertheless, the issue of the economic security innovative constituent management is still understudied, regardless of numerous investigations and publications, making it prospective and topical for further research.

The author of this research paper pays attention to economic security evaluation issue in the context of identification methods of enterprises' stability which can be applied in practice.

In her “Economic stability of an enterprise as a condition for economic security provision” the author makes parallel and defines common characteristics in the essence of terms “economic security” and “economic stability” of an enterprise providing the possibility to state that economic stability (ability to withstand under changeable conditions) is a high-level correlation of economic security categories (stability provision – a level of development which ensures sense of security today and in future) [2].

The author believes that one of the factors of economic security provision to different forms of business entities in the long-term prospective is their stability and sustainability.

The author presents innovative methods of economic security evaluation in the context of identifying enterprises’ stability; singles out variable ranges of key parameters of stability of an enterprise and forms the algorithm of methods for stability evaluation.

It is emphasized that current approaches to economic stability investigation are united by axiomatics: focus on the result to be achieved – stability. Fixed within a certain interval, it is characterized by synchronicity, and dynamics of time changes – by discreteness and nonlinearity, discouraging its envisaged value, breaking dialectic logic of this phenomenon, unrevealing its time and space dependence.

Variability of analytical indicators of stability of an enterprise is considered on the basis of the analysis of research works.

Economic and mathematic tools for database processing, on the one hand, have common features determined by researchers’ focus on indices aggregation for numerical expression of stability of an enterprise; on the other hand, they possess certain features determined by both a specific character of the methods and primary indices processing during its generalization (Table 2.1).

The author singles out variable ranges of key parameters of economic stability of an enterprise: ability to pay (liquidity), earning capacity (profitability), investment appeal, optimality of financial assets (flows); organizational integrity, availability / robustness of resources, efficiency of their use; reasons that absolutization of any single parameter distorts logic integrity of such a multidimensional concept as stability. Parameters of different approaches are not incompatible. It is suggested to consider them not as self-sufficient alternatives but as elements of a wider field of interpretation [1].

Correspondingly, methodological approaches to evaluation of stability of an enterprise by functional constituents / main forms of economic activities (financial, investment, organizational, managerial, production (operational), market, etc) are developed in the modern research environment (S.N. Anokhin, Yu.V. Bohatin, I.V. Bryantseva, V.Ye. Deming, I.M. Yevstyukhin, S.H. Yezerska, A.O. Kammayev, O.A. Matushevskaya, V.S. Mityushyn, I.M. Omelchenko, O.V. Smirnov, M.D. Sokolov, O.A. Tabekina, and others).

Table 2.1

## Variability of analytical indicators of enterprise's economic stability

[systematized by the author]

Nature of analytical indicators	Author	Principle of calculation
1	2	3
AGGREGATION AND FUNCTIONAL	I.M. Omelchenko [3, c. 122]	$I = k_1 \times I_1 + k_2 \times I_2 + k_3 \times I_3,$ where $I$ – integral index of stability; $I_1, I_2, I_3$ – stability indices of internal production, market system and service support system correspondingly; $k_1, k_2, k_3$ – corresponding weight coefficients
	V.S. Mityushyn [4, c. 15]	$K\Pi e_y = \sqrt{K_i X_i^2},$ where $K\Pi e_y$ – complex index of stability; $X_i$ – the $i$ -th index value of stability; $K_i$ – weight of the $i$ -th index
	I.M. Yevstyuhin [5, c. 91]	$Kec = 6\sqrt{K_{1yc} \times K_{2bc} \times K_{3fc} \times K_{4cc} \times K_{5da} \times K_{6cp}},$ where $Kec$ – general rate of stability; $K_{1yc}$ – rate of managerial stability; $K_{2bc}$ – rate of production stability; $K_{3fc}$ – rate of financial stability; $K_{4cc}$ – rate of social stability; $K_{5da}$ – rate of business activity; $K_{6cp}$ – rate of profit stability
	A.O. Kammayev [6, c. 12]	$I = \frac{EP1_{\text{факт}}}{EP1_{\text{норм}}} + \frac{EP2_{\text{факт}}}{EP2_{\text{норм}}} + \dots + \frac{EPi_{\text{факт}}}{EPi_{\text{норм}}},$ where $I$ – integral index of stability; $EP_{\text{факт}}$ – achieved economic results; $EP_{\text{норм}}$ – regulatory economic results
	O.V. Smirnov [7, c. 137]	$kc = \sqrt{\prod_{i=1}^n (Xm - Xk)},$ where $kc$ – stability rate; $Xm$ – critical value of a factor; $Xk$ – current value of a factor: $kc > 0$ – sustainable economic state; $kc < 0$ – unsustainable economic state
	O.V. Korchahina [8, c. 7]	$R = \frac{\sum a_{ij} \times e_{ij}}{\sum e_{ij}}$ where $R$ – stability evaluation; $a_{ij}$ – actual correlation of indices growth ratio; $e_{ij}$ – targeted (set) correlation of indices growth ratio
AGGREGATION AND FUNCTIONAL	N.M. Hryhorska [9, c.8]	$I = \sum_i d_i \times \sum_j (\beta_j^i \times \frac{\gamma_{jn}^f}{\gamma_{ju}^f} \times \beta_j^i \times \frac{\gamma_{jn}^{pr}}{\gamma_{ju}^{pr}} \times \beta_j^i \times \frac{\gamma_{jn}^m}{\gamma_{ju}^m} \times \beta_j^i \times \frac{\gamma_{jn}^b}{\gamma_{ju}^b} \times \beta_{jc}^i \times \frac{\gamma_{jn}^{mo}}{\gamma_{ju}^{mo}} \times \beta_j^i \times \frac{\gamma_{jn}^{in}}{\gamma_{ju}^{in}}),$ where $I$ – integral index of enterprise's economic stability ; $i$ – stability components; $j$ – index component of stability; $d_i$ – weight ratio of the $i$ -th stability components defined as dynamics of enterprise capitalization; $\beta_j^i$ – weight ratio of the $j$ -th index of the $i$ -th component of stability; $\gamma_{jn}^f, \gamma_{ju}^f, \gamma_{jn}^{pr}, \gamma_{ju}^{pr}, \gamma_{jn}^m, \gamma_{ju}^m, \gamma_{jn}^b, \gamma_{ju}^b, \gamma_{jn}^{mo}, \gamma_{ju}^{mo}, \gamma_{jn}^{in}, \gamma_{ju}^{in}$ – current and acceptable value of relevant index of financial, production, market, business, managerial and innovative component of enterprise's economic stability

Table 2.1 (cont'd)

1	2	3
AGGREGATION AND FUNCTIONAL	E.R. Miskhozhev [10, c. 22]	$Ec = \frac{\sum_{i=1}^n \sum_{j=1}^n C_{ij}}{\sum_{i=1}^n \sum_{j=1}^n H_{ij}}$ <p>where <math>Ec</math> – economic stability of an enterprise; <math>n</math> – number of indices; <math>ij</math> – numbers of indices; <math>C_{ij}</math> – matrix element of actual and absolute (benchmarking) indices growth ratio; <math>H_{ij}</math> – matrix element of benchmarking indices growth ratio included into diagnosis model</p>
	FINANCIAL AND MONITORING	V.I. Roshchin [11, c. 9]
R.Yu. Loskutov [12, c. 13-14]		$Kec = \frac{\text{net profit}}{\text{equity value}}$ <p>where <math>Kec</math> – economic stability ratio of an enterprise</p>
A.D. Sheremet, R.S. Saifulin [13]		<p>Absolute financial stability: <math>3 + B &lt; BOK + K</math>,  where <math>3</math> – provisions; <math>B</math> – expenses; <math>BOK</math> – own current assets;  <math>K</math> – loans on goods and assets  Normal financial stability: <math>3 + B = BOK + \Delta\Pi\Pi</math>  where <math>\Delta\Pi\Pi</math> – long-term loan sources  Fragile financial condition: <math>3 + B = BOK + \Delta\Pi\Pi + K</math>  Crisis financial condition: <math>3 + B &gt; BOK + \Delta\Pi\Pi + K</math></p>
S.Yu. Sydorenko [14]		$Ec = \frac{\left(1 + 2K_d + K_o + \frac{1}{K_3} + K_n\right)_2}{\left(1 + 2K_d + K_o + \frac{1}{K_3} + K_n\right)_1} - 1,$ <p>where <math>K_d</math> – current assets of equity ratio; <math>K_n</math> – net fixed assets index; <math>K_d</math> – long-term raising debt ratio; <math>K_p</math> – real value ratio; <math>K_3</math> – debt-equity ratio; indices 1 and 2 stand for analyzed and previous periods correspondingly</p>
CRISIS PROBABLE	E. Altman [15]	$Z = 0,7X_1 + 0,84X_2 + 3,10X_3 + 0,42X_4 + 0,995X_5$ , where $X_1$ – current capital / assets; $X_2$ – retained profit / assets; $X_3$ – operating profit / assets; $X_4$ – book value per share / debt capital; $X_5$ – turnover / assets; $Z < 1,23$ – enterprise will go bankrupt in the coming years
	H.V. Savytska [16]	$Z = 0,111X_1 + 13,239X_2 + 1,676X_3 + 0,515X_4 + 3,80X_5$ , where $X_1$ – stake of own current assets within general structure of current assets; $X_2$ – current to main assets ratio; $X_3$ – asset turnover ratio; $X_4$ – return on assets; $X_5$ – equity to total assets ratio; $Z > 8$ – absence of bankruptcy risk; $8 < Z < 5$ – small bankruptcy risk; $5 < Z < 3$ – medium bankruptcy risk; $Z < 3$ – serious bankruptcy risk; $Z < 1$ – bankrupt company
	Ukraine's Ministry of Finance's model [17]	$Z = 1,04X_1 + 0,75X_2 + 0,15X_3 + 0,42X_4 + 1,8X_5 - 0,06X_6 - 2,16$ where, $X_1$ – cover ratio; $X_2$ – equity to total assets ratio; $X_3$ – invested capital turnover ratio; $X_4$ – operating profit margin; $X_5$ – return on assets; $X_6$ – debt capital turnover ratio; $Z \leq -0,55$ – fragile financial condition; $-0,55 \leq Z \leq 0,55$ – ambiguity of conclusions on financial condition; extra financial analysis is to be carried out; $Z > 0,55$ – financial condition of an enterprise is satisfactory

Table 2.1(cont'd)

1	2	3
CRISIS PROBABLE	O.O. Tereshchenko [18]	$Z = 1,5X_1 + 0,08X_2 + 10X_3 + 5X_4 + 0,3X_5 + 0,1X_6,$ where $X_1$ – cash flow to liabilities ratio; $X_2$ – assets to liabilities ratio; $X_3$ – net profit to annual average amount of assets; $X_4$ – profit to earnings ratio; $X_5$ – production reserves to earnings ratio; $X_6$ – earnings to main assets ratio; $Z > 2$ – safe from bankruptcy; $1 < Z < 2$ – financial stability is undermined; $0 < Z < 1$ – bankruptcy risk
	J Fulmer [19]	$H = 5,528X_1 + 0,212X_2 + 0,073X_3 + 1,270X_4 - 0,120X_5 + 2,335X_6 + 0,575X_7 + 1,083X_8 + 0,894X_9 - 6,075$ $X_1$ – retained profit / balance; $X_2$ – proceeds / balance; $X_3$ – balance profit / own assets; $X_4$ – cash flow / debt capital; $X_5$ – long-term liabilities / balance; $X_6$ – short-term liabilities / balance; $X_7$ – log (tangible assets); $X_8$ – current assets / debt capital; $X_9$ – log (balance profit + dividends)
	W. Beaver [20]	$CB \text{ (Beaver ratio)} = \frac{NP + A}{LTL + CL}$ where $NP$ – net profit; $A$ – amortization; $LTL$ – long-term liabilities; $CL$ – short-term liabilities; $CB > 0,4-0,45$ – satisfactory condition; $CB > 0,17 - 5$ years before bankruptcy; $CB > -0,15$ – 1 year before bankruptcy

The specific feature of these approaches is orientation towards the complex regime of an enterprise's functioning that can be expressed by the integral index characterizing its economic stability.

This index modeling is based on the so-called "theory of additive value" according to which the total value is equal to the sum of values of its constituents and correspondingly to rating of properties of complex social and economic phenomena and processes using a single number. Generalizing the essence of enterprises' economic stability evaluation methods in the frame of a functional and aggregation approach it is possible to specify five typical stages:

- creation of the initial database of primary indices for a certain period;
- standardization of actual indices according to regulatory (benchmark) values;
- identification of primary indices significance and group indices of functional constituents;
- calculation of group indices of functional constituents as well as the integral index of economic stability of enterprises within a certain period;
- interpretation of optimal results.

The initial database contains a set of primary indices essential for analysis in a specified time period:  $X = \{x_{kj}\}$ , where  $k$  – number of functional component,  $j$  – index number in the  $k$ -th

functional component,  $j = \overline{1, m_k}$ ;  $m_k$  – number of indices in *the k-th* component. A range of primary indices mainly determines variability of methodological approaches to evaluation of economic stability of an enterprise.

Standardization of actual indices that have different dimensions is carried out at the second stage to convert their plural number to a single base. It allows replacing the vector of primary values of indices  $x_{kj} = |x_{k1}, x_{k2}, \dots, x_{km_k}|$  by the vector of standardized values  $Y_{kj} = |Y_{k1}, Y_{k2}, \dots, Y_{km_k}|$ . The highly presented way of index standardization in economic stability evaluation methods is actual values to regulatory (benchmark) values ratio:

$$Y_j = \frac{x_j}{a_j}, \quad (1)$$

where  $Y_j$  – standardized value of the j-th index;  $x_j$  – actual value of index;  $a_j$  – regulatory (benchmark) value of the j-th index.

To provide informational unidirectionality of primary indices, they are divided in respect of their impact on economic stability of an enterprise: incentives – increase of which produces a positive effect (profitability, etc) and disincentives – increase of which produces a negative effect (costs per 1 UAH of sales, length of turnover, etc.)

Standardization (regulation) of incentive indices is performed by the following formula:

$$Y_{kj}^{(s)t} = \frac{x_{kj}^{(s)t}}{a_j}, \quad (2)$$

where  $Y_{kj}^{(s)t}$  – standardized value of the j-th incentive index of the k-th functional component for the i-th enterprise in the t-th period;  $x_{kj}^{(s)t}$  – actual value of the j-th incentive index of the k-th functional component for the i-th enterprise in the t-th period;  $a_j$  – regulation (benchmark) ( $a_j = \max_i \max_t \{ \{ x_{kj}^{(s)t} \}; k = \overline{1, 2}; j = \overline{1, m_k^s}; t = \overline{1, T} \}$ ;  $m_k^s$  – number of incentive indices in the k-th functional component).

Disincentive indices standardization formula is expressed as follows:

$$Y_{kj}^{(d)t} = \frac{\hat{a}_j}{x_{kj}^{(d)t}}, \quad (3)$$

where  $Y_{kj}^{(d)t}$  – standardized value of the j-th disincentive index of the k-th functional component for the i-th enterprise in the t-th period;  $x_{kj}^{(d)t}$  – actual value of the j-th disincentive index of the k-th functional component for the i-th enterprise in the t-th period;  $\hat{a}_j$  – regulation (benchmark); ( $\hat{a}_j = \min_i \min_t \{x_{kj}^{(d)t}\}$ ;  $k = \overline{1, 2}$ ;  $j = \overline{1, m_k^d}$ ;  $t = \overline{1, T}$ );  $m_k^d$  – number of disincentive indices in the k-th functional component).

An alternative way of index standardization in methods of an enterprise's economic stability evaluation is as follows:

$$Y_j = \frac{x_j - a_{\min j}}{a_{\max j} - a_{\min j}}, \quad (4)$$

where  $Y_j$  – standardized value of the j-th index;  $x_j$  – actual value of the j-th index;  $a_{\min j}$  – minimum value of the j-th index;  $a_{\max j}$  – maximum value of the j-th index;  $Y_j = 0$ , if  $x_j = a_{\min j}$ ;  $Y_j = 1$ , if  $a_{\min j} = a_{\max j}$ .

Applying this approach of index standardization S.H. Yezerska takes into account their division into incentives and disincentives [261, c. 104]:

$$K_{\text{пiДВ EC}} = \frac{\sum_{i=1}^n \left( \frac{a_i^{\text{п}} - a_{\min} + a_{\max} - a_i^{\text{H}}}{a_{\min} + a_{\max}} \right)}{n}, \quad (5)$$

$$K_{\text{ЗН EC}} = \frac{\sum_{i=1}^m \left( \frac{a_{\min} - a_j^{\text{п}} + a_j^{\text{H}} - a_{\max}}{a_{\min} + a_{\max}} \right)}{m}, \quad (6)$$

where  $K_{\text{пiДВ EC}}$ ,  $K_{\text{ЗН EC}}$  – summarizing index of partial indices which increase or decrease economic stability of an enterprise respectively;  $a_i^{\text{п}}$ ,  $a_i^{\text{H}}$  – actual values of partial positive and negative indices included into group of incentives;  $n$ ,  $m$  – a number of indices in corresponding group;  $a_{\min}$  – minimum critical value for a positive index;  $a_{\max}$  – maximum threshold value for



a negative index;  $a_j^{\text{H}}$ ,  $a_j^{\text{H}}$  – actual values of partial positive and negative indices included into the group of disincentives.

The following stage involves weight rate identification of primary indices and group indicators by each functional component. It should be mentioned that there is no theoretical substantiation of primary indices impact on enterprise's stability. This resulted in a number of statements in publications as for conditionality of weight ratios which declines the informative value of evaluation results. The following methods are used for significance (level of impact) identification of certain indices to economic stability:

- calculation of correlation ratios of primary and integral indices;
- application of expert opinions:

$$v_i = \sum_{k=1}^m v_{ik} r_k, \quad (7)$$

where  $v_i$  – mean value of the level of relevance of the  $i$ -th index to the enterprise profile;  $k = 1, \dots, m$  – a number of experts taking part in the questionnaire;  $i = 1, \dots, n$  – a number of indices specified for stability evaluation of an enterprise;  $r_k$  – competence rate of the  $i$ -th expert ( $\sum_{k=1}^m r_k = 1$ ).

An extend of expert opinion concordance is calculated via the concordance ratio ( $W$ ):

$$W = \frac{12 S}{m^2(n^2 - n)}, \quad (8)$$

where  $S$  – a sum of squares of tolerances of the  $i$ -th index rank sum from the average rank sum:

$$S = \sum_{i=1}^n \left( \sum_{k=1}^m r_{ik} - \bar{r} \right)^2, \quad (9)$$

where  $k = 1, \dots, m$  – a number of experts taking part in questionnaire;  $i = 1, \dots, n$  – a number of indices specified for stability evaluation;  $r_{ik}$  – a rank awarded by the  $k$ -th expert to the  $i$ -th index;  $\bar{r}$  – estimation of expectation:

$$\bar{r} = \frac{\sum_{i=1}^n \sum_{k=1}^m r_{ik}}{n} \quad (10)$$

A satisfactory concordance ratio is or higher than 0.5.

The fourth stage involves calculation of functional components group indices as well as the integral index of economic stability of an enterprise in a certain period by the following formulas: (I. V. Bryantseva, A. A. Zotov, Yu. A. Kozhevnikova, N. V. Krasovska, and others):

$$I_{ik}^t = \sum_{j=1}^{m_k} Y_{kj}^{s(d)t} w_{kj}, \quad (11)$$

where  $I_{ik}^t$  – integral (group) index of the k-th functional component of the i-th enterprise in the

t-th period;  $i = \overline{1, n}$ ,  $k = \overline{1, 2}$ ,  $t = \overline{1, T}$ ;  $w_{kj}$  – weight ratio of primary indices.

$$I_i^t = \sum_{k=1}^2 I_{ik}^t * w_k, \quad (12)$$

where  $I_i^t$  – integral index of economic stability of the i-th enterprise in the t-th period;  $w_k$  – weight ratio of group indices of functional components.

The above mentioned tools for standardized indices integration (form. 11, 12) are widely described in scientific publications, but the other tools can also be found.

The development of methodological approaches to enterprises' economic stability evaluation goes along with static standards replacement with dynamic ones. Initially they were employed in terms of general evaluation of enterprise efficiency by I. Syroyezhyn [21]. Adaptation of dynamic indices (growth rate, increment, absolute increment, etc.) to issues of economic stability evaluation is considered in works of A.I. Afonichkin, L.I. Zhurov, O.V. Hlushko, I.Yu. Hryshnova, M.Yu. Shcherbata, M.N. Kozin, E. R. Miskhozhev, N.N. Pohostynska, R.L. Pohostynky, R.L. Zhambekova, P.S. Tsvetkov. H.R. Yarulina and others. Practically significant in this respect is an approach to dynamic modeling of economic stability offered by S.V. Voytko [22]. Foreign researchers also emphasize on priority of the dynamic concept of economic stability evaluation [23, c. 159].

Focusing on the advantages of dynamic standards applied for economic stability evaluation of an enterprise researchers emphasize that they reflect development of an enterprise [24]. It is impossible to agree with this statement considering the following:

- first, index trend can be negative;
- second, considering development as a process of positive qualitative changes it should be noted that even positive trends are not necessarily the result of these changes as they can be caused by favorable market conditions in a certain period, etc.

Although, it should be mentioned that dynamic indices reflect the vector of enterprise conditions change by a criterion during enterprise operation. The algorithm of application of static and dynamic authors is shown in Fig. 2.1.

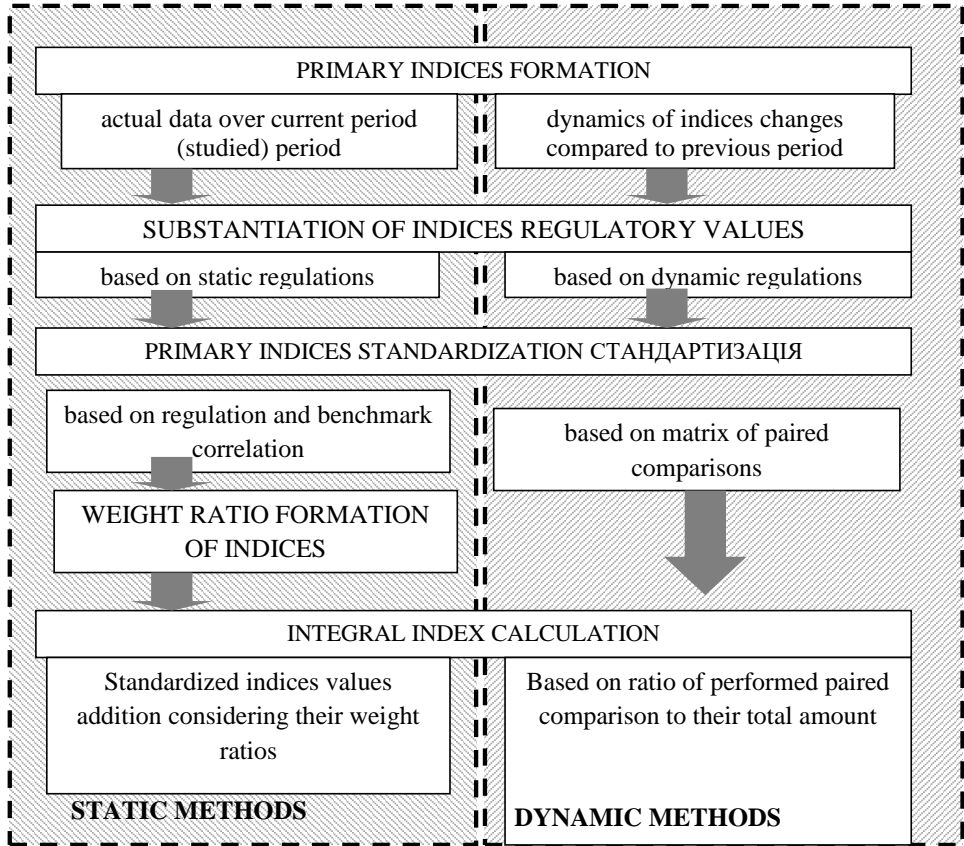


Figure 2.1. Algorithm of methods of an enterprise’s economic stability evaluation [developed by the author]

Dynamic methods of stability evaluation of enterprises have doubtless advantages which determines the promising outlook of their application in analytical business practice.

Results of summarizing methodological approaches to stability evaluation state that the base of quantitative evaluation is financial indicators and indices of business activity calculated on their base which are as a rule identified on the audit analytical model base.

The theoretical base of the suggested approach to economic stability evaluation as a property of an enterprise is a modern conceptual basis of business analysis relied on accounting

and cost analytical models. Logic combination of these models rather than their contrasting which is a traditional characteristics of modern publications enabled the substantiation of the universal concept of *VBM* model factor interpretation representing a basis for identification of economic stability/instability of an enterprise. The main feature of this approach unlike the existing practices is not in strictly mathematic formalization of analytical procedures, but in forming a strategic concept of analyzing and making a relevant decision considering the identified specific features of the problem under research.

**The main idea** of the suggested methodological approach to stability evaluation of enterprises as a property of a complex economic system is that internal characteristics of an enterprise, that determine its ability to accomplish its function regardless of business environment impacts, are expressed in the capacity of forming added value flows amount of which (“+” or “-“) is taken as an identification criterion of economic stability/instability. However, such segregation is not sufficient to analyze cause-and-effect trends that specify a relevant cost result to the full extent. The suggested multifactor interpretation of *VBM* models can be applied as a stated, strong methodological base for further formalization, diagnostics of different aspects and identification of stability as a property that necessitates particularization of corresponding conditions as a relevant information baselines characterized by interconditionality of main causes (parameters) it is determined by.

The content of the suggested methodological approach to stability evaluation of enterprises based on its multifactor interpretation provides the possibility for substantiated formalization of parameters in fields of interest and accessibility which are specified in respect to the developed within the thesis methodology of stability evaluation in the context of a target model of approach that respectively allows for arrangement of edge states multiplicity of an enterprise in which it exists according to those parameters, criteria, indicators and indices that is substantiated for relevant analytical procedures.

Formalization of a field of interest in terms of the suggested methodological approach to stability evaluation will be specified by the amount of added value which is a basis for singling out “stability” and “instability” of an enterprise. Analytical background of added value provision is spread productivity of assets and spread of sales that in interconditional combination characterize efficiency and competitiveness as structural units of stability of an enterprise (Fig. 2.2).

Particularization of conditions and levels of stability during their identification is to be performed in cost analytical model projections such as “risk” – “liquidity” – “growth”. Projections fulfillment with analytical indices is carried out by an analyst in compliance with a chosen *VBM* model of factor interpretation and depending on the evaluation stage and severity of

a problem to be identified to make more accurate decision as for the object of analysis. As for identification of a stability level, priority of projections and indices included in it, is identified by the analyst situationally depending on the sector comprising the greatest number of reasons that caused corresponding result.

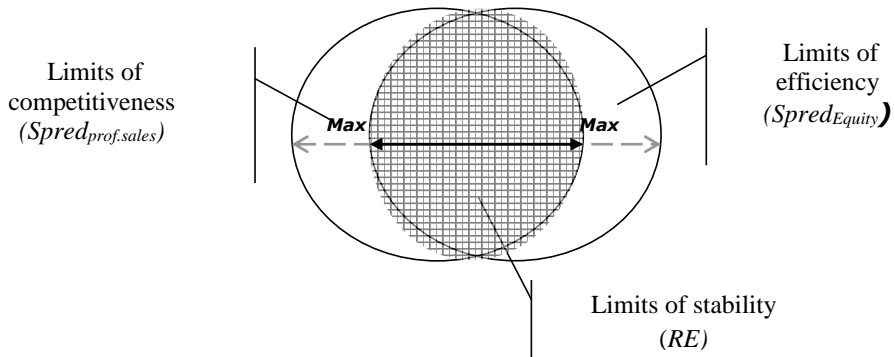


Figure 2.2. Principles of parameter formalization of stability of an enterprise on the basis of RE model factor interpretation [Original development]

The research performed states that the modern research space has a wide range of methods for stability evaluation of enterprise. The author presents the innovative method of economic security evaluation in the context of stability identification of enterprises. Theoretical basis of the suggested methodological approach to stability evaluation as a property of an enterprise is a modern conceptual basis of business analysis relied on accounting and cost analytical models.

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## **2.2 ECONOMIC MECHANISM OF INCREASE OF INNOVATION ACTIVITY OF ENTERPRISES ON A COMPETITIVE LEVEL TO MITIGATE THREATS TO ECONOMIC SECURITY**

Reorganization of the modern world space architecture occurs under the conditions of contemporaneous intensification of international socio-economic, geopolitical, cultural, historical, scientific, technological, military-industrial, and other types of networking between some countries and a full or partial exclusion of the other states from these links. An expression of this structural imbalance is the formation of the nodes (i.e., cores, poles) and peripheral areas of different scale being characterized by varying degrees of integration depth, breadth and frequency of functions and processes. Qualitative unevenness of the world system is a consequence of the trinity of interrelated effects of “globalization – regionalization – polarization” that is primarily manifested in the strong differentiation of areas in terms of socio-economic development as a result of rivalry for resources.

In this regard, countries intensify the desire to ensure long-term competitiveness via building up strategic competitive advantage that cannot be fully or partially reproduced anywhere else, which would involve their localization in certain geographically and institutionally defined borders. In the foreground comes the competitiveness of a particular region, being determined by the efficiency of the functioning of its institutions [9, p. 144–151].

Regional development becomes an objective requirement of achieving national competitive advantage, while decentralization and empowerment of regional authorities is a necessary condition for such development.

The region is increasingly being transformed from a passive object for implementation of state policy, and masters the role of an independent and direct participant in the political and economic processes, including those of an international character, realizing the need to protect the vital interests of the national and regional levels. In this context, the relevance of issues related to the formation of a comprehensive regional security system and determination of a place and role of a particular region is increasing tremendously. Of particular importance is an innovation security (IS) as an integral characteristic of regional security, affecting the whole complex of relations and sub-systems of a regional system, being directly related to ensuring the competitiveness of the region [1, p. 334].

Functioning and development of the enterprises is influenced by numerous external and internal factors. Multiple threats of economic security may lead to negative consequences in form of solvency and financial stability violations, profitability reduction and other deterioration in the

enterprise. In this regard, the relevance and the need of ensuring economic security of enterprises are increasing. In order to counter threats of economic security and to ensure stable functioning of enterprise, the comprehensive system of economic security ensuring is presented in the paper. The algorithm of actions and strategies of ensuring of economic security are revealed. The main directions of strengthening of economic security of enterprise for each of the functional components were presented. Ensuring of economic security of enterprises serve as a basis for sustainable development both businesses and the economy as a whole.

The foundation of every state and for guaranteeing the welfare of its residents is innovative, contemporary, strong and competitive economy.

The progress of Ukrainian entrepreneurs and scientists in developing and implementing innovative technologies generates a growing interest in foreign enterprises operating in the same field of marketing as well as in special services. Procuring information on scientific achievements, new technologies, innovative solutions related to different research but even on business ideas etc. enables to implement them without major costs. There is the attempt to strengthen the economy of a state through economic intelligence and industrial espionage. The enterprise chosen as a target of intelligence activities may suffer resultant economic loss even to the point of liquidation. From the perspective of a state and especially a small state, the damage inflicted on an enterprise means a loss for the whole state – unpaid taxes, expenses increase in the social sphere, the economy of the entire state weakens [2, p. 23].

Therefore economic security constitutes one of the most important components of national security. The world today requires that the state, enterprises and citizens would pay far more attention to the issues related to economic security.

The Ukrainian Internal Security Service as a security authority has a crucial role in guaranteeing economic security of Ukraine – the state has granted us the responsibility to prevent foreign economic intelligence and industrial espionage, including foreign influence activities carried out through economic institutions; also anti corruption combat.

As regards the prevention of economic intelligence and industrial espionage, the primary interest of foreign special services has been noted in issues related to the energy sector. Energy security is the backbone of a state. In the case of an independent state the keywords of energy security are the security, independence and variety of energy supplies, investments and objects of high importance. It all requires coordinated cooperation between different state agencies, government invested enterprises but also private enterprises as well as the priority of security aspect in working out and realizing essential action plans and long-term strategies [3, p. 257–291].



Ensuring economic security does not only consist in counterintelligence. Independence of national decision-making mechanism from the influence activities of persons connected with foreign capital is very important. In this regard it is sometimes rather difficult to ascertain whether one acts in the interests of a company, a state or simultaneously in the interests of both. Considering Estonia's rather small size economy, more attention should be drawn to capital consolidation. A foreign business partner of today who gains too big share in some important public sector might start influencing the domestic and foreign policy of the state in the coming years. The occasions are not rare when one attempts to use the influence as barter trade for gaining business favours in his/her own country.

A significant factor in influencing the economic competitiveness of a state is international and domestic reliability on its economic and financial policy. It presumes the reliability of state agencies and low-level corruption. It is evident that the more corrupt the state, the fewer chances there are to obtain investments necessary for fostering entrepreneurship.

During the last century the safety phenomenon has been significantly transformed. At the beginning of the last century the safety of a company has mainly been associated with the protection of the assets, personnel safety, namely the managers of the company. In the second half of the XX century the safety has included, besides physical safety, reservation and protection of information resources, which was caused by the acceleration of scientific and technological progress. At the end of the XX century company security acquired a systematic character, including financial, technical, intellectual, physical and other components, becoming one of the major needs and goals of the organization. The term “corporate safety”, as inherently multifunctional and polymorphic concept requires study of its nature, structure and components while applying from the position of systemic approach. Therefore during the study of the structure of corporate security, companies use the theoretical and methodological apparatus of systems theory. According to this theory all the processes, phenomena, functioning of structures of different complexity must be considered in terms of a systemic approach. No business entity is operating in the “vacuum”, it's surrounded or it is in a highly differentiated and complex environment. Everything that is outside of the company to some extent affects its activity. This effect can occur constantly or from time to time with varying attitude.. Therefore, every company must not only know the features of environment in which it operates, but also be able to adequately respond to each of these influences. In a market economy, stability and security of the enterprise depends on the wellknown factors of macro environment, which include the cyclical economic development, particularities and conditions of governmental interference in economic processes, political situation, the level of economic freedom in the country, scientific and

technological development of the state. With this in mind, it is important for national enterprises conducting to analyze and take into account various environmental factors. We believe that the long run level of corporate security of entities is directly proportional to the level of national and, above all, economic security of the country, in other words, corporate security of the company steams from the economic security as a part of the national security of the country. Taking this into consideration we will analyze the features of corporate security of entities in the current economical conditions of Ukraine. Let's study the features of the modern period of Ukraine's economic development that must be considered in the process of providing corporate security of the companies and identify factors that are permanent sources of risk at the enterprise level.

1. One of the main factors of destabilization of the national economy, in our opinion, is a high level of political opposition in the Ukrainian society, which results in a system crisis of national administration, which covers technical basis, the economy, social sphere, politics, law, etc.

2. At the present stage of national economy development entities suffer from another equally important factor – corruption.

3. Threatening proportions has reached the sphere of economy that functions outside of the government control.

4. A characteristic feature of the domestic economy is distorted structure of social production according to the needs of the state and population.

5. The demographic situation in the country is rather complicated. During the last decade the level and quality of life has been significantly reduced.

6. The negative trend of recent years is the loss of our country a part of scientific and technological potential.

7. Unfavorable for domestic entities is foreign policy of our country [7, p. 28–40].

The features of the modern period of Ukraine's economy, affecting its level and recommended to be considered during the process of ensuring corporate security of domestic enterprises, in our opinion, are: high level of political opposition in the Ukrainian society, excessive corruption at the highest levels of government, a large proportion of the shadow economy; distorted structure of production; complicated demographic situation in the country, loss of scientific and technological potential of the state, unfavorable foreign economic policy, low economic culture and extremely low index of economic freedom in our country.

Only the most complete consideration of these features of the modern economy of Ukraine will promote the safe operation and development of domestic enterprises. In our opinion, providing the corporate security to domestic enterprises, and taking into account features of the modern period of Ukraine's economical development must manifest itself in:

- a constant analysis and effective management of political risks, keeping the political neutrality and non-interference in internal political process;
- establishing an adequate system of protection and counteraction the criminal and economic organized crime, illegal acts or omissions of public officials;
- effective implementation of personnel policy in the company, forecasting, and taking into account changes in consumer demand, the level of security entities qualified personnel, the formation of modern corporate culture;
- monitoring of the foreign policy, the optimal regional diversification of sources of raw materials and markets;
- long-term forecasting prospects for further integration of Ukraine into the international sharing of the labor, modeling the effects of globalization of the domestic economy and the implementation of measures to neutralize the negative effects of these processes.

Bearing in mind research outcomes, only the most complete consideration of the features of modern economy of Ukraine will give the opportunity to provide stability of operations and safe development of domestic enterprises. Given the clear trend of strengthening the legal protection of the individual, business, national security in the industrialized countries at the beginning of the XXI century Ukraine should as soon as possible make maximum effort to reform national legislation to guarantee the security of businesses and the state at large.

We note at once that the level of financial and economic business security depends on how well its management is able to avoid the real threats and eliminate the harmful effects of certain negative external and internal environments components.

Modern scientific researches indicate that there is impossible to find exit from crisis, to stabilize the economic situation, to create an effective mechanism of doing business without unified system of business financial and economic security. The efficiency and reliability of the existing system is proposed to evaluate, based on following criteria: the company saves and multiplies wealth and doing business through sustainable development; timely prevents crises and neutralizes negative factors affecting its activities.

The search of the main ways of business acceleration with minimal expenses for forming of effective system of enterprises functioning is aimed at profit maximization and relation harmonization between business stakeholders, and is very relevance in the conditions of post-crisis reconstruction. Increased risk of doing business requires entities to effective formation environment of financial and economic security, identification and prevention of major impacts on their safety. The financial and economic security business depends on the financial security.

Meanwhile, it should be noted that currently the financial security of Ukraine is under threat because all components to ensure financial and economic security are under threat. One should consider the fact that production and economic system, regardless of ownership, are characterized by constant threats and risks associated with the dynamics of external and internal environment their operation.

The problems of their own economic security faced every kind of business, not only in times of crisis, but also when working in a stable economic environment, the complex solved with targets has significant difference. Ensuring an adequate level of safety and security is one of the fundamental principles of maintaining its viability in a dynamic economic environment. Business Security – is the basis of preserving a sustainable competitive position, the premise effective functioning and stable development of the entity. The quality of the business is determined by such basic elements as: economic efficiency; social orientation; security [5, p. 28–40].

Therefore, safety management is an integral part of business culture, and according to modern views – as business in general. local business, then, according to experts, the main negative factors are [11, p. 24–33]:

- lack of full market environment;
- incomplete formation of the institutional framework for economic policy;
- unbalanced state regulatory policy;
- inadequacy of budgetary policy;
- abuse of monopoly price nature;
- increasing the number of criminal attacks, so-called “raid” of corruption and discriminatory action for entrepreneurs;
- imperfection of the judicial system, corruption in government and the lack of public institutions that effectively protect the rights of the owner;
- low competitiveness of enterprises and their innovative activity;
- poor performance of the financial condition and efficiency of enterprises and the use resource support and more.

We, in turn, will defend the idea that an important element in the functioning of financial and economic security business is a mechanism to ensure it is realized through strategic and operational planning to ensure financial and economic security. The main purpose of the system of financial and economic security business is ensuring its sustainable and maximize performance, create high potential growth and development in future. The system of financial and economic security business – organized actions to ensure the coherent

functioning of all services and divisions of the company's employees to prevent or remove threats to the enterprise.

It should be noted that the main tasks of economic security business include:

- protection of the legitimate rights and interests of the company and its employees;
- collection, analysis, data evaluation and prediction of the situation;
- study partners, customers, competitors, candidates for the job;
- detection, prevention and suppression of illegal and other possible negative of the company's employees to the detriment of its security;
- preservation of assets and information;
- obtain the necessary information to develop the most optimal management decisions on strategy and tactics of economic activity etc. [2, p. 12–13].

The main value of the system of financial and economic security business is that it should be precautionary in nature, and the main criteria for assessing its reliability and efficiency are:

- sustainable development, conservation and enhancement of property company, a high level of competitiveness of products;
- ensuring the stable operation of the business, conservation and enhancement of financial and material assets;
- security of all business information and resources;
- the use of innovative technologies in production activities;
- timely warning of crises and neutralization of negative factors affecting the enterprise [10, p. 135–147].

In the event of a threat to global challenges and threats are resolved and liquidated in working order. Among those already traditional for domestic enterprises threats include: the appearance of unfair competition; changes in the dynamics of enterprise development caused by adjusting strategies and tactics of economic activity, the emergence of new production technologies and access to new markets; change the list of data that constitute commercial secrets and confidential information of the company; changes in applicable law; worsening crime situation in the country (region); change in headcount (high turnover, the release of highly-skilled workers who possess valuable information and have access to trade secrets); improving information network [13; 15].

Immediately, we note that the method of constructing a system of financial and economic security business includes the following steps:

- analysis of external and internal threats to economic security business and study information about crises, their causes and ways of settlement;
- modeling the new system of economic security business: development plan addressing the identified deficiencies during the audit; preparation of proposals on improving economic security (including the establishment of security in the enterprise, if such existed, or security at its base, the mechanisms of support), the calculation of all kinds of necessary resources; planning the monthly costs of running the system of economic security;
- the study of specific business segment, which it occupies in the market, staffing, and familiarity with the staff;
- evaluate the effectiveness of the existing system and its improvement;
- audit of the existing facilities to ensure safety and compliance analysis of identified threats;
- the formation of a new system of economic security;
- approval of the leadership model of the new system and the budget for its maintenance [16, p. 32].

Such evaluations should be based on the cause-and-effect relations between the processes of production and economic activities for the complete consideration of all impact factors. Economic security evaluation is an integral management tool, as it creates an information base for making strategic management decisions to ensure a long-term performance of an enterprise.

For this purpose an economic security configuration of strategic enterprise development, which includes the following areas of evaluation: "interests", "economic and financial stability", "effective functionality" "organizational adaptability", "strategic competence", was formed. According to the results of E. Derous (2000), H.A. Simon (1993), Cluster 3 Cluster 2 Cluster 1 Evaluation of the factors -3,0 -2,0 -1,0 0 1,0 2,0 Factor 1 Factor 2 Factor 3 Factor 4 peculiarities of such relationships reflect the interests of enterprise, form various types of strategies and can be organizationally expressed in the form of state protectionism, association, affiliation, alliance, league of public providers, political and technological strategies, political and trade-union strategies etc. Under the conditions of global integration and globalization the economic efficiency of modern industrial enterprise depends on establishing and maintaining close relationships with 4 types of partners: state, competitors, customers and suppliers, interest groups [25, 17].

Among the measurements it's important to mention the following: – value or attractiveness of business areas; – enterprise competence in this area of activity, which manifests itself as a competitive position; – security, defined by the importance of existing organizational

relations in order to avoid competition. Indicators for the evaluation of enterprise's and its partners' interests include: the exchange index of best practices among partners; the activity index in cooperation with universities; state support index; the activity index in cooperation with competitors; the activity index in cooperation with customers. By implementing such strategies, an enterprise may secure itself against a variety of possible risks, creating the so-called "niche security" where it is protected from competition and which allows entering competitive struggle at exposed markets. In this sense there is a three-dimensional definition of a business strategy in a certain type of activity. Adaptivity is a state of organizational structure that allows responding flexibly to changes in the environment. Financial analysis is the primary task of effectiveness evaluation of production and economic activity according to the indicators: absolute, quick and current liquidity, autonomy, equity and return on assets [18].

The indicators for such evaluation are: the index of organizational experience gaining; the integration index; the index of productive diversification development; the specialization index; the index of outsourcing expenditures. Particular attention should be paid to the specialization index, calculated by the method of R. Rumelt which is detailed in the scientific work of A. Nalyvaiko (2001) in the context of research of productive diversification processes and systems of its effectiveness measurement. The component of adaptivity of organizational structure reflects the main results obtained by means of diversification, integration and specialization [17, 18].

Within the today's realities of Ukrainian machine-building, a set of indicators reflecting the effectiveness of the key functional fields of activity was formed: innovative development index, renewal product offering index, index of reduction of project design duration; index of increasing own innovative base; innovation development index. Evaluation of enterprise strategic competence is based on the usage of such indicators: management standartization index; index of managerial knowledge formalisation; index of managerial staff education; index of return on costs for managerial knowledge development; index of bench-marketing costs.

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### **2.3 THE TRENDS IN SMALL BUSINESS DEVELOPMENT IN UKRAINE AND IN DNIPROPETROVSK REGION**

Small business is the main indicator of the development of a market economy in any country. In addition to ensuring a high level of competition, in developed countries small business plays a significant role in the formation of GDP (up to 80%) and gross regional product, affords opportunities for business owners to realize business potential and provides job for employees (up to 60%). Due to its mobility, flexibility and ability to adapt to changes in the market situation quickly, small business is able to meet the needs of customers in goods and services not mass consumer goods, but exclusive (one-off production), which is impossible for large businesses.



A vivid attribute of small business is the regional character of its development: taking into account specifics of the region's development: industrial, agricultural, recreational, etc.

The connection between the development of small business and the revenues of local budgets and regional development is described by the following scheme (Fig. 2.3): financially independent regions stimulate the small business development using budget funds. In turn, small business is a source of income, which increases the profitability of local budgets due to taxation of results of its activities.

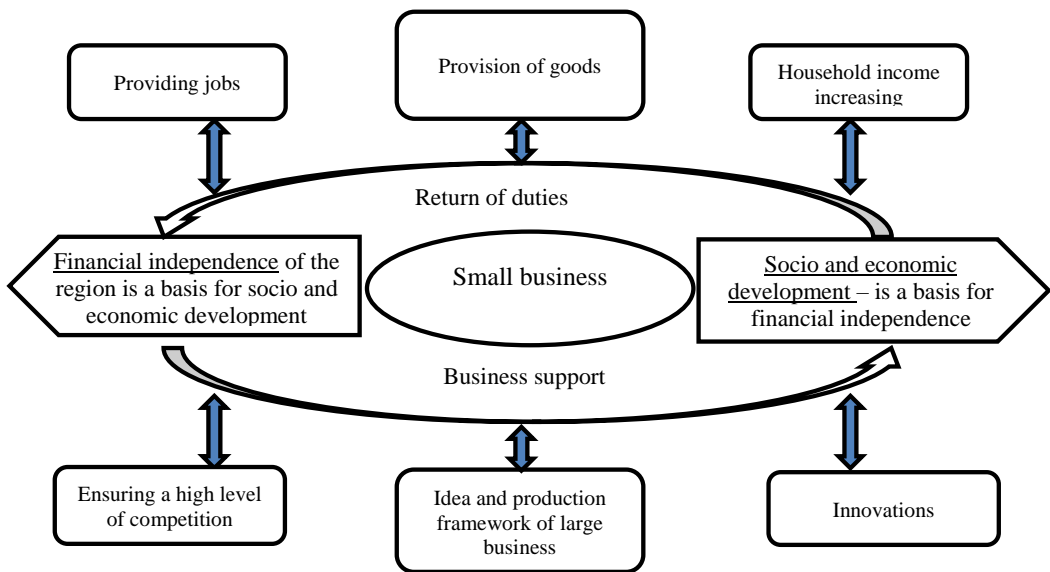


Figure 2.3. The scheme of connection between small business development and of local budgets incomes [developed by the authors]

At the same time, the role of small business in the socio-economic development of the state is not only to provide jobs and product sales, but also in the introduction of advanced technologies and heaving unlimited economic potential, which requires the creation of appropriate conditions for the small business development in accordance with its specifics.

On the one hand, the inexhaustibility of opportunities, on the other hand, exposure from economic conditions, determine the necessity for realizing the state support of small business for the full realization of its economic and social role at the present time of economic transformations.

Local budget revenues from small businesses are provided through the execution of the taxation system, which involves the return of duties (taxes and fees) related to the small businesses activities.

So let's look at the development of small business at the national and regional levels. According to statistical data [4], about 35% of newly created enterprises are eliminated during the first year, 60% of them balance between profits and losses, that is they try to “stay afloat”, and only 5% of newly created enterprises find their niche and take a foothold on the Ukrainian market. The environment, in which entrepreneurs work, is an object of analysis not only for national scientists, but also for international organizations (Table 2.2).

Table 2.2

Ranking ease of doing business 2017 (developed by the authors based on [12])

Country	Doing Business 2011	Doing Business 2012	Doing Business 2013	Doing Business 2014	Doing Business 2015	Doing Business 2016	Doing Business 2017
Singapore	1	1	1	1	1	1	2
Hong Kong	2	2	2	2	3	5	4
New Zealand	3	3	3	3	2	2	1
USA	4	4	4	4	7	7	8
Denmark	5	5	5	5	4	3	3
Germany	19	18	20	21	14	15	17
China	87	91	91	96	90	11	11
Belarus	91	60	58	63	57	44	37
Russia	124	118	112	92	62	51	40
Ukraine	149	152	137	112	96	83	80

According to the World Bank’s report [12], in 2012-2013, Ukraine crowded the top of the list of ten countries that achieved the greatest results in 2012-2013 in the area of improving business conditions by implementing the reforms in 8 of the 10 surveyed regions that participated in Doing Business research. In the ranking Doing Business 2014 Ukraine had 112<sup>th</sup> position, and in 2017 it already has the 80<sup>th</sup>. Such a rapid upturn of positions in the rating is ensured mainly due to the introduction of a tax reform [11].

Small business is the basis for the formation of the middle class. So indicators of small business development characterize the level of socio-economic development of the country. At

the same time, not always statistical data is an objective reflection of its level of development, but the data is formed depending on the criteria which classify the enterprises as small.

According to the Commercial Code of Ukraine [1], by 2017 the subjects of small business are:

- private persons registered in the determinate law order as individual entrepreneur, whose average number of employees for the reporting period (calendar year) does not exceed 50 persons and the annual income from any activity does not exceed the amount equivalent to 10 million euros determined in the average annual rate of the National Bank of Ukraine;

- legal entities – business entities of any types of business and form of ownership, in which the average number of employees for the reporting period (calendar year) does not exceed 50 persons and the annual income from any activity does not exceed the amount equivalent to 10 million Euro, determined by the average annual rate of the National Bank of Ukraine.

Starting 01.01.2018, the Law of Ukraine «Concerning the introduction of amendments to the law of Ukraine «On Accounting and Financial Reporting in Ukraine» on improving some of the provisions» (dated on October 5, 2017 No. 2164-VIII) [8] becomes effective, according to which the maximum values of quantitative criteria are decreased, but their list is expanded – the parameter of net book value is added.

Small enterprises will include enterprises that do not meet the criteria for microenterprises (of net book value – up to 350 thousand euros, net revenue (goods, works, services) – up to 700 thousand euros, the average number of employees – up to 10 people) which indicators on the date of preparation of the annual financial statements for the year, which preceding the reporting one, match two of the following criteria:

- net book value – up to 4 million euros;
- net revenue (goods, works, services) – up to 8 million euros;
- average number of employees – up to 50 persons.

Let's make the regional analysis of small business development. The dynamics of the number of small enterprises and the portion of theirs sales volume by region are presented on Fig. 2.4.

On the Fig. 2.4 it is shown that the largest number of small enterprises is concentrated in the Dnipropetrovsk region, where the largest portion of sales volume (except for Kyiv) is formed. There are also Odesa and Kharkiv regions in three leaders for the number of small enterprises and the portion of sales volume. The lowest rates of development are shown by the western regions. This suggests that the geography of the concentration of small enterprises tends to the east of the country – industrial regions. Therefore, further research will be devoted to the analysis of the small business development in Dnipropetrovsk region.

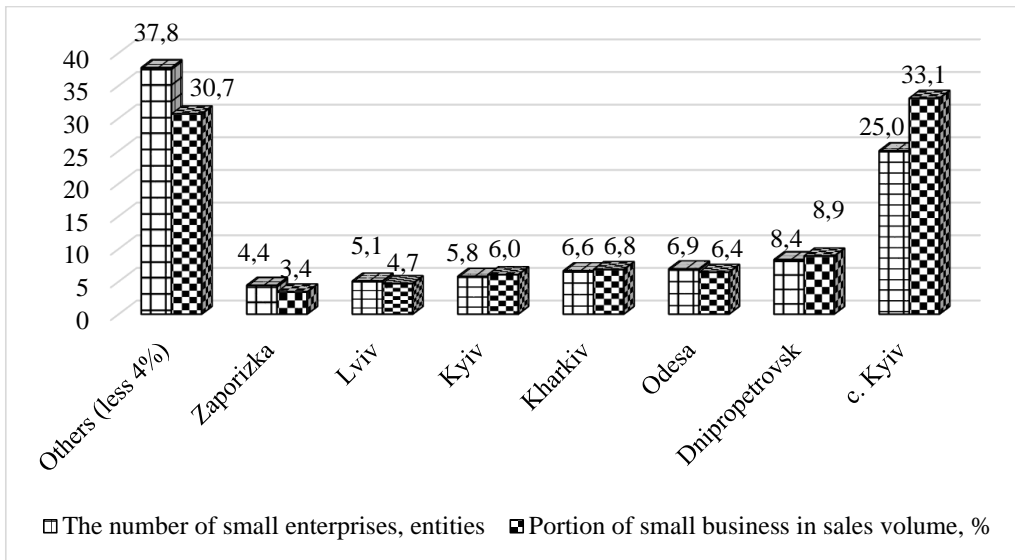


Figure 2.4. The dynamics of the number of small enterprises and the portion of their sales volume by region in 2017 (developed by the authors based on [6])

The dynamics of the main indicators of small business development in Ukraine and in Dnipropetrovsk region during 2000-2016 is presented in Table 2.3.

It should be noted that the following specifics have been typical for the national small business development for 17 years:

- the number of small enterprises (SEs) has a tendency to increase;
- the number of employees in one small enterprise decreases annually;
- the salary of employees in a small enterprises increases, but its level is significantly below than the average wage in the country, it generates a question, what motivates such employees to work;
- the indicators of small business profitability are negative, it generates a question why entrepreneurs should operate at a loss;
- the most important quality indicator of the small business efficiency is the portion of the sales volume in the sales volume of the region. Each year it decreases or grows insignificant, even though the number of these enterprises increases each year.

Table 2.3

The dynamics of the main indicators of small business development in Ukraine and in Dnipropetrovsk region during 2000-2016 (developed by the authors based on [3-6])

Year	The number of small enterprises (entities)		Average number of employees per 1 small enterprise (persons)		Portion of small business in sales volume (%)	
	Ukraine	Dnipropetrovsk region	Ukraine	Dnipropetrovsk region	Ukraine	Dnipropetrovsk region
2000	217 930	13 494	8	8	8,1	3,7
2002	253 800	17 001	7,6	7,2	6,7	4,1
2003	272 741	18 566	7,1	7,1	6,6	4,5
2004	283 398	18 960	7,2	6,5	5,3	3,5
2005	295 109	19 424	6	6	5,5	3,2
2006	307 398	20 453	6	6,4	18,8	15,6
2007	324 000	21 607	5,8	6	18,1	15
2008	333 883	23 449	5,7	6,2	16,3	13
2009	348 245	23 957	5,7	6	16,6	14,1
2010	357 241	25 736	5,7	5,9	16,9	14
2011	354 283	25 173	5,7	5,8	15,2	12,1
2012	344 048	25 691	5,7	5,5	16	12,6
2013	373 809	26 651	5,1	5	16,6	12,2
2014	324 598	24 821	4,9	5	16,9	12,3
2015	327 815	25 969	4,4	4,5	18,2	14,1
2016	306 369	24 325	5,0	5,3	18,9	15,6

But the special interest in analysis of small business is the dynamics of the small business sales volume as an indicator of its development. The dynamics of the number of small enterprises and the portion of small business in sales volume in Ukraine and in Dnipropetrovsk region are presented in Fig. 2.5.

The figure demonstrates that with insignificant growth in the number of small enterprises, there is a intermittent growth in the sales volume of the region, and the same tendency is typical for the whole country. Unfortunately, such changes in the indicators don't indicate the business activity increase, but the effect of the introduction of group of actions for the Ukraine entry into the European Business Register in 2008 and becoming effective the Law of Ukraine «Concerning the introduction of amendments to certain legislative acts of Ukraine on business regulation» (dated on September 18, 2008, No. 523-VI) [9].

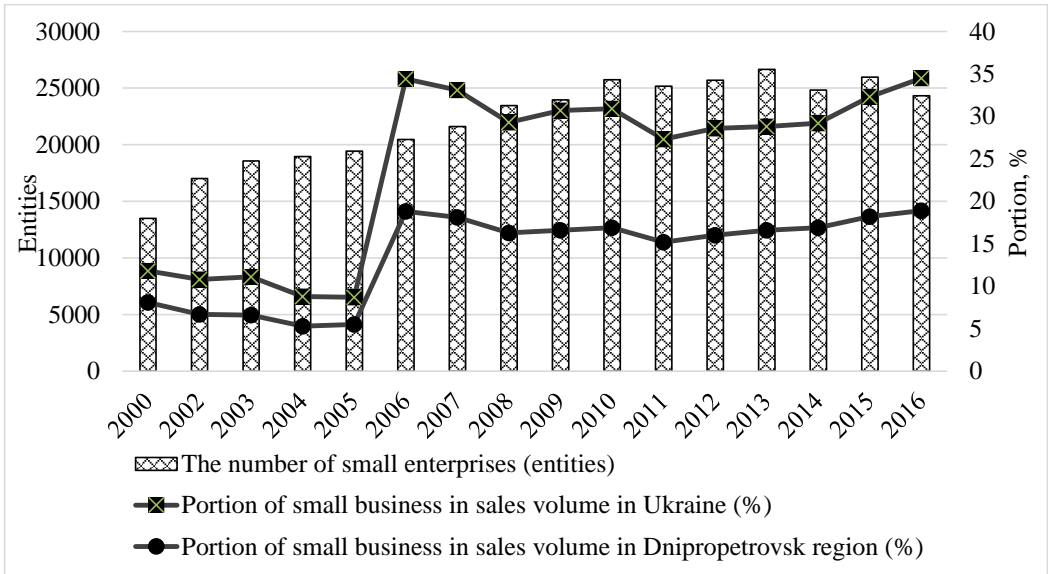


Figure 2.5. The dynamics of the number of small enterprises and the portion of small business in sales volume in Ukraine and in Dnipropetrovsk region during 2000-2016  
(developed by the authors based on [3-6])

So statistical data published after the Law [9] become effective (taking into account the revision of the indicators by the State Statistics Committee since 2006) shows a sharp increase the indicators of small business activity, which does not correspond to the facts (Table 2.4).

Table 2.4

The dynamics of small business sales volume of Dnipropetrovsk region in 2000-2016  
(developed by the authors based on [3-6])

Year	2000	2002	2004	2006	2007	2008	2009
Sales volume (according to statistical data), mil. UAH	3,5	4,1	6,5	37,2	42,5	45,9	40,8
Year	2010	2011	2012	2013	2014	2015	2016
Sales volume (according to statistical data), mil. UAH	43,9	55,8	56,4	54,2	58,7	82,1	104,8

Taking into account the changes in criteria of small enterprises definition in 2008, that is the increase in annual revenue from 500 thousand euros to 70 million UAH, it is necessary to align the statistical series (until 2006) in order to obtain adequate dynamics.

To do this, we determine a linear relationship that describes the trend of changes in the sales volume, depending on the changes in the time factor for 2000-2005, and we put the data into Table 2.5:

$$Y = 0,717 \times t + 2,1613 \quad (1)$$

де Y – sales volume; t – time factor.

Table 2.5

The adjusting of sales volume of small business of Dnipropetrovsk region during 2000-2006 according to changes in the criteria for the of small business definition in 2008  
[calculated by the authors]

Year	2000	2001	2002	2003	2004	2005	2006
Sales volume (according to statistical data), mil. UAH	3,5	3,8	4,1	6,2	6,5	6,5	37,2
Time factor	1	2	3	4	5	6	7
Calculated indicator of the sales volume, mil. UAH	3,3	4,0	4,8	5,5	6,2	6,9	7,6

The adequacy of the model was verified using Fisher's ratio test. The calculated value exceeds the value of the F-ratio, that is, the model is adequate (with a given error 0.05):  $F_{emp} = 28.54 > F_{(0.05; 1; 4)} = 7.71$ ; the parameters are significant:  $t_1 = 5.34, t_0 = 7.45 > t_{(0.05; 4)} = 5.0$ . At the same time,  $R^2 = 0.88$ .

Substituting the time factor into the obtained formula (1), we determine the calculated indicator of the sales volume. For example, the indicator value of 2006 will be:

$$Y = 0,717 \times 7 + 2,1613 = 7,6 \text{ mil. UAH}$$

Then we determine the adjustment index of the empirical calculated indicator to the value obtained as a result of the of new criteria implementation (according to statistical data):

$$k = \frac{37,2}{7,6} = 4,878 \quad (2)$$

and update the values of indicators during 2000-2005 according to the calculated index.

Consequently, it was received the aligned statistical series taking into account in accordance with changes in legislation in 2008 [9] (Table 2.6).

Table 2.6

Statistical data on the sales volume of small business in Dnipropetrovsk region in 2000-2016, adjusted for 2006 [calculated by the authors]

<b>Year</b>	<b>2000</b>	<b>2002</b>	<b>2004</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
Sales volume (adjusted for 2006), mil. UAH	13,6	20,3	28,4	37,2	42,5	45,9	40,8
<b>Year</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Sales volume (according to statistical data), mil. UAH	55,8	56,4	54,2	58,7	82,1	104,8	55,8

It should be noted the sharp increase in sales volumes since 2010. It takes place because the Law of Ukraine «Concerning development and state support of small and medium business in Ukraine» (dated on March 22, 2012 No. 4618-VI) [174] become effective (taking into account the revision of the indicators by the State Statistics Service starting from 2010). According to this law to the subjects of small business belong economic entities with net revenue of 10 million euros (instead of 70 million USD).

Therefore, in order to obtain adequate dynamics of the statistical series, we will align the statistical data by 2010. To do this, we determine the level of linear relationship between the sales volume depending on the change in the time factor for 2000-2009:

$$Y = 3,319 \times t + 11,776, \quad (3)$$

where Y – sales volume; t – time factor.

As in the previous case, the adequacy of the model was verified using Fisher's ratio test. In fact, the calculated value exceeds the value of the F-ratio, that is, the model is adequate (with a given error 0.05):  $F_{emp} = 123,70 > F_{(0,05; 1; 9)} = 5,12$ ; the parameters are significant:  $t_1 = 11,12$ ,  $t_0 = 5,82 > t_{(0,05; 10)} = 2,26$ . In this case,  $R^2 = 0,93$ .

Substituting the time factor into the obtained formula (3), we determine the calculated indicator of the sales volume. The indicator value for 2010 is UAH 4,987.2 mil.

Then we determine the adjustment index of the empirical calculated indicator to the value obtained as a result of the of new criteria implementation (according to statistical data):



$$k = \frac{55,8}{51,6} = 1,081$$

and update the values of indicators during 2000-2011 according to the calculated index (Table 2.7).

Table 2.7

The adjustment of small business sales volumes of Dnipropetrovsk region during 2000-2010 according to changes in the criteria for the small business definition in 2012

[calculated by the authors]

<b>Year</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Time factor	1	2	3	4	5	6
Calculated indicator of the sales volume, mil. UAH	14,8	19,1	22,0	30,2	30,7	31,1
<b>Year</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
Time factor	7	8	9	10	11	12
Calculated indicator of the sales volume, mil. UAH	40,2	46,0	49,7	45,8	47,4	55,8

Thus, we have the statistical series taking into account the aligning in accordance with the changes in the legislation on the criteria for the small business determination in 2006 and in 2010 and the inflation index. The dynamics of a number of small enterprises sales volume, based on statistical data and taking into account adjustment factor in accordance with changes in the criteria for small businesses definition in 2008 and 2012, is presented in Fig. 2.6.

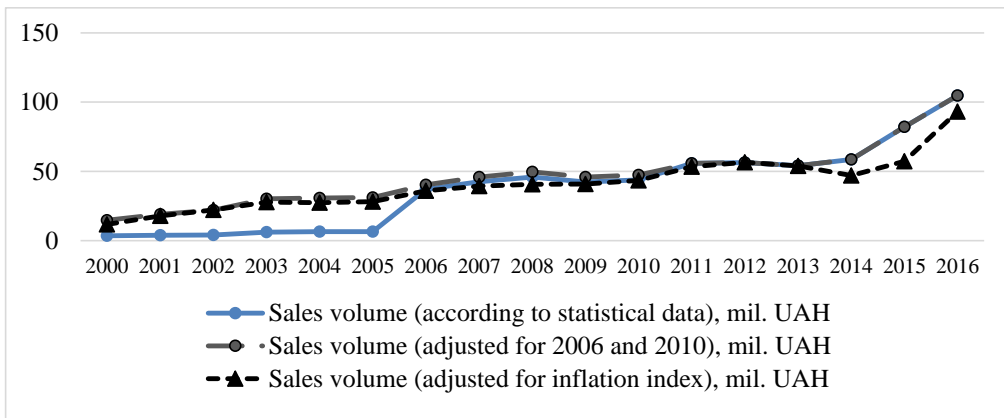


Figure 2.6. The dynamics of a number of small enterprises sales volume, based on statistical data and taking into account adjustment factor in accordance with changes in the criteria for small businesses definition in 2008 and 2012 and the inflation index [developed by the authors]

The analysis shows that statistical reporting does not reflect the true and fear situation of the development of small business. Thus, in 2006 the sales volume of small business exceeded the sales volume in 2005 by 5.7 times, while the number of small enterprises increased by only 5%. Less rapid, but the same one trend is typical for 2011, when the indicator of sales volume went up 1.27 times compared to 2010, and a reduction in the number of small enterprises was 2%. Consequently, the changes have taken place not in the small business activities, but in the criteria for small business definition for statistical reporting.

Significant changes in the dynamics of statistical data of small business development (sales volume) are expected after the introduction of amendments to the criteria for small business definition in accordance with the Law of Ukraine «Concerning the introduction of amendments to the law of Ukraine «On Accounting and Financial Reporting in Ukraine» on improving some of the provisions».

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## **2.4 PERSONNEL – INTELLECTUAL AS A MAKING FORMATIONS ECONOMIC SECURITY OF TRAVEL AGENCIES**

The modern enterprises, carrying out the activity in a services sector, have to realize that their clients become partners in creation of value added and consumer value and, at the same time for their consumers. It directly influences on marketing strategy and key competences of personnel on which formation of economic security of subjects of tourist activity depends. Proceeding from it, the modern enterprises of the sphere of tourist services for achievement of success, formation of economic security and providing a victory in competition are insufficient use of traditional financial management instruments, management of personnel and marketing so far. For the tourist enterprises of ensuring economic security generally depends on mutually beneficial relations between all participant of creation's process of the market offer of a tourist's product. For this reason, effective use of personnel intellectual potential is especially relevant and necessary in ensuring profitable activity and economic security of the tourist enterprises.

In scientific works of such scientists as S.O. Arefiev [2], M.I. Balashov [3], L.I. Hnylytska [5], T.V. Hrynko and O.S. Maksimchuk [6], M.V. Dyshkant [8], L.O. Korchevska [12], V.I. Kutsenko [16], M.V. Makhov [18], V.V. Nemchenko and V.V. Malishevska [21] etc., are taken scalenely up the questions connected to determination of an entity of the concept “economic security”, factors, components and mechanisms of its formation and support. Considerable attention to a research of questions of intellectual and personnel safety of the enterprises, in particular prevention of negative impacts on economic security of the enterprise through the risks and threats connected with personnel, their intellectual potential and the labor relations in general were given in the scientific works by such scientists as S.V. Vasylichak and I.R. Matsiuniak [4], O.M. Kalchenko [9], O.M. Korniienko [11], V.O. Kravchenko [14], O.P. Krupskyi [15], H.Ie. Riabyk [22], V.O. Tkash and O.S. Kamushkov [25]. However, in scientific works of the specified scientists insufficiently where are solved questions connected with justification of a personnel and intellectual component formation of economic security of the enterprises of a services sector, in particular the teurist enterprises, specifics of a field of activity and not capital-intensive and which non-material nature of production of a tourist's product depends on effective use of human resources.

A main objective is justification of influence of a personnel and intellectual component on formation of economic security in the tourist enterprises.

Generalizing scientific views about economic security. It is necessary to understand that the main system of the enterprise and auxiliary, depending on specifics of business, components, complex interaction among themselves which effectively using the growth enterprise available own allows to provide, the attracted and borrowed resources can improve the existing economic potential, strengthen competitive positions in the market and gain income which will answer on planned targets or to exceed its. Using systematic approach in ensuring economic security will allow the enterprise to minimize negative impacts of external and internal environment or to adapt flexibly in change of conditions of business and to achieve the market objectives in the current period and in the future.

The services sector in development of economy and modern society performs two important functions: economic and social. The first, economic function providing purposeful activity of subjects of managing as a result of which the additional benefits in the form of material services are created and also activities for service of process of production of goods in total promotes growth of economic capacity of society (services of transport and communication, service equipment maintenance, legal consultations, services of educational and scientific institutions, consumer services, etc.). The second, social function provides satisfaction of needs of the population for different types of service: housing-and-municipal, medical, cultural and spectacular, safety and normal functioning of the state institutes, protection of public order, etc. [13, p. 14; 20, p. 11].

According to the Qualifier of types of economic activity (AQEA of Ukraine) more than 60 types of economic activity are connected with tourism. So, it is expedient to consider the sphere of tourist services in the following directions: functioning of the tourist enterprise (definition of effective actions for production management and personnel); providing hotel services (services in reception, accommodation, food, improvement in locations) tourist and excursion service (the organization of different types of tourist routes and excursions); the organization of transport travel (use of different types of transport for complex acquaintance with regions, the countries) the organization of specialized rest and entertainments (activity of entertainment complexes) ecological activity (regulation of anthropogenic impact on a natural complex during tourist activity) [10, p. 61].

Resources which use contributes to the development of the sphere of tourist services are: natural, financial, human, enterprise, technical and technological and scientific and also information. These resources of the tourist enterprises which are, actually, ensuring economic security. Resource potential of development of the sphere of tourist services is presented in Fig. 2.7.

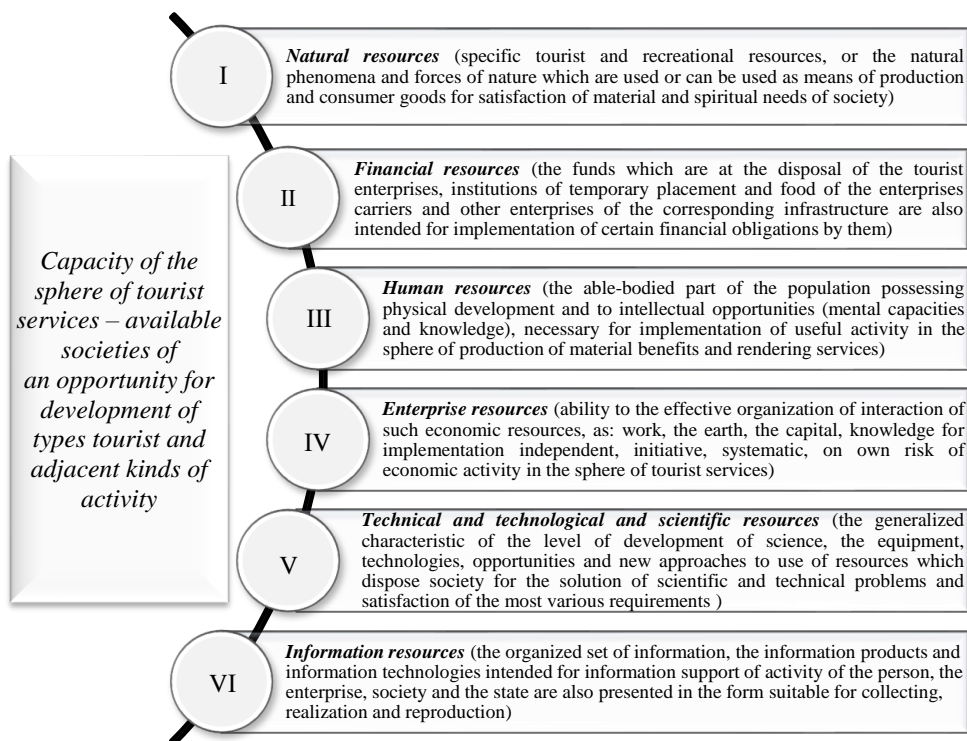


Figure 2.7. Resource potential of development of the sphere of tourist services

[author's development]

Dynamic development of the sphere of tourist services in Ukraine depends on continuous influence of factors of positive and negative character. It is necessary to carry to the first: significant increase in number of the tourist enterprises, institutions of temporary placement and food, enterprises carriers and other enterprises of the corresponding infrastructure; emergency in the domestic market of the foreign competitors having experience of the organization of activity in the sphere of tourist services in the countries; strengthening of the non-state sector of economy, including small and medium business and so forth. Carry rather high level of the competition between the enterprises of the sphere of tourist services to others, in particular between institutions of temporary placement which offer noncompetitive services (hotels and health resorts of times of the USSR); weak response of the domestic enterprises of the sphere of tourist services to the changing conditions consumer demand; shortcomings of the normative legal acts regulating activity of the organizations of the sphere of tourist services, etc. [7; 20; 23; 24].

Ukraine is directed in active way to the European integration, the tourist branch becomes more and more significant determinant of social and economic development. At the same time

insignificant rates of development of tourism, in comparison with other countries, leave Ukraine on rather low rating positions of the world tourist market. Ukraine has considerable natural, historical and cultural, recreational and infrastructure potential, promotes formation of considerable competitive advantages in the offer of a domestic tourist's product. However, today this potential is insufficiently fully used. To the main obstacles, slowing down development of the tourist sphere in Ukraine it is possible to refer political and economic crisis and also ecological, administrative and welfare factors. The general characteristic of subjects of tourist activity of Ukraine is presented in Table 2.8.

The analysis of Table 2.8 allows to draw a conclusion that during the crisis period of 2014-2015, there was an essential reduction of number of subjects of tourist activity, on 703 units, or for-18,1%. As production of tourist services has not capital-intensive character, so in formation of economic security of the tourist enterprises the personnel and intellectual component gains special priority value. Therefore, reduction of number of subjects of tourist activity (legal entities and individual), has led to reduction of highly skilled workers and has led to easing of intellectual potential, in turn, significantly has influenced formation of economic security of the tourist enterprises. At the same time, it should be noted that by all quantitative indices of number of the workers who have remained to work at the enterprises, less than 50% have the higher or secondary vocational education in the field of tourism, also poses a certain threat for economic security of the tourist enterprises. Crisis consequences 2014-2015, which has been caused by serious political and economic factors and had system and destructive character, have significantly influenced players of the market of tourist services, demanding from them development not of the next crisis response measures, but serious structural transformations to branches. All this factors have negatively affected on economic security of the tourist enterprises which are connected with dismissal of personnel on which tourist's product sales volumes and also with reduction of income from providing tourist services depended. At the same time to some tourist enterprises, in particular with the Russian capital (in particular, "Tez Tour", "Pegas Touristik"), it was necessary to leave the Ukrainian market of tourist services.

According to experts, crisis 2014-2015 has turned out to be consequence of the system mistakes caused, first of all, by weakness of the standard legislative base. Studying crisis consequences in the market of tourist services, it should be noted how an important factor, precipitate policy of the leading tour operators, sales volumes at the expense of low prices therefore have formed "a financial pyramid" increased. The last was formed in such a way that, as a rule, it was the share of one completely paid tour from several tens prior to several hundreds of paid tours unpaid in whole or in part.

Table 2.8

## General characteristic of subjects of tourist activity of Ukraine\* [19]

Indicator	2014				2015			
	In total	Including			In total	Including		
		Turoperator	Travel agents	the subjects which are carrying out excursion activity		Turoperator	Travel agents	the subjects which are carrying out excursion activity
<i>Entities</i>								
Number of subjects' tour. activity, piece.	2198	667	1473	58	1785	500	1228	57
Average and registration number of permanent members of staff, persons	9834	5235	4428	171	8086	4131	3799	156
who of them have the higher or secondary vocational education in the field of tourism	4475 (45,5%)	2266 (43,3%)	2140 (48,3%)	69 (40,3%)	3735 (46,2%)	1806 (43,7%)	1862 (49,0%)	67 (42,9%)
Income from providing tourist services, one thousand UAH.	5432673,4	5129201,9	294107,7	9363,8	4797731,6	4233712,6	549791,8	14227,2
Operating expenses, only, one thousand UAH.	5104476,7	4836818,2	258707,8	8950,7	4513433,2	4085140,5	414286,8	14005,9
<i>Individuals-entrepreneurs</i>								
Numbers of subjects of tourist activity, piece.	1687	x	1596	91	1397	x	1319	78
Average and registration number of permanent members of staff, persons	1679	x	1609	70	1502	x	1438	64
Income from providing tourist services, one thousand UAH.	133971,1	x	129572,0	4399,1	217617,6	x	210957,4	6660,2

\* Excluding the temporarily occupied territory of the Autonomous Republic of Crimea, the Sevastopol and part of the area with the anti-terrorist operation.

It is adjusted years in tourism the system of the delayed payments glitches for today which reason were sanctions, currency fluctuations, refusal of banks to re-structure the debts of tour operators and so forth. The reasons can be different, and result one – failure to follow contractual obligations before clients (an indicative example in this case is the policy of the company of tour operator of “Idriska Tour” which has recently gone out of business).

Also it should be noted that according to the Rating of the countries of the world, consisting every two years, on the level of competitiveness of travel and tourism in 2013. Ukraine took the 76th place with the index 3,98, and in 2015 hasn't been presented in this rating at all. It is connected with the fact that the tourist activity is very sensitive to external cataclysms therefore events of 2014. (Political and tragic events in Ukraine, bankruptcy of tour operators and travel agents, sharp fluctuations of exchange rates) have negatively affected the general assessment of tourist appeal of Ukraine in 2014-2015.

Considerable problem of the modern tourist field of Ukraine is, first, low-quality advance of national tourist products in the world market, secondly, discrepancy of reality of spreading information in world media about political and economic crisis and escalation of the conflict in the east of Ukraine. Such asymmetry of information is connected with the fact that, first, the military conflict in Ukraine is local and doesn't extend to zones of an arrangement of the vast majority of the tourist objects which are of special interest for foreign tourists, secondly, in the territory of Ukraine for tourists the maximum security measures of stay are guaranteed and the corresponding tourist infrastructure is created. Dynamics of tourist flows by the number of citizens of Ukraine who went abroad by the number of the foreign citizens who have visited Ukraine and by the number of the tourists served by subjects of tourist activity of Ukraine is given in Table 2.9.

The analysis of tourist flows to Ukraine for 2000-2016 (tab. 2.9) indicates the intensity of processes. According to State Border Guard Service of Ukraine, total amount of entrance and exit tourists in 2014 is 35,2 million people, that is for 38% lower than an indicator of 2013. Almost same indicators are noted also in 2015 – 35,6 million people. The person, that is for 6,7% less than an indicator of 2016 – 38,0 million people. It should be noted that with simultaneous increase in number of citizens of Ukraine who went abroad in 2016, insignificant increase in number of the foreign tourists who have visited Ukraine. It is observed that the tendency of increase in capital outflow from Ukraine remains. The leading countries on reception of directly tourist flows from Ukraine by results 2014-2016. There were Egypt, Turkey, Slovakia and Hungary. The popularity specified to the tourist directions among the Ukrainian tourists is connected with rather low cost of tours and active, in some cases even aggressive, advertising policy of the main players of the market of tourist services concerning these countries.



Table 2.9

## Tourist flows, person [19]

Year	The number of Ukrainian citizens traveling abroad – total <sup>2</sup>	The number of foreign citizens who visited Ukraine – total <sup>2</sup>	The number of tourists served by the subjects of tourist activity of Ukraine-total	Including		
				foreign tourists	tourists-citizens of Ukraine who traveled abroad	domestic tourists
2000	13422320	6430940	2013998	377871	285353	1350774
2001	14849033	9174166	2175090	416186	271281	1487623
2002	14729444	10516665	2265317	417729	302632	1544956
2003	14794932	12513883	2856983	590641	344 332	1922010
2004	15487571	15629213	1890370	436311	441798	1012261
2005	16453704	17630760	1825649	326389	566942	932318
2006	16875256	18935775	2206498	299125	868228	1039145
2007	17334653	23122157	2863820	372455	336049	2155316
2008	15498567	25449078	3041655	372752	1282023	1386880
2009	15333949	20798342	2290097	282287	913640	1094170
2010	17180034	21203327	2280757	335835	1295623	649299
2011	19773143	21415296	2199977	234271	1250068	715638
2012	21432836	23012823	3000696	270064	1956662	773970
2013	23761287	24671227	3454316	232311	2519390	702615
2014 <sup>1</sup>	22437671	12711507	2425089	17070	2085273	322746
2015 <sup>1</sup>	23141646	12428286	2019576	15159	1647390	357027
2016 <sup>1</sup>	24668233	13333096	2549606	35071	2060974	453561

1 Without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea, the Sevastopol and parts of the zone with the anti-terrorist operation

2 Including one-day visitors (according to the Administration of the State Border Guard Service of Ukraine)

In order that tourism became one of the most developed branches of Ukraine it is necessary to popularize internal tourism, to systematically conduct active advertising campaigns as in Ukraine, and abroad, to develop programs of involvement of foreign tourists, to develop tourist infrastructure and so forth. The lack of such actions leads to the fact that most of tourists don't possess information about the tourist and recreational capacity of Ukraine.

We will note that it is rather difficult for tourist enterprises to differentiate accurately production, marketing, service and consumption of services on separate processes. These

processes are interconnected among themselves and at their implementation all are used in Fig. 2.7 types of resources that are given in figure and also there is a direct contact and interaction between producer (producer) of service and its consumer (recipient) which contact personnel, so-called “front office” or personnel have to provide the front line.

In our judgement, the staff of the front office or a contact staff is the customer-oriented managers and specialists of the enterprise providing establishment and maintenance of the long mutually advantageous communications with internal and external contact audiences for achievement of the marketing purposes of the enterprise. That is, it is the experts who are realizing direct interaction with end users of services create, offer and sell service, create the database, accompany with the client.

The contact staff (front office), except implementation of direct interaction with the client in the course of his service, provides the organization of operation of the servicing and support personnel, realizes registration of the contractual relations and creates the client database. Therefore, we are happy, devoted to business and motivated employees the front line being important as in processes of the organization of interaction with the client, formation at it the benevolent relation to the enterprise, owing to receiving high-quality service, and in the course of formation of an economic safety of the tourist enterprise.

It should be noted that especially important for implementation of effective marketing activity of the tourist enterprises adjustment of bilateral mutually beneficial relations with all contact audiences – the state institutes, the enterprises, public organizations and individuals is, show real interest in activity of the enterprise and can influence achievement of the marketing purposes by him.

Interaction of contact personnel of the tourist enterprises with various contact audiences for the nature of action and frequency of contacts it is shown in Table 2.10.

The contact personnel of the enterprises of the sphere of tourist services do their activity by respect for such principles of marketing as: a direct priority of the consumer (satisfaction of his individual requirements and obtaining the expected result), strengthening of a role of communications and information (adaptability by Wednesday, the speed and initiative in decision-making), creativity (creation of a new unique product and providing high-quality service and service taking into account current trends and technologies). It is turning these demands to a constant introduction of innovations in this sphere.

On the other hand, ensuring economic security of the enterprises of the sphere of tourist services, except such components as financial, technological, information, legal, economic, power (physical safety of workers), social, etc., more depends on intelligence and a set of competences of the personnel working at the enterprise.

Table 2.10

## Interaction of contact personnel with contact audience's tourism enterprises

[author's development]

Contact Area Staff	Contact us the audience	Nature contact (actions)	Periodicity contact
<b>Front office (call center, specialist directly provide service and contact with consumers)</b>	financial and credit institutions	opening of accounts, settlement and cash servicing, execution of other transactions and execution of other financial documents	periodic and permanent contact
	consumers	identifying needs, ordering, creating, offering and selling services, additional clarification on the technology of providing services, providing guarantees, answering requests and complaints (if necessary)	
	staff	creative interaction between different units in order to meet their own and "alien" interests	
	mass-media	provision of information on the competitive advantages of the services of the enterprise	
	State institutions	clarification of information and preparation of reports on the results of inspections	
	local community	realization of joint projects, provision of consultations and participation in projects, coordination of actions	
	intermediaries	clarification of the terms of the agreement, participation in the settlement of disputes, incl. in court	

Thus the quality of the offered tourist services, both at the time of their granting, and at the time of their direct consumption depends on personal characteristics and professional competences of contact personnel. It is turning the intellectual potential and creative abilities of personnel, also a non-material asset of the tourist enterprise on which his profitable activity and economic security depends.

The tourist service as well as the substantiated goods, must satisfy most fully specific needs of customers, has the realistic price, to be offered through convenient distribution channels and to move ahead actively. Depending on it, it is expedient to tourist enterprises to use model of the integrated marketing of services, integrates eight strategic variables "8P" [17]:

- 1) product (service and additional service);
- 2) place (including cyberspace) and service provision time;
- 3) process (a technique and the sequence of the actions ensuring effective functioning of operating systems);
- 4) productivity and quality (how effectively the resources used turn into the results having consumer value; as far as this or that tourist service satisfies the consumer as far as she coincides with his expectations and corresponds to requirements);

5) personnel (that provides direct interaction with the consumer and on which the quality of service and profitable activity of the enterprise depends);

6) promotion, advertising and training of the consumer (providing the consumer with necessary information, beliefs of the target consumer in advantages and benefits of receiving service and his stimulation to certain actions);

7) physical evidence (appearance of the place of providing service, the equipment, printed materials, etc., that is all that serves as the physical, material evidence of quality of services and process of service);

8) price and other expenses of clients (except traditional actions of price policy, are considered and whenever possible decrease, other expenses which are incurred by consumers at acquisition and consumption of tourist services and services of excursion service).

Joint efforts and close interrelation between all components of model of the integrated marketing of services are a necessary condition for the maximum requirements satisfaction of the consumer and achievement of enterprise success in the market [17, p. 50]. In activity of the modern tourist enterprises of purpose of a marketing complex purpose of each marketing tool, from the point of view of the services consumer, focused on increase in its benefit consists in formation of consumer value and the solution of a purchasing problem on a target segment.

The quality of the majority of tourist services is derivative of intelligence, a set of competences, experience and knowledge of contact personnel of motives, expectations and individual values of the client and also spending for rendering service time. So, the operated resources of the tourist enterprise, the most influencing formation of economic security personnel (human resources) and other non-material, including intellectual assets (which can be reflected in balance). From this point of view on the management of marketing activity in the tourist enterprises field, it is possible to divide into two components conditionally: the first of them is connected with development and management of assets of the enterprise, which offers services; the second is connected with impact on contact personnel and its relationship with clients (internal marketing).

For the tourist enterprises of quality management of services has to occur taking into account two aspects. On the one hand, the consumer has to receive from the enterprise-service oriented truthful and real promises concerning quality of tourist services with use of the integrated marketing communications and mechanisms of advance. On the other hand, marketing technologies and tools have to provide to the enterprise feedback with consumers and other contractors first of all for understanding of their expectations, formation of the appropriate marketing programs and modification of characteristics (specifications) of quality of services.

Activity of the tourist enterprise in the market and its economic security are connected with emergence of problems. For adoption of the qualitative decisions aimed at the solution of problems and ensuring economic security of the tourist enterprises. It is necessary to form the balanced and efficient complementary team of managers at the enterprise. Also we may consider that in any team the opportunism to changes exists; and collisions of interests of workers, different styles of thinking and behavior therefore it is inevitable the emergence of the conflicts. Therefore, success of any system can be provided by means of one indicator – a ratio between external integration and internal disintegration (formula 1) [1, p. 185], or external and internal marketing (formula 2) [1, p. 129].

In external integration I. Adizes understands extent of integration of system (organization) into the external environment, degree of compliance of abilities which are possessed by system (organization), to requirements of an external environment. Internal disintegration, according to his mind, is the constraining force for which it is necessary to spend energy before the desirable result is received from system [1, p. 185].

$$\begin{array}{c}
 \text{opportunities} \\
 \text{ability} \swarrow \quad \nwarrow \\
 \text{Success} = f \left\{ \frac{\text{external integration}}{\text{internal disintegration}} \right\} \quad (1) \\
 \uparrow \\
 \text{mutual trust and respect} \\
 \hline
 \begin{array}{cccc}
 \uparrow & \uparrow & \uparrow & \uparrow \\
 \text{Vision,} & \text{Structure} & \text{Process} & \text{People} \\
 \text{mission,} & & & \\
 \text{values} & & & 
 \end{array}
 \end{array}$$

At the same time, external marketing is defined by quantity of resources, the organization puts in identification and a requirements satisfaction of external clients, and internal marketing, according to I. Adizes, is defined by amount of the administrative energy necessary in order that in the organization took place desired an event. That is, external marketing is a function, including such variables as market segmentation and commodity differentiation, and internal marketing is a function of mutual respect and trust. At the same time the definition “trust” should be treated as belief in existence of the common long-term interests, and “respect” as recognition of sovereignty of other party, recognition of the right of other person to be oneself, the right to have the opinion another than opinion of other person.

$$\text{Success} = f\left\{ \frac{\text{external marketing}}{\text{internal marketing}} \right\} \quad (2)$$

The essence of trust which it is impossible to estimate qualitatively or quantitatively that, dispersing in details, the team is uniform in the strategic interests, and the respect for others opinion allows to consider all nuances and to make the qualitative administrative decision. Therefore, if at the enterprise there is no mutual respect or trust, then power consumption on implementation of internal marketing will be too high [1, p. 129], it will negatively affect the relations in collective, quality of the offered services, on reduced income and, at the end, on deterioration in economic security of the enterprise.

The main objective of any enterprise of the sphere of tourist services for the organization and implementation of effective operating activities is optimization of processes of management of human resources. The specifics of activity of the enterprises of the sphere of tourism, not capital-intensive and the non-material nature of their production depend on effective use of human resources, in formation of economic security in the tourist enterprises that gain special priority value. Thus, ensuring economic security of the tourist enterprises and balance in the system of the relations between all participants of creation of consumer value of services can be reached only due to introduction of marketing business management and personnel.

The personnel of the tourist enterprises come into the first contact with the consumer, allow it to create the first impression and formulate expectations from the offered service, provide direct interaction with the consumer in the course of service and also it depends on, in most cases, the quality of service. For this reason, a personnel and intellectual component directly influence to the level of economic security of the tourist enterprises. It is necessary for referring to negative impacts on a personnel and intellectual component of formation of economic security of the tourist enterprises: outflow and turnover of staff; physical aging of shots, their knowledge, qualifications; low qualification of shots; work in combination which is usually connected with low return of the worker and possible leakage of confidential information out of limits of the enterprise.

Delegation contact personnel of powers, with providing right of access to use of the available resources, opportunities independently and quickly making decisions in the course of service of consumers and to form at it innovative competences will allow to increase productivity, so both effectiveness and competitiveness of the enterprise that provides services. Therefore, for formation and ensuring economic security of the tourist enterprises of top management it is necessary to build relationship with contact personnel on the basis of partner marketing. This perspective will become subject to the following scientific research.

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## **2.5 MECHANISMS FOR OPTIMIZING REDISTRIBUTION OF PROFIT OF THE MARKET ENTITIES**

In this section of the monograph we consider highlights of a certain view on the problem for search of mechanisms of economic security of Ukraine. We remember that we have the right to make mistakes, but also, we remember about a civic duty to look for alternative solutions for economic security of the whole country. We express our vision on the tabulated directions of scientific thought. In it we see the both civic and scientific stand and also some advantages not only for the authors personally. We will talk about the mechanism of economic management, which, at first glance, seems rather controversial in terms of market (liberal) economy. But this mechanism is quite marketable, because it can effectively work, in our opinion, both in the direction of economic development and in the direction of improving national security of the country exclusively only in the conditions functioning of the economy on market principles. At the initial stage of our textual presentation of the problem it is too early to define the essence of the mechanism, which is proposed, because market economic theory has never considered the mechanisms of market management under such point of view. We propose this material for the purpose of a possible, in the future, not politically biased, but scientifically-directed discussion.

The essence of market management in line with theoretical fundamentals of classical political economy is based on unlimited freedom of private initiative and business relations, which leads to the formation of a mechanism of free competition, which is regulated by the market [1, p. 212]. It was meant by Smith when he spoke about "invisible hand" which leads the market. "By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it" [3, p.322].

Since the end of XIX century "... Free competition capitalism has become a corporate, monopolistic, according to modern terminology — oligarchic, which has changed the structure of ownership and its role in the economy. Small and medium-sized enterprises, usually individually owned, or affiliated with two or more persons, account for 80% of all enterprises in the United States, but account for 12% of business turnover. At the same time, the share of powerful corporations accounts for 88% of business turnover [5, p. 72]. As you can see, with the huge spread of small and medium business the defining role in development of economy belongs to large business. Such new structure of subjects of the market causes essential changes in a market mechanism. Instead of the perfect competition that prevailed in the previous stages, large monopolies, which dominate in the market, define conditions of his functioning for its own



benefit. The limited quantity them allows them to divide spheres of influence and to dictate the prices of the production, there is market monopolization. Respectively, the competition stops being perfect and the general. The prices are defined not by supply and demand, but by force of the dominating corporations" [1, p. 213].

Such condition of the market relations, we call it corporate-oligarchic, exists in modern world market space including national Ukrainian economy, slows down the economic development of Ukraine and becomes economically dangerous for the country. Such condition of the market relations has induced us to present for consideration of scientific community, according to us new, or, at least, the alternative mechanism of economic security management for the countries which don't belong to developed economy as economy of the United States, Germany or Great Britain. The situation is contradictory in economic terms and is threatening for the country's development, when the determining role belongs to large business in Ukraine, and, consequently, a large share of the national income is accumulated among representatives of large business. Part of this profit, which actually returns to the business turnover of its country, is extremely insufficient. Ukraine, and any national economy cannot have a ownership structure that directly affects the redistribution of profits, such as in the United States, and at the same time have a GDP of 0.005% of the US GDP (as for 2016, Ukraine's GDP is 93.27 billion dollars, the US GDP is 18570,0 billion dollars). The Ukrainian economy needs an effective mechanism for redirecting the profits of economic residents for the needs and development of the national economy. Market economy both in theory and in practice presupposes and legislatively builds up the activities of service or commodity-producing business entities (enterprises, firms, associations, etc.) as profit-oriented commercial organizations. In other words, the enterprise is a financial and economic entity that concentrates and uses resources to produce goods and services for profit. In the previous sentence-definition before a subject "entity" has appeared its characteristic — "financial and economic" that means, first of all, the monetary and financial goal of the enterprise's activities, that is, the receipt by the enterprise, firm, profit in cash, and only after that, an economic component — production of goods. Thus, profit in monetary measurement is the main and only objective of any market-oriented institutions in the modern economy. The profit reception is the main motivation that encourages an individual, a group of individuals to organize and maintain current production, trading, servicing, and other profitable activities. That is why this financial and, at the same time, economic indicator — profit, as a rule, neither theoretically, nor legally in quantitative definition isn't limited. It should be noted that the restriction of the amount of profit is not inherent in the business entity according to its endogenous (internal) positions of activity. But among the exogenous (external) factors that

affect the amount of the profit of the enterprise and limit its profit, the main is the market price of the product or service, which is formed, mainly, by factors independent of the activities of enterprises. Therefore, for profitable business entities, the main way to increase profits is to reduce the costs of production for products or services, because the selling price of a manufactured product exists as an already accomplished fact.

In the areas of monetary and financial support for the production (trading, servicing, etc.) activities of a profitable enterprise, in addition to the profit indicator, there is another indicator that is neither practically nor legally limited in its quantitative growth, it is wages, or remuneration to employees. According to the legislation existing in Ukraine the salary is limited from below; it has a minimum, but has no upper limits, it can have any amount but not less minimum. There is quantitatively neither minimum nor maximum for remuneration. Also pay attention to the fact that the indicator of the wages amount is the cost of the enterprise along with other costs, such as raw materials, materials, components, energy and so on.

Consequently, the price of goods, services is determined, in the general structured financial construction, as a sum of costs and profits. Or, the amount of profit is determined by the difference between the price of the sale of goods and the costs of its production. It is appropriate to consider the structure of the price as the sum of costs and profits, in which the price is exogenous feature, that is, the top price limit, and as a result, the external regulator of profits. And on the part of the enterprise the source and regulator of profit increase are the costs of the enterprise in its full amount. Economically and financially justified by the enterprise becomes the need to reduce costs, which automatically increases the profit of the enterprise, as the model "price equals profit plus costs" is limited from the outside — fixed from the outside or regulated by the market [5, pp. 167-168]. The goal of profits maximizing is also achieved by reducing or not raising of the wages. In conditions when reserves of economical use of raw materials, energy carriers, minimal depreciation have already worked out, already have a technologically acceptable minimum, the only source of cost reduction is wages. Thus, there is an interdependence and mutual influence between two financial and economic indicators, which do not have an upper limit in their growth. The interdependence and mutual influence between the indicators of wages and profit are inversely proportional: a decrease in wages leads to an increase in the profit of the business entity and an increase in wages leads to a decrease in the profit of the business entity. Such interdependence and mutual influence between indicators of wages and profits caused by the market system, because the model "price is equal to profit plus costs" is inherently closed, "clogged" by the market, on which the price of the product is formed. So, answer the rhetorical question now: "If a dilemma becomes a businessman's (owner of an enterprise, an oligarch, etc.) to increase wages, that will lead to a decrease in profits, or to increase profits by

reducing wages? What will the owner (founder, organizer) of such an enterprise choose? ". As a rule, the option of increasing profits is chosen, since it was with this purpose that the business entity was created by the entrepreneur. Quite natural for a market economy is the effort of business to maximize profits by paying low wages and rewards, by redundancy and etc. But gradually, over the years, as the effect of accumulation, an economic contradiction arises which undermines bases of economic activity that functions on the base of the market relations. Finally, those who receive the salary and who are subjects of the market, form solvent demand for goods and services which are made by the profitable manufacturing enterprises. Thus, the increase in profits due to the reduction of wages leads to decrease of demand that leads to closing up of the production, to the redundancy and, as a result, to a further decrease of effective demand. It should be noted that the solvent market demand is created by employees with the money of their wages, and not by business holders owning income from a part of the profits (dividends) or personifying fully all the profits of their enterprise. Within the national economy, an uncontrolled imbalance from the direction of a steady flow of money from the monetary aggregate of "wages" and "remuneration", accumulated and spent by employees, to the direction of transferring money to the business category "profit" leads to future crisis phenomena.

Now, after the arguments and explanations given above, we will express the proposal that we promised to express at the beginning of the article.

Our position is the legal restriction of profit by setting the upper margin of profitability.

We will start explaining this proposal by using a simulated example. In order to understand the new theoretical proposals, which are published, the way of presenting and explaining the essence of the proposals by using of simulated examples is quite common in economics and finance.

There is a certain process of production of the imagined batch of goods, characterized and described by the indicators collected in Table 2.11. Table 2.11 describes the case when the amount of profit arises in fact, depending on the price of the goods in the market. The profitability is 50% in such a market-actual case. In the following Tables 2.12–2.15 we normatively restrict the profit for the enterprise: 40% (Table 2.12), 30% (Table 2.13), 20% (Table 2.14), 10% (Table 2.15), but such restriction of profitability don't influence market prices of sale. The prices of sale are invariable and therefore, sales proceeds and income of the enterprise don't change (position No. 10 in the Tables 2.11–2.15). Also, positions 1, 2, 6, 7, and mentioned 10 are invariable and therefore they are highlighted with bold type. According to the example, all net profit is directed to dividend payment. On the other hand, in the example, in the context of the limited profit that we are offered as a regulatory proposition, part of the income from the profit structure is directed to increase the salary.

There are some informative reminders. First, in the general economic sense, profit is the difference between gross income (including sales proceeds) and the economic costs of the enterprise of such goods producing. This concept is defined as an economic profit. However, entrepreneurs do not use the economic concept of profit in practical activities, but accounting. Accounting profit is the difference between gross income and accounting (external) costs, or, in other words, the growth of the company's own capital for a certain period of its activity. Accounting profit has two main forms: total, or balance, profit is the entire profit of the enterprise; and net profit is the profit that remains at the disposal of the enterprise after paying taxes and is usually used to create a fund of payments to the company's owners (dividends, interest), for replenishment of the reserve and authorized funds, for investments, etc. There is a new, different from the above definitions of profit in our research, namely, market profit. Market profit is calculated under the condition when profit limitation by fixing profitability is absent. Secondly, the calculation of the tax burden on the personal income in the form of dividends, calculated (paid) by a legal entity which is a payer of the corporate profit tax in favor of an individual, is presented in line 13/1 in Tables 2.11 to 2.15, included in its total monthly (annual) taxable income and is taxed on income of individuals at the rate of 5% and military tax at the rate of 1.5% (according to the current tax legislation of Ukraine in 2017).

We will compile the final table, Table 2.16 on the basis of the calculations provided in Tables 2.11–2.15. Analyzing this Table 2.16 we can draw some interesting conclusions.

The resulting indicators of only one of the possible options for optimizing redistribution of market profit are collected in the Table 2.16. We are talking about redistribution of the amount of market profit between the total, accounting profit, which is formed in accordance with a fixed level of profitability, and its (market profit) residual part, which are joined wages fund. Thus, the mechanism of fixed profitability allows influencing the growth of wages, rewarding, etc. (see line 4 of the Table 2.16) by reducing the payment of corporate dividends (see line 5 of the Table 2.16). This is the mechanism of redistribution of a part of profit of business entities directly to the sphere of household or employees income, passing the sphere of bank crediting. Tax revenues of budget not significantly, but nevertheless grow (see the line 3 of the Table 2.16). The last line is interesting in the Table 2.16, the total amount of payments to individuals (salaries plus dividends) has a decreasing trend. The indicators, which are in the column with a fixed profitability of 10%, attract attention. This rate of profitability is unacceptable because the net profit is fully spent for the VAT payment. Therefore, in our opinion, a fixed rate of profitability cannot be less than 20% with a VAT rate of 20%.

Table 2.11

Economic indicators for the production of batch of imagined products (goods) at the rate of profitability, which is the maximum possible in the market

(According to the current tax legislation of Ukraine in 2017), thousand UAH

Position №	FS item	Symbolic notation	The sum, UAH	Including taxes and other obligatory payments
1.	<b>Raw materials, semi-finished products, components, etc.</b>		<b>400.0</b>	
2.	<b>Energy sources and heating</b>		<b>200.0</b>	
3.	Salaries / Salaries after tax	S	150.0 / 120.75	29.25(personal income tax - 18% + military tax -1.5%)
4.	Tax accruals on salaries – 22%	TAS	33.0	33.0
5.	<b>Depreciation</b>		<b>67.0</b>	
6.	<b>Other variable costs (including other taxes charged to expenses)</b>		<b>50.0</b>	<b>10.0</b> – (for example – environmental tax, etc.)
7.	<b>Other fixed costs (including other taxes charged to expenses)</b>		<b>100.0</b>	<b>20.0</b> (for example – land tax, etc.)
	Cost of goods sold	CGS	1000.0	
8.	Profitability (actual, depending on the selling price), %	P	50%	
9.	Accounting profit	AP	500.0	
10.	<b>Sales proceeds (income) of the batch of imagined goods (by actual price prevailing on the market)</b>	SP	<b>1500.0</b>	
	Value added tax (paid) – at the rate of 20%	VAT	130.0	130.0
11.	Corporate profit tax – 18%	CPT	66.7	66.7
12.	Net profit	NP	303.3	
13.	Distribution of net profit: – consumption funds (see 13/1); – accumulation funds (development funds), see 13/2;		303.3 –	
13/1.	Consumption funds: – dividend fund / post-tax payment; – material incentive fund; – welfare fund.	Dvd – –	303.3/28 3.6 – –	19.7 (personal income tax -5% + military tax - 1.5%)
13/2.	accumulation funds (development funds): – surplus fund; – development fund (investment).	– –	– –	
	Total taxes payable:			308.9
	Total paid to individuals in the form of salaries and dividends, including: – salaries (or remuneration) – dividends.	PI (personal income)	404.35 120.75 283.6	

Table 2.12

Economic indicators for the production of batch of imagined products (goods)

at the rate of profitability 40 %

(According to the current tax legislation of Ukraine in 2017), thousand UAH

Position №	FS item	Symbolic notation	The sum, UAH	Including taxes and other obligatory payments
1.	<b>Raw materials, semi-finished products, components, etc.</b>		<b>400.0</b>	
2.	<b>Energy sources and heating</b>		<b>200.0</b>	
3.	Salaries / Salaries after tax	S	208.2 / 167.6	40.6 (personal income tax -18% + military tax - 1.5%)
4.	Tax accruals on salaries – 22%	TAS	45.8	45.8
5.	<b>Depreciation</b>		<b>67.0</b>	
6.	<b>Other variable costs (including other taxes charged to expenses)</b>		<b>50.0</b>	<b>10.0</b> – (for example – environmental tax, etc.)
7.	<b>Other fixed costs (including other taxes charged to expenses)</b>		<b>100.0</b>	<b>20.0</b> (for example – land tax, etc.)
	Cost of goods sold	CGS	1071.0	
8.	Profitability is fixed, but the price remains the same, %	P	40%	
9.	Accounting profit	AP	429.0	
10.	<b>Sales proceeds (income) of the batch of imagined goods (by actual price prevailing on the market)</b>	SP	<b>1500,0</b>	
	Value added tax (paid) – at the rate of 20%	VAT	130.0	130.0
11.	Corporate profit tax – 18%	CPT	53.8	53.8
12.	Net profit	NP	245.2	
13.	Distribution of net profit: – consumption funds (see 13/1); – accumulation funds (development funds), see 13/2;		245.2 –	
13/1.	Consumption funds: – dividend fund / post-tax payment; – material incentive fund; – welfare fund.	Dvd – –	245.2/ 229.26 – –	15.94(personal income tax -5% + military tax - 1.5%)
13/2.	accumulation funds (development funds): – surplus fund; – development fund (investment).	– –	– –	
	Total taxes payable:			316.14
	Total paid to individuals in the form of salaries and dividends, including: – salaries (or remuneration) – dividends.	PI (personal income)	396.86 167.6 229.26	

Table 2.13

Economic indicators for the production of batch of imagined products (goods)

at the rate of profitability 30%

(According to the current tax legislation of Ukraine in 2017), thousand UAH

Position №	FS item	Symbolic notation	The sum, UAH	Including taxes and other obligatory payments
1.	<b>Raw materials, semi-finished products, components, etc.</b>		<b>400.0</b>	
2.	<b>Energy sources and heating</b>		<b>200.0</b>	
3.	Salaries / Salaries after tax	S	276.23 / 222.37	53.86(personal income tax-18% + military tax - 1.5%)
4.	Tax accruals on salaries – 22%	TAS	60.77	60.77
5.	<b>Depreciation</b>		<b>67.0</b>	
6.	<b>Other variable costs (including other taxes charged to expenses)</b>		<b>50.0</b>	<b>10.0</b> – (for example – environmental tax, etc.)
7.	<b>Other fixed costs (including other taxes charged to expenses)</b>		<b>100.0</b>	<b>20.0</b> (for example – land tax, etc.)
	Cost of goods sold	CGS	1154.0	
8.	Profitability is fixed, but the price remains the same, %	P	30%	
9.	Accounting profit	AP	346.0	
10.	<b>Sales proceeds (income) of the batch of imagined goods (by actual price prevailing on the market)</b>	SP	<b>1500.0</b>	
	Value added tax (paid) – at the rate of 20%	VAT	130.0	130.0
11.	Corporate profit tax – 18%	CPT	38.88	38.88
12.	Net profit	NP	177.12	
13.	Distribution of net profit: – consumption funds (see 13/1); – accumulation funds (development funds), see 13/2;		177.12 –	
13/1.	Consumption funds: – dividend fund / post-tax payment; – material incentive fund; – welfare fund.	Dvd – –	177.12/ 165.61 – –	11.51(personal income tax -5% + military tax - 1.5%)
13/2.	accumulation funds (development funds): – surplus fund; – development fund (investment).	– –	– –	
	Total taxes payable:			325.02
	Total paid to individuals in the form of salaries and dividends, including: – salaries (or remuneration) – dividends.	PI (personal income)	387.98 222.37 165.61	

Table 2.14

Economic indicators for the production of batch of imagined products (goods)

at the rate of profitability 20 %

(According to the current tax legislation of Ukraine in 2017), thousand UAH.

Position №	FS item	Symbolic notation	The sum, UAH	Including taxes and other obligatory payments
1.	<b>Raw materials, semi-finished products, components, etc.</b>		<b>400.0</b>	
2.	<b>Energy sources and heating</b>		<b>200.0</b>	
3.	Salaries / Salaries after tax	S	355.0 / 285.77	69.23(personal income tax-18% + military tax - 1.5%)
4.	Tax accruals on salaries – 22%	TAS	78.0	78.0
5.	<b>Depreciation</b>		<b>67.0</b>	
6.	<b>Other variable costs (including other taxes charged to expenses)</b>		<b>50.0</b>	<b>10.0</b> – (for example – environmental tax, etc.)
7.	<b>Other fixed costs (including other taxes charged to expenses)</b>		<b>100.0</b>	<b>20.0</b> (for example – land tax, etc.)
	Cost of goods sold	CGS	1250.0	
8.	Profitability is fixed, but the price remains the same, %	P	20%	
9.	Accounting profit	AP	250.0	
10.	<b>Sales proceeds (income) of the batch of imagined goods (by actual price prevailing on the market)</b>	SP	<b>1500.0</b>	
	Value added tax (paid) – at the rate of 20%	VAT	130.0	130.0
11.	Corporate profit tax – 18%	CPT	21.6	21.6
12.	Net profit	NP	98.4	
13.	Distribution of net profit: – consumption funds (see 13/1); – accumulation funds (development funds), see 13/2;		98.4 –	
13/1.	Consumption funds: – dividend fund / post-tax payment; – material incentive fund; – welfare fund.	Dvd – –	98.4/ 92.0 – –	6.4 (personal income tax -5% + military tax - 1.5%)
13/2.	accumulation funds (development funds): – surplus fund; – development fund (investment).	– –	– –	
	Total taxes payable:			335.23
	Total paid to individuals in the form of salaries and dividends, including: – salaries (or remuneration) – dividends.	PI (personal income)	377.77 285.77 92.0	



Table 2.15

Economic indicators for the production of batch of imagined products (goods)

at the rate of profitability 10 %

(According to the current tax legislation of Ukraine in 2017), thousand UAH

Position №	FS item	Symbolic notation	The sum, UAH	Including taxes and other obligatory payments
1.	<b>Raw materials, semi-finished products, components, etc.</b>		<b>400.0</b>	
2.	<b>Energy sources and heating</b>		<b>200.0</b>	
3.	Salaries / Salaries after tax	S	448.36 / 360.93	87.43(personal income tax-18% + military tax - 1.5%)
4.	Tax accruals on salaries – 22%	TAS	98.64	98.64
5.	<b>Depreciation</b>		<b>67.0</b>	
6.	<b>Other variable costs (including other taxes charged to expenses)</b>		<b>50.0</b>	<b>10.0</b> – (for example – environmental tax, etc.)
7.	<b>Other fixed costs (including other taxes charged to expenses)</b>		<b>100.0</b>	<b>20.0</b> (for example – land tax, etc.)
	Cost of goods sold	CGS	1364.0	
8.	Profitability is fixed, but the price remains the same, %	P	10%	
9.	Accounting profit	AP	136.0	
10.	<b>Sales proceeds (income) of the batch of imagined goods (by actual price prevailing on the market)</b>	SP	<b>1500.0</b>	
	Value added tax (paid) – at the rate of 20%	VAT	130.0	130.0
11.	Corporate profit tax – 18%	CPT	1.08	1.08
12.	Net profit	NP	4.92	
13.	Distribution of net profit: – consumption funds (see 13/1); – accumulation funds (development funds), see 13/2;		4.92 –	
13/1.	Consumption funds: – dividend fund / post-tax payment; – material incentive fund; – welfare fund.	Dvd – –	4.92/ 4.6 – –	0.32 (personal income tax -5% + military tax - 1.5%)
13/2.	accumulation funds (development funds): – surplus fund; – development fund (investment).	– –	– –	
	Total taxes payable:			347.47
	Total paid to individuals in the form of salaries and dividends, including: – salaries (or remuneration) – dividends.	PI (personal income)	365.53 360.93 4.6	

Table 2.16

## The effect of fixed profitability on the company's total indicators

Indicator, (see Tables 2.11–2.15)	Profitability:				
	50% (not fixed, factual, norm)	fixed at the rate of:			
		40%	30%	20%	10%
Sales proceeds (income) of the batch of imagined goods (by actual price prevailing on the market), thousand UAH	1500,0	1500,0	1500,0	1500,0	1500,0
Net profit, thousand UAH	303,3	245,2	177,12	98,4	4,92
taxes and other obligatory payments in total, thousand UAH	308,9	316,14	325,02	335,23	347,47
Salaries paid, thousand UAH	120,75	167,6	222,37	285,77	360,93
Dividends paid, thousand UAH	283,6	229,26	165,61	92,0	4,6
Total paid to individuals in the form of salaries and dividends, thousand UAH	404,35	396,86	387,98	377,77	365,53

In our opinion, the proposal to limit profits by setting the upper margin of profitability is a mechanism of state regulation (increase or decrease) of mass effective demand. In turn, under the market laws an inevitable response to the growing demand will be the further growth of the supply of goods from commodity producers. And the current mechanism, which is the mechanism which doesn't limit profit on the contrary, is a mechanism for a steady decline in the overall mass demand. By mass demand we understand, for example in Ukraine, the solvency of 80-90% of the able-bodied population of the country, who receive income as wage earners. At the same time, 10-20% of people have high incomes, which almost do not affect the demand for goods and services of everyday mass demand, but affect the growth of demand only for goods of single, not mass demand, such as exclusive cars, yachts, fashionable mansions etc. Mostly, the funds of people with high incomes flow into the sphere of banking or speculative business, usually outside their own country. All this does not increase the mass demand and purchasing power of 90% of the able-bodied population, at least in the economic conditions of modern Ukraine.

Also, in our opinion, the proposal to limit profits by setting the upper margin of profitability is, for industrial and commercial enterprises, a mechanism for redistributing cash flows from their market profit to the wages fund. This, in our opinion, will increase demand in the consumer goods market, in turn, will lead to an increase in supply from the manufacturers. So, the economy will begin to grow. This, in fact, is the mechanism for restarting the economy, a similar mechanism that took place in the US in the 80s of the twentieth century, which later became known as the Reaganomics. As opposed to Reaganomics, the growth of the effective

demand of the population, according to our model, does not grow due to bank loans (as happened in Reaganomics: – due to credit), but at the expense of the money of ordinary households. Such funds in their circulation do not lead to defaults and financial crises, which arise because of outstanding debts. This is a mechanism for stimulating demand, not through bank loans, but through a circulation system, through the business turnover of cash flows between households and enterprises, both production and trade, and through service provision enterprises.

Also, we note, there are other possible options for optimizing redistribution of market, which require further systemic research, namely:

- the immunity from corporate profit tax if income does not exceed a fixed rate;
- the inclusion into the model of the fixed profitability a progressive scale of taxation on profits which exceeds the fixed profitability;
- the possibility to redirect part of the market profit exceeding the fixed amount into the company's funds (see lines 13/1, 13/2) with the application of its tax scale for such monetary sums;
- the monetary savings accumulated in the funds of enterprises (see lines 13/1, 13/2), cannot be exported abroad. But they, perhaps, can be brought only to the banks of their country or to mutual national corporate funds;
- also other options, both new according to contents, and mixed from above-stated are possible.

In conclusion we note that the mechanisms of legislative restriction of economic entities` profits have long been applied in many developed countries of the world including Ukraine. For example, a maximum profit level has been set for many monopoly enterprises in Ukraine. The regulation of the rate of profit by the state is mainly used to control pricing in the enterprises that provide public services and are privately owned. At the end of November 2016, the National Commission implementing state regulation in the energy sector (NERC), by Decree No. 1029 of July 26, 2013, obliged Oblenergo to invest at least 50% of the profit from the asset base existing when switching to rate-of-return regulation [2].

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## **2.6 ANTI-CRISIS MANAGEMENT OF INNOVATIVE DEVELOPMENT OF WINE-MAKING ENTERPRISES**

Enterprises of the wine industry are surviving difficult times now, most of them are in a crisis situation. This points at the limitedness of extensive economic development and the need for a quick transition to intensive development based on the implementation of an innovative model. In order to overcome the crisis, firstly, it is necessary to diagnose the crisis and identify its etiology; secondly, to form theoretical and methodical approach and a set of appropriate adaptive tools for providing the transformational changes of enterprises of the industry; and, thirdly, to develop effective mechanisms for the renewal of financial equilibrium of enterprises. The process of management activity in the company that is in a certain external environment must be aimed at providing the stability of its functioning, financial equilibrium and regular profit generation. As the experience of developed countries shows, without innovations the enterprises of the industry will not be able to develop, accelerate the rate of economic growth, increase the share of products export, use material and natural resources effectively, and implement social and economic development programs. The quality of management (efficiency and effectiveness) and focusing on overcoming crisis phenomena and market transformations of anti-crisis tools are acquiring the particular relevance.

The financial condition of the enterprise is the result of the interaction of the relevant factors of the internal and external environment, expressed by a combination of certain effects, and, based on the results of the analysis, by a system of indicators and indices. The study of the problem of analyzing the financial condition of the enterprise and the mechanisms for its improvement was widely carried out by scientists in the nineties of the XX century in relation to the formed current crisis conditions of management in those days. Devoted to this problem results of the research works of M.I. Bakanov, A.P. Gradov, V.V. Kovalyov, V.M. Rodionov, A.D. Sheremet, R.S. Sayfulin, etc. gained widespread appreciation and were highly demanded by economic practice. However, solving the issue of overcoming crisis and the directions of renewing the financial equilibrium of economic entities in those years, as a rule, did not coincide with the task of innovation development of the enterprise. In addition, marketing tools were not used in anti-crisis management. In domestic scientists' opinion [1, 2, 3], the crisis is one of the stages of enterprise development. In the quality of a separate stage of the cycle of development of the enterprise, the crisis was considered by such scientists as L.A. Ligonenko [4], O.O. Tereshchenko [5], and G.V. Telnova [6]. Researchers state that the emergence of crisis phenomena is possible at each stage of the life cycle of the enterprise. Comprehensive toolkit of

timely detection and opportunities of localization of the crisis is defined in scientific sources [7, 8, 9]. The questions of defining the crisis as a phenomenon, process, result or consequence remain the tasks of scientific inquiry. Synergetics characterizes the crisis as a key factor contributing qualitatively new changes to the system as a choice point (bifurcation) between potential alternatives of the future paths of its evolution. The crisis and such its consequences for the enterprise as instability and uncertainty become an essential characteristic of any open evolutionary system.

The evolving of theoretical insights into the crisis at the microlevel is expressed in the modern directions of study of the crisis from the point of view of riskology, bankruptcy, anti-crisis management, investment, innovation theory, the theory of transition processes [10], that in its turn has led to pluralism in relation to the definition of crisis. Therefore, the crisis in the company is expressed by such categories as insolvency, risks, threats, critical stage, etc. Market transformations of anti-crisis management toolkit acquire a particular relevance, as management of innovation development is carried out in conditions of information, procedural and market uncertainty, counteraction on the part of competitors, as well as randomness of combinations of factors and causes that determine the potential effectiveness of innovation. Apart from existing factors that are the causes of risks, the additional effects from the combination of these factors with nonlinear interaction effects are possible.

Only innovative development for domestic winemaking is a non-alternative way of getting out of a difficult situation. Of course, taking into account the inertia of the enterprises of the domestic agro-industrial complex in relation to innovations, launching such a process is not a simple task and requires, firstly, scientific and methodological support, significant motivational stimulants from the state and special effective mechanisms for implementation.

Therefore, the problem of anti-crisis management, that presupposes preventing crises, effective overcoming them and eliminating the negative effects with the help of adaptive means of innovative transformations of the internal environment of enterprises in accordance with the requirements of the external environment, acquires a particular relevance.

The purpose of the article is to substantiate theoretical and methodological statements and develop practical recommendations for the anti-crisis management of innovative development of winemaking enterprises.

In order to achieve the goal, the following tasks must be solved:

– to justify the essence and identify the sources of crisis at winemaking enterprises;

– to distinguish possible directions of implementation of innovations and tools of effective anti-crisis management for solving the identified problems and intensifying the innovative development of winemaking enterprises in Ukraine.

The technical renewal and development of the agro-industrial sector is one of the priority directions established by the Government of Ukraine for agenda for the period 2017-2021 [11]. That is, innovation should be the main driver of development for enterprises.

The functioning of the enterprise is complicated by the constant change of the factors of external and internal environment, therefore, the management system, in accordance with the development goals, must provide the enterprise with the possibilities to carry out economic activity effectively and stably by using a set of diagnostic, instrumental and control measures that have to optimize the use of available resources, ensure their proper level and neutralize the impact of risks. The impact of the external environment, in which the enterprise functions, is expressed in the form of risks, problems, threats or changes (especially undesirable) that are closely interrelated and should be considered within the framework of management of deviations, which is expedient to provide in three stages:

1. Risk management. The threats of stabilization of economic activity of the enterprise have not yet occurred, but there is a possibility of emergence of undesirable and unplanned events that can lead to the fact that the objectives of the measure will not be achieved. The purpose of the stage is to prevent the threat.

2. Problem management. It is the situation, when threats have already come, it is necessary to find out their nature, the cause and to find ways to solve it. The deviation of the actual state of the enterprise from the desired state can be considered as the problem. The purpose of the stage is to provide the opportunity for the development of planned events.

3. Management changes. It is the situation, when the threats have turned out quite serious, and it is impossible to cope with them without damage. The purpose of the stage is to correct the taken decisions.

The crisis is a state of the enterprise, when the financial and economic indicators do not correspond to the parameters of the external environment. The factors that cause the crisis are conditionally divided into external and internal ones.

When developing measures for counteracting possible threats, it is necessary to take into account the impact of one of the competitive market strategies implemented by the enterprise (violent, patient, explorant or commutant). Determining the type of competitive market strategy of enterprises is carried out by market share occupied by them, for the violent (power strategy) the share is equal to or exceeds 35%, for patient (niche strategy) it is in the range of 5-10%, for the commutant (adaptive

strategy) it is no more 5%, for an explorer (pioneer strategy), due to the features of the strategy it is not calculated.

The scope of each strategy is different:

- violent strategy is appropriate in the field of standard large scale production of goods and services, as it provides economy by scale of production and widescale scientific research. The main task of management for violent lies in keeping stability;

- patient strategy presupposes the production of a limited number of highly specialized products of high quality and is aimed at promoting it with limited demand. The stability of a company depends entirely on the precise choice of product and its positioning in the narrow segment of the market; therefore, the greatest attention is paid to the spheres of marketing and production;

- an explorer strategy is oriented to radical innovations, the creation of a new market and the deriving profit from the initial presence on it. It is mastered by young enterprises that do not have sufficient financial resources but have great scientific, technological and research potential. The greatest attention should be paid to infocommunications, R & D and finance;

- a commutant strategy presupposes maximum flexible satisfaction of small (local) market needs by volume. Small companies that choose it do not have effective equipment, advanced technologies or special knowledge in any special area. Despite its extraordinary flexibility, commutants are the most vulnerable enterprises, because the risk of even small financial losses for commutants is catastrophic. Therefore, the main attention is paid to the high level of management, governance and financial control.

As one can see, each of the listed competitive market strategies has both its positive and negative sides that cause growth, development or loss of the competitive advantages by the company, gain or exit from the market, as well as the transition to another strategy or its complete liquidation.

Possible procedure for changing the competitive market strategies by the stages of the life cycle of the enterprise, as well as an appropriate change of the measures necessary to ensure a certain level of financial stability is presented in Table 2.17, from which it is obvious that during the development of an enterprise any strategy embraces the entire life cycle. At the same time, during the development the emphasis and ranking of measures on counteracting possible threats are changing. However, the enterprise may change its strategy for various reasons. This can happen variably, according to typical schemes of changing the competitive market strategies of industrial enterprises (arrows in Table 2.17). Such changes are possible only if the company performs the necessary minimum of anti-crisis measures, the most characteristic for them at the appropriate stages of the life cycle and with the implementation of a certain market strategy.

Table 2.17

The matrix of priority and ranked anti-crisis measures depending on competitive market strategies (CMS) and life cycle stages (LCS) of enterprises [improved on the basis of [12, 13]]

LCS		Creation	Growth	Maturity	Fall
CMS					
Violent	A	Management Technological R&D	Market Management Technological R&D	Market Management Technological R&D Financial	Management Financial Technological Market
Patient	B	Market Informational R&D	Market Technological Professional	Market Technological Professional Management	Management Financial Technological
Explorant	C	Financial Informational Market	Financial Informational R&D Professional	Technological Informational Management Market	Management Market Technological
Commutant	D	Financial	Financial Market	Financial Market Management	Financial Market Management Professional

Most companies starting their business, use a commutant competitive market strategy (D1). During the process of enterprise development (D2, D3), the evolving and counteraction to threats is beginning to slow down. There are two variants of solving this situation: the first one presupposes that the company can not change the strategy due to a number of external and internal reasons and then it inevitably is waiting for a fall (D4): the second variant presupposes, when the company has sufficient opportunities for further development, then the change of the competitive market strategy is happening. A possible variant is the transition (arrow I) to the patient market strategy (B1-2). In the framework of this strategy an enterprise can actively work and develop despite of the higher level of threats, because it possesses a much greater potential for counteraction. But sooner or later it will again turn out (B3) before the choice: to enter the stage of recession (B4) or use an explorant strategy (indicated by arrow 2). In the case of a successful implementation of an explorant strategy, the opportunities for further development are opened up for the enterprise. It can either return (arrow III) to the patient competitive market strategy (B1-2) again or transit (arrow IV) to the violent one (A1-2). The own system of economic interests corresponds to every market strategy of an enterprise, which is integrated with the LCS. Within the framework of anti-crisis management it is necessary to conduct the identification of threats through the prism of the economic interests of the enterprise itself.



Having assessed the socio-economic system correctly, one can predict the probability of a crisis and make everything possible in advance to avoid its consequences. At the same time, the most dangerous crisis is the one that can not be predicted.

For the previous assessment of business development trends based on the financial indicators reflected in the financial reporting the analysis of the main tempo indices of enterprise development is used, which usually include the indicators of dynamics of currency balance, sales revenue and net profit. The ratio of these indicators by inequality, called "golden rule of the economy of the enterprise" is actively applied in economic diagnostics [14, 15].

$$R_{fr}(\text{gp, froa, np}) > R_{sr} > R_{cb} > 0 (>100\%), \quad (1)$$

where  $T_{fr}(\text{gp, froa, np})$  – the growth rate of financial result (gross profit, financial result of operating activity, net profit) of the enterprise;  $R_{sr}$  – the growth rate of sales revenue;  $R_{cb}$  – the growth rate of the currency balance of the enterprise.

This dependence means:

–  $R_{cb} > 0$  – the economic potential of the company is growing, as the increase of the currency balance shows the expansion of the volume of economic activity of the enterprise. It is necessary, however, to take into account the impact of reassessment of fixed assets, inflationary processes and their impact on the state of stocks, prolongation of payment period with debtors and creditors.

–  $R_{sr} > R_{cb}$  – in comparison with the growth of economic potential, the sales revenue is growing at an accelerating pace, that is, the efficiency of the resources use is increased (the income from every hryvnia invested in the value of the enterprise property is increased). This ratio shows the "justification" of the increase of the property value in the reporting period for providing a faster growth of sales volumes.

–  $R_{fr}(\text{gp, froa, np}) > R_{sr}$  – in comparison with the growth of revenues the financial result is growing at an accelerating pace that indicates to a decrease of unit costs and overhead costs.

–  $R_{fr}(\text{gp, froa, np}) > R_{cb}$  – in comparison with the increase of the property value and invested capital, the obtained financial results are growing at an accelerating pace that indicates to the increase of the efficiency of capital use by means of increasing sales volumes (if the inequality  $R_{sr} > R_{cb}$  is performed as well), the decrease of unit cost, overhead cost and total cost, decrease of specific total expenses of activity.

These conclusions are confirmed by the calculation of specific indicators, non-fulfillment of the conditions of the "golden rule" will be reflected by a decrease of the corresponding specific indicators.

Hereafter, we will consider the main indicators of the activity of LTD "Odessa Champagne Wines Plant" and analyze whether the so-called "golden rule of the economy" was followed at it during the analyzed period. Table 2.18 shows the key financial indicators of activity and their rates of growth by year totally for 3 years.

Table 2.18

Indicators of the currency balance dynamics and the financial results of the enterprise LTD "Odessa Champagne Wines Plant" for the period 2013 – 2015  
[author's research according to smida]

<b>Indicators</b>	<b>2013 thousand UAH</b>	<b>2014 thousand UAH</b>	<b>2015 thousand UAH</b>	<b>Rate of growth in 2014 till 2013, %</b>	<b>Rate of growth in 2015 till 2014, %</b>	<b>Rate of growth in 2015 till 2013, %</b>
Balance currency at the end of the year	110874	108487	135953	-2,15	+25,32	+22,62
Net income from sales of goods (goods, works, services)	78883	45318	83380	-42,55	+84,99	+5,70
Gross profit (loss)	15675	6359	28923	-59,43	+354,84	+84,52
Financial result of operating activity: loss	( 27828 )	( 23570 )	( 3639 )	+15,30	+84,56	+86,92
Net financial result: profit, (loss)	( 27361 )	( 23289 )	( 11279 )	+14,88	+51,57	+58,78

The results of the calculations indicate to the partial non-implementation of the "golden rule" at the enterprise. The increase of operating and net profit growth rates over the growth rate of sales revenue shows an increase of the efficiency of the operating and the whole activity of the company (profitability of sales and overall profitability of activity) in 2015. The outpacing of the growth of sales revenue in comparison with the growth rate of the currency balance in 2015 indicates to an increase of return on assets (turnover of assets and capital). The outpacing of the growth rate of gross profit over the growth rate of revenue shows a significant decrease of the unit cost of production of the company in 2015.

Actually, the studied period (2013-2015) for the enterprise is unprofitable by all indicators. These conclusions are confirmed by the calculation of specific indicators (Table 2.19).

Table 2.19

The main specific indicators of the activity of LTD "Odessa Champagne Wines Plant"

[author's research according to smida]

Indicators	2013 thousand UAH	2014 thousand UAH	2015 thousand UAH	Rate of growth in 2014 till 2013, %	Rate of growth in 2015 till 2014, %	Rate of growth in 2015 till 2013, %
Net revenue for 1 UAH of property value (assets turnover)	0,71	0,42	0,61	-40,85	+45,24	-14,08
Net profit for 1 UAH of property value (return on assets)	-0,25	-0,21	-0,08	+16,00	+61,90	+68,00
Gross profit for 1 UAH of net revenue (profitability of products)	0,20	0,14	0,35	-30,00	+150,00	+75,00
Net profit for 1 UAH of net revenue (overall profitability)	-0,35	-0,51	-0,14	-45,71	+72,55	+60,00

As a result, for the 3 years studied, the nonfulfillment of the inequality of development is observed. The currency of the balance sheet started to increase only in 2015 (by 25.32%), while the loss-making activity of the company is reduced by 51.57%, that indicates to the increase of the profitability of aggregate assets. Comparison of the net income and profit indicators testifies to the increase of profitability indicators of the activity, that is achieved not due to the increase of the volume of the main activity and its efficiency, but for the account of reducing overhead costs. The data of the analysis testify to the economic crisis at the enterprise, caused by lack of own circular assets, absence of credit resources.

The analysis of the structure and structural dynamics of the enterprise's liability allows to make the following conclusions:

- the borrowed capital, formed for the account of current liabilities, dominates in the liability structure that negatively characterizes the financial sustainability of the enterprise and indicates to its high dependence on short-term debt capital;

- the negative phenomena are the increase of the share of current liabilities in the financing structure: from 8,86% at the end of 2013 to 76,87% at the end of 2015, and the lion's share of uncovered losses: the growth of the share of undistributed profit was 81.21% over 3 years. Thus, the level of equity capital concentration is sufficient.

For the period of 3 years the significant structural changes of the liability of the balance of LTD "Odessa Champagne Wines Plant" were in the direction of increasing the share of current liabilities and reducing the share of equity capital. The enterprise is funded mainly by short-term obligations. Accounts receivable has a significant share in current assets (about 40%) and affects the financial position of the enterprise. Increase of accounts receivable of the company always testifies to financial instability and deterioration of solvency of the enterprise due to lack of funds. In addition, the deterioration of the turnover of money (turnover speed) is happening. As a result of these factors, the accounts payables of the company are increased to its suppliers (due to insufficient funds). The deterioration of company solvency is a real threat to the probability of its bankruptcy, or inhibition or cessation of development.

This is typical for the current development of the wine industry. The obtained data indicate to an insufficient level of management work that is related to the formation and repayment of accounts receivables, to the need for implementation and use of more advanced ways, forms and methods for influencing the accounts receivables.

Particularly relevant for winemaking enterprises is the management of cash flows, taking into account the seasonality of production and economic activity and inconsistency of the receipt and spending of money resources. Therefore, the formation of an effective system of financial monitoring in the context of financial planning of enterprises with the use of advanced technologies, methodical tools and attraction of highly skilled management personnel becomes extremely necessary.

Table 2.20 shows data on the sources of innovation financing at winemaking enterprises. The situation is absolutely unsatisfactory for the innovative development of winemaking enterprises. Beginning from 2012, credit resources are not available. Investments in the enterprises of this industry for the studied period were absent at all.

Innovation financing is fulfilled for own funds almost throughout the studied period (except 2011, when credit funds accounted for 53.9% of the total financing of innovations, as well as 2015, when 5.3 thousand UAH or 1.4% of the state budget funds were allocated). The analysis data points to the crisis inability of state management to regulate the innovation activity of industrial enterprises.

Thus, due to lack of own funds and absence of real assistance from the state, it is very difficult to talk about innovative development for winemaking enterprises, but this issue is extremely relevant and requires attention from both the authorities and the enterprises. Innovation is the basis of the anti-crisis mechanism at the enterprises.

Table 2.20

The volume of financing the innovations at winemaking enterprises of Ukraine in 2009-2015

(author's research according to the data [16])

	Code of Standard Industrial Classification of Economic Activities	Total amount of expenses for innovation, thousand UAH	Of those, that were financed for the account of:					
			Own funds		State funds budget		Credits	
			thousand UAH	in %	thousand UAH	in %	thousand UAH	in %
2009								
Production of beverages	15.9	92696,2	90504,4	97,6	35,5	0,0	2156,3	2,3
Production of grape wines	15.93	24642,1	24642,1	100	-	-	-	-
2010								
Production of beverages	15.9	176112,0	129610,2	73,6	-	-	46501,8	26,4
Production of grape wines	15.93	14915,8	13831,8	92,7	-	-	1084,0	7,3
2011								
Production of beverages	15.9	149227,6	125831,6	84,3	-	-	23396,0	15,7
Production of grape wines	15.93	38356,2	17685,9	46,1	-	-	20670,3	53,9
2012								
Production of beverages	15.9	210102,3	208112,5	99,1	-	-	1989,8	0,9
Production of grape wines	15.93	12905,0	12905,0	100,0	-	-	-	-
2013								
Production of beverages	11.0	194132,4	186188,9	95,9	-	-	7943,5	4,1
Production of grape wines	11.02	10418,4	10418,4	100,0	-	-	-	-
2014								
Production of beverages	11.0	247975,6	215077,6	86,7	-	-	32898,0	13,3
Production of grape wines	11.02	652,6	652,6	100,0	-	-	-	-
2015								
Production of beverages	11.0	132513,3	132508,0	100,0	5,3	-	-	-
Production of grape wines	11.02	379,2	373,9	98,6	5,3	1,4	-	-

Actually, the following industry features of winemaking enterprises can be distinguished in terms of opportunities and the main directions of innovation development.

Firstly, the essential features of winemaking enterprises are that the wine industry is one of the most conservative, so development is possible only with the harmonious combination of traditions of winemaking with innovations. The trajectory of enterprise development is determined by its adaptive abilities to solve, on the one hand, internal contradictions caused by internal factors, and on the other hand, external negative influences at the level of meso- and macro-environment. The task of management of innovative activity is to ensure the transition of the socio-economic system to a new balanced state. Such a state of the socio-economic system is the result of the balance of business processes, and, consequently, the effectiveness of the management system. The concepts of effectiveness and efficiency are not identical. Effectiveness is expressed by the degree of achievement of goal sets (development indicators), and efficiency is the ratio of obtained effect and costs (resources) to achieve such an effect. Herewith, the scale of the renewal of the winemaking company depends on the effectiveness of managing the potential of innovation development.

Secondly, the winemaking sector is sufficiently structured regarding the development of a competitive environment of enterprises. For the market of winemaking products (especially sparkling wines), a rather high level of stability is a characteristic feature due to exclusively positional nature of competition. That is, in the market there are different manufacturers on competitiveness (which are clearly divided into leaders, followers, outsiders by market share), which, moreover, use different strategies of competition fight. At the bottom of current trends towards the consolidation of the industry, specific features of the complex capital-intensive production technology and rather high barriers in order to entry into the industry are laid. For example, one of the necessary conditions for the production of wines of Control Names by Origin is the creation of a closed cycle of production. As the experience of Champagne shows, the region of wines of Control Names by Origin, if large producers are far from the raw material area, it leads to a steadily high price for grapes. Therefore, the pursuance of "closed" cycle by leading players in the wine market is quite logical as an attempt to obtain an additional opportunity of independence on raw material instability. In this sense, the creation of vertically-integrated structures can be considered one of the important evidence of the fact that the domestic market is rapidly civilized, rising to a new level. At the same time, the decision of the issue of providing the production of high-quality wine materials, for the future perspective as well, is directly in the plane of change of the legislative base. In order to regulate administrative and financial relationships between raw material producers and finished products, there is a need for

the creation of special structures (Interprofessional Committee of Wine-growers and Wine-makers – CIVC), on the model of experience of EU countries. Innovative trends of the wine industry development should be oriented, first of all, to the search, acquisition and protection of their own unique competitive advantages, a certain group of consumers, the price segment, as well as the implementation and use of advanced technologies and methods of production of wine products. In addition, the provision of enterprise development should be based on modern marketing technologies – integrated marketing management, marketing strategies for attracting consumer loyalty to their own brand and a program for the formation of consumer.

Thirdly, a long-lasting production cycle increases the dependence of enterprises on sources of financing, as storekeeping of materials, maintenance of uncompleted work require significant costs. In addition, seasonality of business activity is a characteristic feature of winemaking enterprise, which determines the specifics of the production and financial cycle and manifests itself in the inconsistency of cash flows. There is a significant gap (lag) between the moment of formation of sales revenue of finished products and the actual costs for its production. Therefore, an important condition for ensuring the stability of the enterprises of the winemaking industry is the formation and implementation of an effective marketing policy, which should take into account the seasonality of "production", "expenses" and "cash receipts". That is, the transition of enterprises to the innovative concept of development requires a clear formalization of methods and algorithms for planning innovations that ensure the efficiency of investing in innovation practice.

Fourthly, the feature of the production of grape wine is still a considerable amount of manual labor, which is necessary at almost all stages of the production process. Therefore, it is important for winemaking enterprises to ensure economic and social efficiency of labor use. In this sense, innovation must be socially and economically oriented.

That is, the necessity of developing a system of innovative development of viticulture and winemaking industry enterprises has emerged, which must meet the following requirements:

- consideration and adaptation of leading foreign experience and best practices of the implementation of innovative activities of enterprises of the studied industry to the conditions of Ukraine, that will activate the microeconomic factors of modernization of production potential and product assortment;

- planned structural reforming the industry with the obligatory reinforcement of the relevant regulatory framework, which combines social and environmental interests with the economic ones and ensures the level of compliance of the Ukrainian environment with all the basic requirements of the EU for the exchange of innovations, apart from to technological innovations, in the field of education and infrastructure;

– institutional regulation of the role and support on the part of the state that will provide additional impulses for technological convergence through: increasing the volume of foreign trade with the developed countries of the EU, cooperation of importers and exporters with contractors of these countries, increasing the investment attractiveness of the industry and, accordingly, stimulating the inflow of foreign direct investments, increasing the population mobility, developing the scientific cooperation and additional sources of financing within European funds.

Talking about innovative development, it is necessary to understand that for the viticulture and winemaking the process of innovation changes should be systemic, that is, the unified government program of the planned purposive nature must be implemented which concerns, firstly, economic entities, and, secondly, the environment of functioning and the nature of the relationship, and thirdly, products, which will be the subject of the future scientific research.

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## **PART 3. GLOBALIZATION DETERMINANTS OF NATIONAL SECURITY INNOVATION COMPONENT MANAGEMENT**

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### **3.1 DEVELOPMENT OF MECHANISMS OF MANAGING INNOVATION COMPONENT OF ECONOMIC SECURITY IN CROSS-BORDER SPACE**

Border areas, which are peripheral in their own states, usually have a lower level of social and economic development comparing with the central regions. However, one cannot say this in relation to contiguous border territories of neighbor countries– the situation varies. For example, in border areas between France, Germany and Belgium – the level of development is almost the same; there are some disparities between Spain and Portugal although they are not so considerable as between Germany and Poland or the Czech Republic. Smaller disparities can be seen in the border areas of east European countries within the EU. However, there are considerable disparities in the level of development on the external borders of the EU countries and their neighbors which are not EU member states. As time passes this asymmetry intensifies, which creates various threats and challenges, including through the outflow of resources into a more productive environment, which, in its turn, creates threats to the economic security of backward regions. Predicting such negative consequences, the EU, in particular the European Commission is forming the policies of cohesion, convergence, etc. which are being implemented using the mechanisms and tools of the common regional development policy, namely the structural funds, cohesion fund and EU common initiatives.

Consequently, following the results of the analysis of regional asymmetries, an assumption has been made that in the nearest decade the task of **levelling the social and economic development of EU regions** including by GRP per capita will remain on the agenda of the cohesion policy. Moreover, the EU enlargement “to the East” to include less developed countries has only intensified the contrasts of asymmetries of regional development against the background of proclaimed goals of joint convergence.

Another task remains **to bring the development in the most backward regions to a higher level**, which, having no development resources of their own, due to peripheral situation, permanent migration of skilled workforce to large cities, ineffective local governance and for other reasons lag behind considerably in the processes of general convergence and economic growth.

However, it should be noted that methodological principles of the EU regional policy realization have changed drastically: the mechanisms of providing financial support have been replaced with the mechanisms of creating conditions for accelerated development, in other words, “it’s reasonable to give a fishing rod instead of a fish”.

That is, there can be only one way to eliminate in the future the asymmetry between the leading economic centres of the EU and peripheral / depressive territories – **by creating possibilities for building up their own capacity of innovation development** in the EU regions on condition of conducting coherent and harmonized regional development policy at all levels (from regional to transnational one).

Western border regions of Ukraine are contiguous with EU countries and according to our observations the asymmetry of their development is increasing [10]. Unfortunately, similar situation can be observed in other border territories of Ukraine, including temporarily occupied territories.

This fact calls for determining the factors and elaborating the ways of levelling the asymmetry of development in the context of the necessity of ensuring economic security, in particular, its innovation component.

The problem of development of mechanisms of managing the innovation component of economic security in cross-border space is based first of all on clear understanding of threats emerging in a border region both for its life activity and for the country as a whole, as well as the possibility of working out the ways of prevention, offsetting or eliminating such threats.

At first, we’ll consider and specify the terms that will be used in this chapter: economic security of a state, economic security of a region, cross-border region and cross-border space, innovation component of economic security of a cross-border space.

Taking into account the achievements in institutional economics (D. North, M. Maksymchuk [18; 11]) concerning the explanation of economic phenomena alongside the development of behavioral economics (D. Kahneman, R. Taylor, [8; 23]) and creative economy (R. Florida, O. Datsko, [22; 3]), who emphasize the basic role of a person in the postindustrial stage of civilization development, we’ll subscribe to the definition of economic security of a state as a system which is characterized by the condition and potential opportunities of the national economy development, which ensure the protection of a person, a citizen in the system of national interests, resistance to internal and external threats, the possibility of realizing the potential, the development and protection of vitally important interests of people, society and the state [3].

At the same time, we’ll be considering the economic security of a region as the ability of regional economy to function in the mode of expanded reproduction, that is to say of sustained

economic growth, and to provide to the maximum extent possible an adequate standard of living and development of the individual for most of the population. Economic security at a regional level – it's also the capability of economy to resist destabilizing actions of internal and external social and economic factors, as well as the ability not to create threats for other elements of the region and outside environment. Economic security of a region – is a range of levels of economic and social indicators, within the limits of which a region sustains long-term development [16]. Thus, we've determined the notion of economic security, including for a border region.

Unlike a border region, which is internal for every country, a cross-border region encompasses contiguous territories of at least two neighboring states, and it should be considered as **a single integral specific territorial, polystructural entity** [13]. Singling out and study of a cross-border region is determined by objective factors – the existence of **common problems** for border regions of both states, which cannot be resolved by one party, regardless of its economic development level. Thus, state borders usually run along river beds, and managing them – is a **common** problem of neighbors, namely: the pollution of water in river basins, water purification and its use, fishery, etc. Another common problem is to coordinate the location for laying communication lines across the border – the point of junction, power magnitude etc. – these are the issues that require joint efforts. At the same time, a lot of **identical problems** arise on both sides of the border, and in order to resolve them, it is reasonable to use mutually the experience of the sides or to combine efforts for more effective problem resolution. That's why it's very important to develop cooperation in cross-border regions in order to have an opportunity to accelerate the development due to combined efforts and to increase competitiveness of peripheral, which are, as a rule, backward regions.

The next term – is cross-border space. Why not limit ourselves to the notion of cross-border region which has well defined territorial administrative boundaries either at the level of oblast or district, or village council – that is to say it always has clearly defined territorial administration ? Subjects and participants of cross-border cooperation – they are first of all people, public organizations, private business, which are developing according to their own vision, but not of regional authorities. Potential partners and participants of cross-border cooperation are not always located within administrative-territorial limits of a cross-border region. Often intensive links are established with partners of other regions, situated at a distance from the border. Thus the boundaries of border regions are being transformed in the cross-border space (something similar to puzzles), which is determined by intensive and close links between the subjects. That's why it is important to determine not the region of activity, but a space with certain coherence, intensiveness and closeness of links between partners, which has the specific

features of a cross-border region and opportunities to obtain cross-border effects.

However, as evidence suggests, the impact of positive changes in EU border regions contiguous with Ukraine can result in both the intensification and holding back the regional development of Ukrainian border area, that will affect the economic security of the border region due to the increase in threats and dangers in the less-developed country as a result of the outflow of resources to a more productive environment [14].

Gradual convergence of specific features of adjacent border regions of neighboring countries, which is taking place in the process of recreating (formation and use) of common methods, ways and tools of enhancing competitiveness (convergence of competitiveness mechanisms), that contributes to reducing disproportions (asymmetries) in social and economic development in a cross-border space, determines **cross-border convergence of regions** [10] and, in its turn, will determine **the level of economic security** in a cross-border space. At the same time, the processes of cross-border divergence – the formation of distinctions in the vital activities of residents in border regions are being observed at the present stage, which increasingly intensify the asymmetry of development of cross-border region parts, thus reducing the level of economic security. These processes have been described in detail by V.Borshchevsky and K.Kutsab-Bonk as institutional traps of cross-border divergence [1].

The complexity of processes and phenomena in Ukraine's cross-border space highlights, first of all, the importance of formation and implementation of the state policy of cross-border cooperation, whose importance has been underestimated until recently in comparison with neighbor countries [13]. Inefficient use of organizational and economic mechanisms of cross-border cooperation development known in Europe [15] necessitates their investigation and assessment of action from the point of view of institutional theory, which defines the economic mechanism as an aggregate of sets of behaviors of economic relations subjects, forms and methods of economic management and contributes to coordination and harmonization of social, collective and private interests, as well as promotes the functioning and development of the national economy [12]. Besides, according to D. North every institution is made up of rules (formal and informal); organizations / players; control, coercion and / or punishment mechanisms.

Thus, any change of formal rules of activity of economic relations subjects on one side of the border brings about further adaptation of mechanisms of cross-border interaction on the other side of the border. The intensity and speed of the adaptation processes result in neutralizing or eliminating possible negative consequences of such changes on the other side of the border.

The emergence of above-mentioned institutional traps of cross-border divergence, which have predominantly a negative dimension, is the result of the lack of strategic vision of the cross-

border cooperation development and the use of its potential.

It should be noted, that a low level of the use of cross-border cooperation potential in Ukraine is determined by the existence of the whole range of mechanisms of blocking the interaction and by insufficient level of providing the mechanisms of their neutralizing.

As stated above, an accelerated increase in asymmetry of the development of contiguous border territories of neighbor countries in the cross-border space of Ukraine and the EU is being observed nowadays. The possibility of reducing these disproportions is considerably determined by the activity of a number of factors, whose influence can accelerate the convergence processes or slow them down (in other words, have positive and negative effect at the same time). Understanding the mechanisms of the influence of factors and of neutralizing their negative effect is an important and necessary moment for taking informed decisions in the sphere of ensuring economic security in a cross-border space. Therefore, if the legal framework of Ukraine on cross-border cooperation development has been generally formed, the organizational-economic mechanisms of subjects of economic relations interaction on both sides of the border need considerable improvement, particularly, for ensuring economic security and its innovation component.

Bearing in mind that there exist technological, product, organizational, marketing etc. innovations and they can penetrate all kinds of activity of economic entities, including various forms of their cooperation, it is reasonable to define what will be most crucial for ensuring economic security in a cross-border space.

In our opinion, the main subject / object of innovation activity is a person. They are initiators of innovations, their architects as well as their implementers and consumers. That's why the vital activities of a person in a cross-border space are determinative in view of the innovation component of economic security of a border region.

**Taking into consideration the goal of ensuring economic security, in particular its innovation component by way of accelerating the convergence of regions in Ukraine-EU cross-border space, we'll touch upon the negative factors which slow down positive changes:**

**1. Increasing asymmetry of development** (of the living standards of population, economy, social services etc.) is observed on almost all indicators. This can be seen using the example of the data of Lviv oblast and Subcarpathian and Lublin Voivodeships of Poland. The indicators of the GRP, GRP per capita and the average wage of the Polish side exceed the Ukrainian indicators four times (Table 3.1). Besides, it should be mentioned, that these indicators in the Lviv oblast have returned to the level of 2011, while in Poland they continue to increase.

Table 3.1

Some statistical data for Lviv oblast and Subcarpathian and Lublin Voivodeships of Poland (2015) [19; 21]

<b>Indicator</b>	<b>Lviv oblast</b>	<b>Subcarpathian Voivodeship</b>	<b>Lublin Voivodeship</b>
Area (km <sup>2</sup> )	21831	17846	25122
Forests and forested area ( as a percentage of total area)	31,8	41,5	24,3
Agricultural lands ( as a percentage of total area)	59,1	51,7	69,9
Population (in thousands)	2534,2	2127,2	2139,7
Natural increase in population per 1,000 persons	-2,0	0,1	-1,4
Unemployment rate according to ILO, in percentage points	8,2	11,7	9,31
Average monthly nominal wage in euros	150	806	836
Commissioning of new housing per 1,000 inhabitants, apartments	4,3	3,6	2,9
Students of higher education institutions per 10 thousand population, persons	495	241	332
Doctors per 10 thousand population, persons	55,5	21,0	24,9
The number of accommodated tourists per 1,000 population, persons	282	450	371
GRP, in mln euros (2014)	4640	16092	16026
GRP per capita, in euros (2014)	1828	7560	7448
Research and development expenditures as a percentage of GRP (2014)	0,4	1,38	1,03
The number of business entities per 10 thousand population	74	182	189
The number of scientific organizations and researchers in them	76/3422	137/4330	105/3639

Special attention should be paid to the research expenditures: in Ukraine they are reducing continuously (from 0,7 % in 2010 to 0,4% in 2014 ), and in Poland – they are increasing (from 0,97 and 0,64% to 1,38 and 1,03% in 2014 respectively in the Subcarpathian and Lublin Voivodeships) [19; 21], that indicates orienting the Polish economy towards the formation of the innovation development model.

Attention should be drawn to the number of registered businesses on the Polish side in comparison with the Ukrainian side (exceeds almost 2.5 times) (see Table 3.1). This translates into jobs, the income of citizens and their living standards and, respectively, the incomes of the region.

**2. Lack of symmetry in state policies of Ukraine and neighbor states with regard to national minorities.** Due to common history national minorities of neighbor countries reside on the territory of border regions. Every country supports its national minorities by giving certain preferences. For example, the primary focus in Ukraine-Hungary bilateral relations is ensuring the rights of national minorities, trade and economic cooperation and border cooperation. Such an approach is stipulated by the basic foundation of the Hungarian foreign policy concept on the protection of Hungarians' rights all over the world. These foundations are implemented through the realization of decisions of the intergovernmental Ukraine-Hungary commission on ensuring the national minority rights, in particular through the development of cross-border cooperation. The lack of a similar state policy from the Ukrainian side creates a disparity in the cross-border space, thus deepening the differentiation of various groups of local population, sets the stage for possible interethnic conflict situations, as clearly evidenced by the situation as regards Article 7 of the law of Ukraine "On Education". In terms of the economic security of regions de-facto we have lost almost 150-170 thousand Hungarians of the Trans Carpathian oblast for Ukraine. Dual citizenship (the Pole's card, Hungary card, passport of a Romanian citizen, passport of a Russian citizen), which leads to simplification of labor migration processes, encouragement of migration of economically active population from Ukraine, the outflow of active human capital, mainly highly qualified, to the environment with higher living standards (to the EU countries). This results in the loss of a part of intellectual and human capital in Ukrainian border regions, thus enhancing the asymmetry between the territories of Ukraine and the EU (including in the sphere of intellectual staff provision).

Thus, for example, before the introduction of the visa-free regime the holders of the Pole's card could obtain a multiple long-term national visa, officially and through a simplified procedure for foreigners they could get a job in Poland, do business on the same basis that the Polish citizens, receive free education, request on a priority basis the financial assistance from the state budget of Poland, which is designed for supporting Polish citizens living abroad.

After the introduction of the visa-free regime with the EU and the permission of the Polish side to get jobs for Ukrainian biometric passport holders, over 1 million Ukrainians have got jobs on the territory of the neighbor country and more than 30 thousand students study there (according to the data of 2016) [17]. Among those who work in Poland there is a considerable percentage of academic teaching staff, specializing mainly in exact sciences and not only from Lviv but from all over Ukraine. With regard to their current situation the scientists are mainly dissatisfied with low wages and insufficient financing of research activities. It's for these reasons that 28% of respondents are ready to abandon science, and every fourth respondent is considering

emigration [4]. And this poses the biggest threat to the innovation component of the economic security of both the region and the state.

Sociological surveys show that unfortunately, more than half of the migrants are not planning to go back to Ukraine, because in recent decades there have been no considerable changes in the state policy concerning the return of migrants [4].

**3. Lack of common approaches to the policy of social-economic and ecological development of cross-border regions and its implementation mechanisms.** Border territories are one of the priority objects of EU regional policy implementation and, respectively, of regional policies of Ukraine's neighbor countries. The analysis of its implementation found a clear vision of the contiguous border territories development directions in terms of enhancing their competitiveness and ensuring sustainable social-economic and ecological development. Business environment infrastructure (technological parks, the service provision system, business incubators etc.) is being developed intensively; communication, social, educational infrastructure, cluster formations such as "Aviation valley", which all together increase the accessibility of a peripheral region and ensure the creation of the innovation model of development and regional competitiveness.

It is reasonable to examine more closely the possibilities of implementing new forms in cross-border cooperation in Ukraine [9].

For example, the development of cross-border clusters – is quite a prominent phenomenon in the world economy. The functioning of such well-known trade networks as «BioValley», CH/D/F, since 1996) [5] or cross-border association around Oresund strait (Oresund, DK/S) of Denmark and Sweden, which include «Medicon Valley») [6], have demonstrated their own efficiency due to a high level of employment of residents, a large number of small and medium businesses, which, owing to closer ties with scientific communities and rapid implementation of innovations ensure a high level of labor productivity, hence, territorial/regional competitiveness.

Successful use of cluster-based approach on all continents causes permanent interest of researchers and practitioners concerning profound understanding of clusterization phenomena, in particular, the analysis of factors which stimulate or restrain the activities of cluster formations; the assessment of their influence on the territorial development; the study of mechanisms and tools used by regional management to form and implement the cluster policy; the role of the individual, their creativity in the above-mentioned processes etc. Diversity and multidimensional nature of such a phenomenon require certain systematization of knowledge to use it effectively. For Ukraine it's extremely important, because the existing **practice of using**



**effective mechanisms and tools of other countries does not produce the expected positive results when implemented on Ukraine's territory.** That's why rethinking and profound understanding of economic phenomena in Ukraine, summing up the international experience, defining the priority goals and elaboration of a concrete action plan are crucial and of urgent importance for the formation and implementation of the cluster policy, in particular, in Ukraine's cross-border space.

As to policy. We should agree with A.Granberg's approach, who noted that the absence of policy – is also a policy [2]. It means that policy can be formalized (there is a strategy or action plan of its realization) and not formalized (with the absence of any documents of its conduct). Besides, policy can be defined as dynamic, institutionally separated, equipped with specialized mechanisms and tools etc., or as barely noticeable, which can hardly be distinguished from other policies of a state / region.

These thoughts are given in order to characterize to a certain measure the existing cluster policy in Ukraine and in its cross-border space. Despite the initiatives of researchers and practitioners concerning the efforts to draft a certain legal framework to facilitate the development of clusters in Ukraine, to create working groups at the governmental level, to draw up the National strategy of the formation and development of cross-border clusters (2008), we can state that today there is no active cluster policy in the cross-border space of Ukraine. All practical and theoretical groundwork was performed on the initiative of individuals with some support of regional authorities.

In spite of diversity of approaches to the development of clusters, the countries of the world define three basic models of the so-called cluster policy formation: the Italian model (evolutionary development of clusters), the Danish model (the state policy of economy clusterization) and the Dutch model (enhancing of scientific-technological and innovation components in the clusterization processes). The Danish model has become the most widespread in the world taking into account the specifics of every beneficiary country that is determined, in our view, by accelerated pace of implementing new mechanisms. The Italian and the Dutch models require much more time for the transition to a cluster model of development of a territory's economy.

The specific features of the Dutch model are: emphasis on innovation and technology; active innovation government policy; close cooperation between business and research sector.

Unfortunately, despite the efforts of scientists, entrepreneurs, in particular a group of enthusiasts from the Union of economists headed by S.Sokolenko, no progress has been made so far due to bureaucratic resistance in elaborating and implementing the cluster policy in Ukraine as

a way of enhancing the competitiveness of the state, and in adopting the national strategy of cluster development on the basis of either Danish or the Dutch model or their modification.

However, it is possible to assert that cluster formation processes in the regions of Ukraine, in particular in the cross-border space, are taking place both on an evolutionary basis and with the support of regional authorities. Thus, for example, the creation of Lviv IT cluster [20] was designated as one of the priorities in the “Strategy of enhancing competitiveness of the city of Lviv” (2010). A similar picture is observed in other oblasts of Ukraine, where the local elite have discovered more rapidly the advantages of the cluster-based approach. That is, we can state, that the cluster policy is being formed and implemented at a regional level and is based, for example, for the Lviv city council, on the Dutch model, where the synergy is gained from close cooperation between universities, business-structures and local authorities. Yet, the stage of the formation of cross-border cluster with Poland is somewhat slow, although the IT-cluster has opened an office in Lublin (Poland).

Another positive experience is the creation of scientific information and statistical cross-border cluster “Infostat Ukraine-Poland”, which, unfortunately, operates on a voluntary basis and on the enthusiasm of its participants.

At the same time the Ukrainian side has been reluctant to cooperate in the framework of “Aviation Valley” cluster. The cooperation started 11 years ago and lasted through 2006. There has been no cooperation since then, although this cluster holds pride of place in the Subcarpathian Voivodeship as regards the life of the region and implementation of the innovation model of the Polish economy development [7].

The use of any existing mechanisms can be effective only in case of their systemic application that, in its turn, requires the functioning of the strategic planning system. However, regrettably, during the transition from administrative command economic system to the market economy, Ukraine abandoned the system of planning as a necessary component of state governance, erroneously believing that a market economy does not need it. This resulted in chaotic nature of the regions’ development and of the state as a whole.

Besides, competitiveness and clusterization require the development of business environment infrastructure. The comparison of the number of infrastructure centres in Ukraine and Poland shows their considerable (15-fold) predominance in Ukraine, however, regarding the competitiveness – the Polish regions considerably surpass those of Ukraine.

Profound analysis shows that in Ukraine the formation of infrastructure centres for supporting entrepreneurship is not systematic and somewhat chaotic, and is not due to implementing the relevant policy of the state; as a result, taken together, these centres do not form

a complete system of supporting innovation-based entrepreneurship. However, in Poland **a gradual formation of the system of business environment infrastructure is underway now, whose institutions are grouped in the so-called Polish technological platforms:** 1. Entrepreneurship centers; 2. Innovation centers; 3. Financial institutions [13].

Thus, the systemic vision of the border territories development, the effective use of mechanisms, tools and best practices of contiguous regions of neighbor states can accelerate the economic development of peripheral territories, ensure the increase of their competitiveness and reduce the asymmetry.

Beside the main factors mentioned above having influence on the innovation component of the economic security of the region there are other factors, such as functioning of euroregions as coordinating institutions of cross-border cooperation and conditions of cross-border projects implementation, and insufficient consideration of external influence, which creates the situation when the Ukrainian side, with its significant resource potential and creative capacities, is in the position of “catching up with the rest” etc.

In sum, the accelerated development of contiguous territories of EU member-states is taking place according to a clear-cut scenario which is determined by **organizational and economic mechanism of strategic planning**. This means, that there are goals set, priorities chosen, means of achieving goals defined – all this is reflected in the relevant Strategies of the regional development in the overall system of strategic planning of the development of the EU and national economies. The methodology of strategic planning and mechanisms of its implementation are common for all EU countries. As to the sphere of cross-border cooperation, the mechanisms of EU regional policy implementation extend also to the border territories of Ukraine. At the same time, a lot of other common EU policies (in the spheres of trade, competition, transport, agriculture etc.) are being implemented on the border territories of EU countries, which as a whole create the conditions for their accelerated social and economic development. Moreover, relevant organizational and economic mechanisms have been elaborated for the implementation of these policies, which, regrettably, are not used in Ukraine (or their use is simulated), which, in its turn, results in falling behind in the social and economic development of its border regions. On condition of adaptation of these mechanisms in the Ukrainian border regions it is necessary to observe all the rules of transferring institutions from a more developed environment. That is, a new institution, which is cross-border cooperation for Ukraine, should encompass not only rules (formal and mental), but also subjects of economic relations (core and auxiliary); mechanisms of control, encouragement and/or coercion to the realization of such institution. Careful consideration of the evolution of priorities and goals of the

EU regional policy towards Ukraine in the area of cross-border cooperation makes it possible to notice that they are aimed at step-by-step formation of all the elements of the cross-border cooperation institution.

It is appropriate to emphasize that **continuous monitoring and tasks and operative goals update** accompanied by transparency and accessibility of information to enable public scrutiny are important aspects of effective implementation of all strategies in the EU countries. That is, the formation of civil society, the development of democratic foundations of a border region's economy functioning, ensuring oversight of the actions of government authorities etc. are some of the main organization and economic mechanisms of intensifying cross-border cooperation and using the potential of the latter, which means it will contribute to enhancing the level of economic security of a cross-border space and its innovation component.

With the aim to eliminate the negative trends in the Ukrainian border regions which lead to the increase of asymmetry in the development of cross-border space of Ukraine and the EU and to ensure the innovation component of the economic security of border regions, **it is necessary to carry out measures of the state policy, the strategic guidelines of which are aimed at:**

1. **Cross-border convergence of competitiveness mechanisms** – converging of mechanisms which are used by neighbor countries and their regions to increase competitiveness in the cross-border space; borrowing or extension of the existing competitiveness mechanisms to the neighbor territories; the formation of common mechanisms in the cross-border region for obtaining competitive advantages by the latter.

The mechanisms of enhancing competitiveness of a region have more or less stable classification criteria which, as a rule, are based on the appropriate scientific-technical and organizational level of a region's development; on advanced marketing and management; on the provision of adequate financial and economic resources for the region's functioning; on highly skilled labor etc.

Various forms of cross-border cooperation (clusters, partnership, industrial parks, techno parks, projects, Euroregions and European Associations of territorial cooperation etc.) and cross-border regions marketing are the illustrations of such mechanisms, which are actively used internationally, which are relevant for the modern globalization trends and can be used in today's Ukraine.

That is, the main factor in stemming the outflow of resources can be the use of similar to the EU practice competitive mechanisms and priorities of regional development. On the one hand, it will accelerate the eurointegrational processes of Ukraine, on the other hand – due to

intensive activities of euroregions, cross-border clusters, partnerships and other forms of CBC these mechanisms will be tried out. It is not reasonable to have the policy of cross-border cooperation only as a means of receiving financial assistance under the programs of international financial structures which ensure the achievement of their own purposes. Ukraine should create and implement its own *state policy of the cross-border cooperation development*.

2. **The development of regional policy of cross-border cooperation of Ukraine**, which would take into account the policy tasks of neighbor states concerning the development of border regions and cross-border cooperation, and determine the short-term and long-term priorities for the solution of common and identical problems and for overcoming negative trends. The implementation of such policy should be based on cross-border convergence of competitiveness mechanisms and ensure the impossibility of emergence of institutional traps of cross-border divergence.

3. **The implementation of the system of monitoring** the phenomena in the cross-border space by way of establishing the system of collecting, processing and publishing the **cross-border statistical data**. This will make it possible to evaluate the social-economic and ecological development of border regions taking into consideration all existing flows in the cross-border space, to respond in time to the changes in the cross-border markets and neutralize the negative development trends, to take into consideration the volumes of border trade in national accounts. Moreover, the potential of the scientific information and statistical cross-border cluster “Infostat Ukraine-Poland” can be used, which contains considerable amount of research work on the cross-border statistics system.

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### **3.2 WORLD AND UKRAINIAN CRITICAL INFRASTRUCTURE SECURITY AND EMERGING RISK-MANAGEMENT**

Study and analysis of critical infrastructure is a relatively new phenomenon. This question began to attract attention only at the end of the last century. Protection of critical infrastructure as a security target emerged during the Cold War and became an actively developing trend in the leading countries in the beginning of this century in response to abrupt growth of a terrorist threat. It was the events of the middle 90-ies (the terrorist attack in Oklahoma city in 1995, the publication of the findings of the report of the scientific Committee of the Department of defense on information warfare in 1996), and the total computerization of control systems and control of various sectors of critical infrastructure has significantly increased the importance and necessity of such research [5, 15]. So, in July 1996, Executive order of the President of the United States No. 13010 "About work to study security vulnerabilities of critical infrastructure from cyber and physical threats" were formed Commission for the protection of critical infrastructure in the U.S.

President (President's Commission on Critical Infrastructure Protection PCCIP) [7]. Realization of the growing terrorist threats in Europe caused the European Commission to develop and, in November 2005, publish the Green Paper on the European Programme for Critical Infrastructure Protection [9] and subsequently, in 2006, on completion of the consultations between the EU countries, the European Programme for Critical Infrastructure Protection [3].

According to [12, p. 2] in U.S. public policy, the definition of "infrastructure" has been evolutionary and often ambiguous. Twenty years ago, "infrastructure" was defined primarily in debates about the adequacy of the nation's public works – which were viewed by many as deteriorating, obsolete, and of insufficient capacity. A typical report of the time, issued by the Council of State Planning Agencies, defined "infrastructure" as "a wide array of public facilities and equipment required to provide social services and support private sector economic activity". According to the report, infrastructure included roads, bridges, water and sewer systems, airports, ports, and public buildings, and might also include schools, health facilities, jails, recreation facilities, electric power production, fire safety, waste disposal, and communications services.

Critical Infrastructures, as referred to by the United States (US) Dept. of Homeland Security, are "the assets, systems, and networks, whether physical or virtual, so vital that their incapacitation or destruction would have a debilitating effect on security, national economy security, national public health or safety, or any combination thereof" [13, p. 2]. In accordance with Council Directive 2008/114/EC of 8 December 2008 "critical infrastructure" means an asset, system or part thereof located in Member States which is essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant impact in a Member State as a result of the failure to maintain those functions [4]. In Germany, the term "critical infrastructure" are defined as "organizational and physical structures and facilities of such vital importance to a nation's society and economy that their failure or degradation would result in sustained supply shortages, significant disruption of public safety and security, or other dramatic consequences" (German Federal Ministry of the Interior, 2009) [6].

According to the Green Paper for the Protection of Critical Infrastructure in Ukraine [2, p. 2] dramatic events of 2014-2015 in Ukraine increased urgency of protection of infrastructure, objects and systems vital for the activity of the society and created a need to establish a critical infrastructure protection system for Ukraine. The term "critical infrastructure" has been used in Ukrainian regulations on numerous occasions, however there is still no definition in applicable laws. The first reference to critical infrastructure in an official document occurred in 2006 in the text of the Recommendations of Parliamentary Hearings on the Development of Information

Society – alas, with no subsequent development. In the National Security Strategy "Ukraine in the Changing World" (2012), this term was mentioned in the context of defining ways to enhance energy security an avenues to assure information security. According to Green Paper for the Protection of Critical Infrastructure in Ukraine the term "critical infrastructure" of Ukraine shall mean and include systems and resources, whether physical or virtual, that support functions and services whose disruption will cause most severe negative effects for activity of the society, socioeconomic development of the country and national security [2, p. 7].

**Sectors and Resources Attributable to Critical Infrastructure.** Lists of sectors attributed to critical infrastructure in various countries are also largely similar, considering uniformity of trends that shape the development of current society. Existing differences are primarily caused by national conditions, tradition and nature of security policy of the given state or international organization. For example the US Dept. of Homeland Security [16] has identified 16 critical infrastructure sectors (Table 3.2).

Table 3.2

List of critical infrastructure sectors and their integral components (PPD21)  
(author’s composition according to [16])

No.	Sector	Integral component
1	2	3
1.	Chemical	This Sector is an integral component of the U.S. economy that manufactures, stores, uses, and transports potentially dangerous chemicals upon which a wide range of other critical infrastructure sectors rely. Securing these chemicals against growing and evolving threats requires vigilance from both the private and public sector.
2.	Critical Manufacturing	This Sector is crucial to the economic prosperity and continuity of the United States. A direct attack on or disruption of certain elements of the manufacturing industry could disrupt essential functions at the national level and across multiple critical infrastructure sectors.
3.	Transportation Systems	The Sector consists of seven key subsectors, or modes: 1) Aviation includes aircraft, air traffic control systems, and about 19,700 airports, heliports, and landing strips; 2) Highway and Motor Carrier; 3) Maritime Transportation System; 4) Mass Transit and Passenger Rail; 5) Pipeline Systems; 6) Freight Rail; 7) Postal and Shipping.
4.	Defense Industrial Base	This Sector is the worldwide industrial complex that enables research and development, as well as design, production, delivery, and maintenance of military weapons systems, subsystems, and components or parts, to meet U.S. military requirements. The sector provides products and services that are essential to mobilize, deploy, and sustain military operations. The Sector does not include the commercial infrastructure of providers of services such as power, communications, transportation, or utilities that the Department of Defense uses to meet military operational requirements.



Table 3.2 (cont'd)

1	2	3
5.	Energy	The energy infrastructure is divided into three interrelated segments: electricity, oil, and natural gas.
6.	Nuclear Reactors, Materials, and Waste	From the power reactors that provide electricity to millions of Americans, to the medical isotopes used to treat cancer patients, the Nuclear Reactors, Materials, and Waste Sector covers most aspects of America's civilian nuclear infrastructure.
7.	Water and Wastewater Systems	Safe drinking water is a prerequisite for protecting public health and all human activity. Properly treated wastewater is vital for preventing disease and protecting the environment. This Sector is vulnerable to a variety of attacks, including contamination with deadly agents; physical attacks, such as the release of toxic gaseous chemicals; and cyberattacks. The result of any variety of attack could be large numbers of illnesses or casualties and/or a denial of service that would also impact public health and economic vitality. The sector is also vulnerable to natural disasters.
8.	Dams	The Dams Sector delivers critical water retention and control services in the United States, including hydroelectric power generation, municipal and industrial water supplies, agricultural irrigation, sediment and flood control, river navigation for inland bulk shipping, industrial waste management, and recreation.
9.	Food and Agriculture	The Sector is almost entirely under private ownership and is composed of farms, restaurants, and registered food manufacturing, processing, and storage facilities.
10.	Healthcare and Public Health	The Sector protects all sectors of the economy from hazards such as terrorism, infectious disease outbreaks, and natural disasters.
11.	Information Technology	The Sector is central to the nation's security, economy, and public health and safety as businesses, governments, academia, and private citizens are increasingly dependent upon Information Technology Sector functions. These virtual and distributed functions produce and provide hardware, software, and information technology systems and services, and – in collaboration with the Communications Sector – the Internet.
12.	Communications	This Sector is underlying the operations of all businesses, public safety organizations, and government. Over the last 25 years, the sector has evolved from predominantly a provider of voice services into a diverse, competitive, and interconnected industry using terrestrial, satellite, and wireless transmission systems. The transmission of these services has become interconnected; satellite, wireless, and wireline providers depend on each other to carry and terminate their traffic and companies routinely share facilities and technology to ensure interoperability.
13.	Commercial Facilities	Includes a diverse range of sites that draw large crowds of people for shopping, business, entertainment, or lodging. Facilities within the sector operate on the principle of open public access, meaning that the general public can move freely without the deterrent of highly visible security barriers.

Table 3.2 (cont'd)

1	2	3
14.	Financial Services	<p>The Sector includes thousands of depository institutions, providers of investment products, insurance companies, other credit and financing organizations, and the providers of the critical financial utilities and services that support these functions. Whether an individual savings account, financial derivatives, credit extended to a large organization, or investments made to a foreign country, these products allow customers to:</p> <ul style="list-style-type: none"> <li>– Deposit funds and make payments to other parties</li> <li>– Provide credit and liquidity to customers</li> <li>– Invest funds for both long and short periods</li> <li>– Transfer financial risks between customers.</li> </ul>
15.	Emergency Services	<p>The Sector is a community of millions of highly-skilled, trained personnel, along with the physical and cyber resources, that provide a wide range of prevention, preparedness, response, and recovery services during both day-to-day operations and incident response. The Emergency Services includes geographically distributed facilities and equipment in both paid and volunteer capacities organized primarily at the federal, state, local, tribal, and territorial levels of government, such as city police departments and fire stations, county sheriff's offices, Department of Defense police and fire departments, and town public works departments.</p> <p>The mission of the Emergency Services Sector is to save lives, protect property and the environment, assist communities impacted by disasters, and aid recovery during emergencies.</p>
16.	Government Facilities	<p>Many government facilities are open to the public for business activities, commercial transactions, or recreational activities while others that are not open to the public contain highly sensitive information, materials, processes, and equipment. These facilities include general-use office buildings and special-use military installations, embassies, courthouses, national laboratories, and structures that may house critical equipment, systems, networks, and functions. In addition to physical structures, the sector includes cyber elements that contribute to the protection of sector assets (e.g., access control systems and closed-circuit television systems) as well as individuals who perform essential functions or possess tactical, operational, or strategic knowledge.</p>

In Germany nine sectors have been identified critical on the national level. These are [6]:

1. Energy/power supply
2. Information and communications technology
3. Transport and logistics
4. (Drinking-) water supply and sewage disposal
5. Public health/medical services

6. Food
7. Public administration, including emergency and rescue services
8. Economic services/finance, insurance business
9. Media and cultural objects (cultural heritage items).

Obviously, Ukraine, struggling amid stringent security, financial and economic conditions, should compile its critical infrastructure sector list proceeding primarily from available resources and the need to sustain and protect base functions, failing which safe existence of the population, the society and the state as well as due protection of national interests will be compromised (Table 3.3).

Table 3.3

List of Critical Infrastructure Sectors and responsible authorities in Ukraine [2, p. 28]

Critical infrastructure sector	Main institutions responsible for safety, security and operation of sector's facilities
1. Fuel & Energy Complex	Ministry of Energy and Coal Industry, Security Service of Ukraine (SBU) <sup>xxii</sup> , Ministry of Internal Affairs <sup>xxiii</sup> , State Service of Special Communications and Information Protection of Ukraine (SSC) <sup>xxiv</sup>
2. Transport	Ministry of Infrastructure, SBU <sup>xxi</sup> , Ministry of Internal Affairs <sup>xxii</sup>
3. Life Support Networks	Ministry of Regional Development, Construction and Communal Services of Ukraine, State Service of Ukraine for Emergency Situations (SSE) <sup>xxv</sup>
4. Telecommunications and Communication Networks	SSC, Ministry of Internal Affairs <sup>xxii</sup>
5. Financial and banking sector	National Bank of Ukraine, Ministry of Finance, SBU <sup>xxi</sup> , SSC <sup>xxiii</sup>
6. Public administration and law-enforcement	SBU <sup>xxi</sup> , Ministry of Internal Affairs <sup>xxii</sup> , State Guard Service <sup>xxii</sup>
7. Security and defense complex	Ministry of Defense, Ministry of Internal Affairs <sup>xxii</sup> , SBU <sup>xxi</sup>
8. Chemical industry	State Service of Ukraine for Labor, SSE <sup>xxiv</sup> , SBU <sup>xxi</sup>
9. Emergency services and civil protection	SSE, Ministry of Health
10. Food processing industry and agricultural complex	Ministry of Agrarian Policy and Food

*Notes: xxi – institutions responsible for adoption of regulatory and legislative acts governing critical infrastructure protection should be specified; xxii – in the scope of counter-terrorist activities; xxiii – regarding facilities security; xxiv – regarding cyber threat counter-action xxv – in the scope of civil defense tasks.*

**Critical infrastructure: main threats and protection.** As a rule, national legislations of the leading nations distinguish between three main categories of threats to critical infrastructure,

based on their origin. Yet, even here there are differences [2, p. 10]. Say in the US and Canada the range of threats to critical infrastructure includes:

- *malicious acts* (malicious acts of groups or individuals, such as terrorists or criminals);
- *natural hazards* (hurricanes, tornadoes, earthquakes, tsunamis, floods, extreme weather conditions etc.);

- *man-induced emergencies* (air crashes, nuclear accidents, fires, power supply system accidents, releases of hazardous substances etc.).

In Germany, there are threat categories as follows:

- *hazardous natural phenomena* (extreme weather conditions, forest and steppe fires, seismic events, epidemics and pandemics, cosmic phenomena);

- *technical accidents/human errors* (system failures, accidents and emergencies, negligence, administrative errors etc.);

- *terrorism, crime, war* (terrorism, sabotage, crime, civil wars, hostilities).

In Ukrainian It makes more sense to define the following classes of threats for the purposes of critical infrastructure protection [2, p. 12]:

- *accidents and technical failures*, including air crashes, nuclear accidents, fires, power supply system accidents, releases of hazardous substances etc., system failures, accidents and emergencies caused by negligence, administrative errors etc.;

- *hazardous natural phenomena*, including extreme weather conditions, forest, steppe and peat-bog fires, seismic events, epidemics and pandemics, cosmic phenomena, hurricanes, tornadoes, earthquakes, tsunamis, floods, etc.;

- *malicious acts*, including malicious acts of groups or individuals, such as terrorists or criminals, as well as hostilities under conditions of war.

The highest is the hazard from combined threats and threats whose materialization may cause disastrous and varied cascade effects as the result of interdependence of critical infrastructure elements. In addition to the classification by origin, threats to critical infrastructure could be viewed from the perspective of their targets, including:

- *physical elements*, including equipment and resources of critical infrastructure assets;
- *management and communications systems*, including automatic control and regulation systems, communications systems etc.;

- *facility personnel*, including dispatch and operations personnel covering immediate operational needs of critical infrastructure in the real time.

Identification of threat targets offers a more systematic approach to the formation of the state policy and organization of a critical infrastructure protection system.

Development of the methodological basis for the assessment of threats for critical infrastructure at the national level with consideration for interrelations between individual infrastructure assets and sectors, impact of all types of threats, and assessment and management of risks at regional and national levels using world-wide experience are important elements in creation a mechanism for security critical infrastructure. In our view, in the context of technological change, the methodological basis for risk assessment at the regional and national levels should be the concept of emerging risks.

***Conceptual and methodical aspects of emerging risk-management. The black swan theory.*** Natural disasters, terrorist attacks, global pandemics and many other conventional risks keep governments around the world on alert; however they also have to deal with an increasing number of rapidly emerging risks. Therefore the concept of emerging risk has gained increasing attention in recent years. The term has an intuitive appeal and meaning but a consistent and agreed definition is missing. The paper presents [8, p. 61] an in-depth analysis of this concept, in particular its relation to black swan type of events, and show that these can be considered meaningful and complementary concepts by relating emerging risk to known unknowns and black swans to unknown knowns, unknown unknowns and a subset of known knowns.

The black swan theory or theory of black swan events is a metaphor that describes an event that comes as a surprise, has a major effect, and is often inappropriately rationalized after the fact with the benefit of hindsight [17]. The term is based on an ancient saying which presumed black swans did not exist, but the saying was rewritten after black swans were discovered in the wild. The idea of a black swan event was pioneered by the financial professional turned writer Nassim Nicholas Taleb after the results of the 2008 financial crisis. The theory was explained [17]:

- the disproportionate role of high-profile, hard-to-predict, and rare events that are beyond the realm of normal expectations in history, science, finance, and technology;
- the non-computability of the probability of the consequential rare events using scientific methods (owing to the very nature of small probabilities);
- the psychological biases that blind people, both individually and collectively, to uncertainty and to a rare event's massive role in historical affairs.

The term "emerging risks" can be understood as new risks or familiar risks in unfamiliar conditions. Emerging risks can be new and unforeseen risks whose potential for harm or loss is not fully known. In looking at the universe of emerging risks it becomes increasingly clear that a significant portion are by their nature not observable by traditional methods, even though their impact will no doubt at some point be felt [1, p.3]. Systemic emerging risks present particular risk

management challenges due to their low frequency but potentially high impacts that can across economies and have societal, political and other impacts. Further, it is difficult to determine when or how an emerging risks can materialize. Emerging risks may be issues that are perceived as potentially significant, at least by some stakeholders or decision-makers, but their probabilities and consequences are not widely understood or appreciated. The dynamic element of emerging risks is critical, as adaptive systems respond (or learn to respond) to perturbation's. Some emerging risks lessen over time while others become worse than anticipated.

There are three categories of emerging risk according to International Risk Governance Council (IRGC) [10]:

1. Risks with uncertain impacts, with uncertainty resulting from advancing science and technological innovation.
2. Risks with systemic impacts, stemming from technological systems with multiple interactions and systemic dependencies.
3. Risks with unexpected impacts, where new risks emerge from the use of established technologies in evolving environments or contexts.

In Global Risks Report 2017 [14] emerging risks are regarded as a global risks. A "global risk" is defined as an uncertain event or condition that, if it occurs, can cause significant negative impact for several countries or industries within the next 10 years (Table 3.4).

Table 3.4

Descriptions of Global Risks and Trends 2017 [14, p. 61]

<b>Global Risk</b>	<b>Description</b>
1	2
<i><b>Economic Risks</b></i>	
Asset bubbles in a major economy	Unsustainably overpriced assets such as commodities, housing, shares, etc. in a major economy or region.
Deflation in a major economy	Prolonged near-zero inflation or deflation in a major economy or region.
Failure of a major financial mechanism or institution	Collapse of a financial institution and/or malfunctioning of a financial system that impacts the global economy.
Failure/shortfall of critical infrastructure	Failure to adequately invest in, upgrade and/or secure infrastructure networks (e.g. energy, transportation and communications), leading to pressure or a breakdown with system-wide implications.
Fiscal crises in key economies	Excessive debt burdens that generate sovereign debt crises and/or liquidity crises.
High structural unemployment or underemployment	A sustained high level of unemployment or underutilization of the productive capacity of the employed population.

Table 3.4 (cont'd)

1	2
Illicit trade (e.g. illicit financial flows, tax evasion, Human trafficking, organized crime, etc.)	Large-scale activities outside the legal framework such as illicit financial flows, tax evasion, human trafficking, counterfeiting and/or organized crime that undermine social interactions, regional or international collaboration, and global growth.
Severe energy price shock (increase or decrease)	Significant energy price increases or decreases that place further economic pressures on highly energy-dependent industries and consumers.
Unmanageable inflation	Unmanageable increases in the general price levels of goods and services in key economies.
<b><i>Environmental Risks</i></b>	
Extreme weather events (e.g. floods, storms, etc.)	Major property, infrastructure and/or environmental damage as well as loss of human life caused by extreme weather events
Failure of climate-change mitigation and adaptation	The failure of governments and businesses to enforce or enact effective measures to mitigate climate change, protect populations and help businesses impacted by climate change to adapt.
Major biodiversity loss and ecosystem collapse (terrestrial or marine)	Irreversible consequences for the environment, resulting in severely depleted resources for humankind as well as industries.
Major natural disasters (e.g. earthquake, tsunami, volcanic eruption, geomagnetic storms)	Major property, infrastructure and/or environmental damage as well as loss of human life caused by geophysical disasters such as earthquakes, volcanic activity, landslides, tsunamis, or geomagnetic storms.
Man-made environmental damage and disasters (e.g. oil spills, radioactive contamination, etc.)	Failure to prevent major man-made damage and disasters, including environmental crime, causing harm to human lives and health, infrastructure, property, economic activity and the environment.
<b><i>Geopolitical Risks</i></b>	
Failure of national governance (e.g. failure of rule of law, corruption, political deadlock, etc.)	Inability to govern a nation of geopolitical importance as a result of weak rule of law, corruption or political deadlock.
Failure of regional or global governance	Inability of regional or global institutions to resolve issues of economic, geopolitical or environmental importance
Interstate conflict with regional consequences	A bilateral or multilateral dispute between states that escalates into economic (e.g. trade/currency wars, resource nationalization), military, cyber, societal or other conflict.
Large-scale terrorist attacks	Individuals or non-state groups with political or religious goals that successfully inflict large-scale human or material damage.
State collapse or crisis (e.g. civil conflict, military coup, failed states, etc.)	State collapse of geopolitical importance due to internal violence, regional or global instability, military coup, civil conflict, failed states, etc.
Weapons of mass destruction	The deployment of nuclear, chemical, biological and radiological technologies and materials, creating international crises and potential for significant destruction.

Table 3.4 (cont'd)

1	2
<b><i>Societal Risks</i></b>	
Failure of urban planning	Poorly planned cities, urban sprawl and associated infrastructure that create social, environmental and health challenges.
Food crises	Inadequate, unaffordable, or unreliable access to appropriate quantities and quality of food and nutrition on a major scale
Large-scale involuntary migration	Large-scale involuntary migration induced by conflict, disasters, environmental or economic reasons.
Profound social instability	Major social movements or protests (e.g. street riots, social unrest, etc.) that disrupt political or social stability, negatively impacting populations and economic activity.
Rapid and massive spread of infectious diseases	Bacteria, viruses, parasites or fungi that cause uncontrolled spread of infectious diseases (for instance as a result of resistance to antibiotics, antivirals and other treatments) leading to widespread fatalities and economic disruption.
Water crises	A significant decline in the available quality and quantity of fresh water, resulting in harmful effects on human health and/or economic activity.
<b><i>Technological Risks</i></b>	
Adverse consequences of technological advances	Intended or unintended adverse consequences of technological advances such as artificial intelligence, geo-engineering and synthetic biology causing human, environmental and economic damage.
Breakdown of critical information infrastructure and networks	Cyber dependency that increases vulnerability to outage of critical information infrastructure (e.g. internet, satellites, etc.) and networks, causing widespread disruption.
Large-scale cyber-attacks	Large-scale cyberattacks or malware causing large economic damages, geopolitical tensions or widespread loss of trust in the internet.
Massive incident of data fraud/theft	Wrongful exploitation of private or official data that takes place on an unprecedented scale.

The IRGC identifies 12 contributing factors on the emerging risks [10, p. 6]:

- 1) scientific unknowns;
- 2) loss of safety margins;
- 3) positive feedback;
- 4) varying susceptibilities to risk;
- 5) conflicts about interests, values and science; 6) social dynamics;
- 7) technological advances;
- 8) temporal complications;
- 9) communication;
- 10) information asymmetries;
- 11) perverse incentives;
- 12) malicious motives and acts.



Concerning the seventh contributing factor, it should be noted Emerging Technologies (Table 3.5) creates new risks, diminishes others, and in turn can be motivated by the need to cope with risks. It is often associated with increases in efficiency, and therefore lower use of resources for a given output level. However, the resulting decoupling between economic growth and environmental damage will probably be too limited to offset the rise in ecological pressures in the coming decades. On the basis of the foregoing discussion, that risk assessment and management procedures in particular have to be continuously adapted to changing technological structures.

Table 3.5

Description of the Emerging Technologies [14, p. 63]

<b>Emerging Technology</b>	<b>Description</b>
1	2
3D printing	Innovations in printing using various types of materials to move beyond prototyping and towards increasingly distributed manufacturing and medical applications that range from a greater use of technologies such as contour crafting in construction to the opportunity to develop printed biological materials, such as organ tissues, bone and muscle.
Advanced materials and nanomaterials	Innovation in chemistry and physics resulting in the creation of new material substances, smart materials, 2D materials and other breakthroughs in properties and fabrication ranging from thermoelectric properties and shape retention to magnetic and mechanical functionalities.
Artificial intelligence and robotics	Advances in automated processes ranging from manufacturing to driverless vehicles and automated knowledge work, enabled by highly competent cyber-physical systems and machines that can substitute for human beings to complete various tasks most often associated with thinking, multitasking, and fine motor skills.
Biotechnologies	Innovations in genome editing, gene therapies, and other forms of genetic manipulation and synthetic biology resulting in additions to the registry of sequenced species of animals as well as human DNA, the creation of previously non-existent organisms, and modifications to microbes and organisms for medical, agricultural and industrial applications, including integrating them with electronic and computing advancements.
Energy capture, storage and transmission	Breakthroughs in energy technologies, including advanced batteries and fuel cells, orbiting solar arrays, tidal energy capture, wind and bioenergy, as well as advances in nuclear fusion containment, smart grid systems, wireless energy transfer, and increased fuel cell fabrication efficiencies.
Blockchain and distributed ledger	Developments in cryptographic systems that manage and verify distributed transaction data on a public ledger, increasing transparency and securing an immutable record for application to cryptocurrencies such as bitcoin as well as for verification of varieties of transactions across industries, especially in financial technologies.
Geoengineering	Creation and development of technological processes that intercede in the Earth's geological and climatic systems, ranging from land reclamation to atmospheric seeding in order to influence weather patterns or remove carbon dioxide.

Table 3.5 (cont'd)

1	2
Proliferation and ubiquitous presence of linked sensors	Proliferation and ubiquitous presence of linked sensors, also known as the “Internet of Things”, combined with sophisticated large-scale data analytics that will connect, track and manage physical products, logistics systems, energy grids and more by sending and receiving data over widespread digital infrastructures.
Neurotechnologies	Creation of new methods for insight into, and control of, the functionality and processing dimensions of the human brain, allowing for the ability to read, influence and communicate brain activity through various secondary technological dimensions such as smart drugs, neuroimaging, bioelectronic interfaces, machine-brain interfaces and brainwave decoding and manipulation.
New computing technologies	Innovations in materials and assemblages used to process or store digital information, such as centralized cloud computing, quantum computing, neural network processing, biological data storage, and optical computing, including new software development, cryptography, and the cybersecurity processes associated with each.
Space technologies	Technologies that can be used in space that will increase the ability of both public and private entities to access, explore, and create new forms of value such as microsattellites, reusable rockets, integrated rocket-jet engines, optical and imaging technologies, sensor developments, resource exploitation, laser and communications technologies, space exploration and habitat developments, and techno-scientific breakthroughs that are transferable to the marketplace.
Virtual and augmented realities	Development of sophisticated immersive virtual environments that can range from heads-up displays and holographic readouts to fully mixed digital and physical environments and complete virtual worlds and interfaces.

The volatile and unpredictable nature of emerging risk makes monitoring, modeling and development system of critical infrastructure protection more challenging. In fact, governments should intensify their efforts to develop mechanisms that allow for adjustment of their risk management frameworks to capture these emerging risks. Example suggested indicators for economic and social emerging risks for Singaporean are presented in Table 3.6. Systematic monitoring of these indicators could help to detect weak signals which otherwise would have gone unnoticed. A team of experienced strategic planners could formulate critical thresholds for a combination of these non-traditional indicators above which decision makers should consider policy action.

Table 3.6

Suggested indicators for economic and social emerging risks [11, p. 25]

<b>Suggested general indicators:</b>	<b>Criteria for application and suspected interactions with other indicators</b>
1	2
<i>Income inequality (measured by Gini coefficient)</i>	<ul style="list-style-type: none"> <li>– Change over time (Traditional risk)</li> <li>– Can act as an amplifier for other economic and social risks.</li> </ul>
<i>Income quintile share ration (S80/S20 ratio)</i>	<ul style="list-style-type: none"> <li>– Change over time could signal growing divide between the bottom quintile and top quintile of the population</li> <li>– Interacts with price trends and social security measures as well as access to other public services.</li> </ul>

Table 3.6 (cont'd)

1	2
<i>(Youth) unemployment rates</i>	<ul style="list-style-type: none"> <li>– Change over time &amp; critical thresholds to be set</li> <li>– Interacts with social security net, cost of living and other social risks,</li> <li>– Has been contributing factor to Arab Spring.</li> </ul>
<i>Workers' rights and working conditions</i>	<ul style="list-style-type: none"> <li>– When working conditions are the motive for work &amp; social conflicts (e.g. China)</li> <li>– Interacts with economic hardship such as mass layoffs or rising inequality.</li> </ul>
<i>Price increase in critical sectors</i> <ul style="list-style-type: none"> <li>– Food</li> <li>– Energy</li> <li>– Water</li> <li>– Housing</li> </ul>	<ul style="list-style-type: none"> <li>– Requires analysis of specific cultural and political context to set critical “quantitative thresholds”</li> <li>– Measuring change over time is recommended rather than absolute values.</li> <li>– Interacts with social security net as well as key economic trends such as overall inflation, unemployment and inequality, but also social risks such as corruption or arbitrary administrative hassles.</li> </ul>
<i>Access to public health services</i> <ul style="list-style-type: none"> <li>– Availability (eligibility)</li> <li>– Cost (affordability)</li> <li>– Standards (quality)</li> </ul>	<ul style="list-style-type: none"> <li>– Could be critical if large parts of society remain excluded or prevented from access due to corruption</li> <li>– Interacts with social (dis)satisfaction and could amplify protest potential.</li> </ul>
<i>Extent of Social Security System/Net</i> <ul style="list-style-type: none"> <li>– Access to health care,</li> <li>– Pension plans, insurance</li> <li>– Unemployment benefits</li> </ul>	<p>Low or limited social security can lead to disengagement of certain groups (unemployed, elderly, poor &amp; marginalized) which then could fuel social unrest potential (e.g. Arab Spring).</p>
<i>Extreme administrative hassle for citizens or disconnect between administrative regulation and economic/work reality</i> <ul style="list-style-type: none"> <li>– No. of media stories, blogs, tweets</li> <li>– No. of complaints made</li> </ul>	<ul style="list-style-type: none"> <li>– A minor indicator, but can inform qualitative analysis of emerging social risks in a society</li> <li>– Will fuel already existing anger &amp; frustration about societal grievances</li> <li>– Arbitrariness, misconduct, corruption by public officials can trigger disruptive events (e.g. Tunisia).</li> </ul>
<i>Bureaucratic burden</i> <ul style="list-style-type: none"> <li>– Doing Business Index (e.g.)</li> </ul>	<ul style="list-style-type: none"> <li>– Ease of doing business and absence of corruption are important for the self-employed, often in the informal sector</li> <li>– Interacts with other social risks such as unemployment rate, cost of living and access to public services.</li> </ul>
<i>Exclusion from participatory processes</i> <ul style="list-style-type: none"> <li>– Minority representation in parliament</li> <li>– Existence of civic participation platforms</li> </ul>	<ul style="list-style-type: none"> <li>– Can channel citizens into more radical groupings instead of expressing their opinions and demands through official institutions</li> <li>– Interacts with emerging economic risks and has a potential to fuel social protests and unrest when combined with economic hardship &amp; injustice</li> </ul>
<i>Social media amplification</i> <ul style="list-style-type: none"> <li>– Hashtag frequency / trending topics</li> </ul>	<p>Simple measure which can inform deeper analysis of other qualitative sources such as blogs, activities of political movements etc.</p>
<i>Social media text mining / sentiment analysis</i> <ul style="list-style-type: none"> <li>– Software-based keyword analysis</li> <li>– +/- rating of tweets / blog posts</li> </ul>	<ul style="list-style-type: none"> <li>– Can help to detect social trends before they become mainstream and contribute to anticipatory policy making</li> <li>– Application as exploratory early-warning tool</li> <li>– Requires advanced technological capacity.</li> </ul>

Table 3.6 (cont'd)

1	2
<i>Frequency and intensity of protests</i> – Police reports – Media reports – Speech analysis	– Crude measure for social and economic risk, but useful when detected early – Network analysis can establish links between seemingly unrelated locations/cities/social groupings.
<i>More specific indicators</i>	<i>Can be tracked to pick up weak signals, to start digging deeper and uncover underlying social risks</i>
Non-business bankruptcy filings	Positively related to rise in income inequality
Rate of divorce	
Average commuting times	
Total number of hours worked	
Median house prices	

So, improvement of a system monitoring indicators for emerging risks, critical infrastructure threat analysis and forecast, identification of methods and ways for critical infrastructure operation related emerging risk mitigation, enhancement of reliability are the key avenues for the development of mechanism for security of Ukrainian critical infrastructure.

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### **3.3 FREE TRADE AND INCOME POLARIZATION: REASONABLE CONTEXT**

In the context of global economic growth reduction, political support for the process of international trade liberalization has been weakened, which is particularly evident in developed countries, especially in the United States. Some resistance to free trade is not a new phenomenon, but it has never led to the post-war eradication of trade liberalization that ensured economic growth in the developed world and contributed to the equalization of income per capita in the developing world.

Opposition against free trade remains a minority view, but some bright opponents have lately been opposed to trade.

Trade enables the country to use resources more efficiently. At the same time, benefits from raising efficiency can be disproportionately dispersed among the population of the country, what is why some of them are defeated. This can lead to the deepening of inequality of income and the disruption of the normal course of life.

Due to the expansion of trade, technological advancement and political transformation in the last quarter of the era, the global economy has been drastically changed. At a time when it was possible to make significant progress on the international scale which inspired optimism, in many countries nothing was done that the broader layers of society felt the benefits of economic growth (which was also due to trade). The slow growth in some countries and the decline in the overall income level have worsened the dissatisfaction.

Distribution of trade benefits has always been disproportionate, and it has become more evident in recent years. At the same time, under the conditions of low growth, trade benefits are of special importance. Countries should maintain and multiply these benefits by applying such political mechanisms that will ensure fairer redistribution. It also raises the stability of the economy during the influence of various market forces, including those not related to globalization [8, p. 12].

Over the past three decades, emerging economies have become more integrated into the global market. Reducing trade-related barriers along with improving the transportation and communication systems helps companies reorganize their production capacities and manage them outside the founder's country using the relatively inexpensive labor resources of developing countries.

These changes are considered as the result of growing inequalities and losses of jobs in developed countries, which is one of the reasons for the ongoing negative reaction towards international trade.

For the last three decades, income inequality has increased in many developing countries, especially in Asia. Surveys conducted by the Pew Research Center show that 80-96 percent of people in developing countries (Brazil, Vietnam, India, China) consider inequality one of the key challenges their country faces. And only 1 to 13 percent of people in these countries consider trade as the major cause of inequality growth.

This public perception corresponds to the conclusions [3] of scientific literature that trade in developing countries contributes to inequality, but is not considered its main cause.

The impact of trade on inequalities inside the country is complicated because trade affects people's income and consumption differently, and its impact is uneven and varies depending on the context. The nature of trade integration, that is – how easily people and capital move between companies, industries and regions, the situation of people affected by trade (according to the income distribution scale in the country), all these factors matter [9, p. 34].

In the early 2000's, globalization rates, including China's full integration into the international trading system, have accelerated. The growth of investments in educational systems of developing countries has expanded the opportunities to transfer abroad the standard production processes and functions in the service sector, including the export of high-tech products, especially from China. In developed countries, the "disappearance" of middle-qualified professions began, something that was called the "polarization of jobs". This phenomenon can be partly explained as a result of transferring the trade and production beyond the national boundaries, but probably the technological process is also important, as the typical processes are automated more often [4].

Only recently have accumulated enough data that enable us to confirm the long-term negative impact of two factors: the transfer of production to China and the import from there had an impact on the employment level and the level of wages in the local labor market of the sectors competing with imports. In the developed countries, the share of labor force in the processing industry has declined as a result of relatively rapid growth in productivity in that area. Moreover, in the 2000s the sharp decline in this indicator was observed in the United States, which was partly due to the fact that companies capitalized abroad for the production of goods, which were subsequently exported to the United States, including from China (Fig. 3.1).

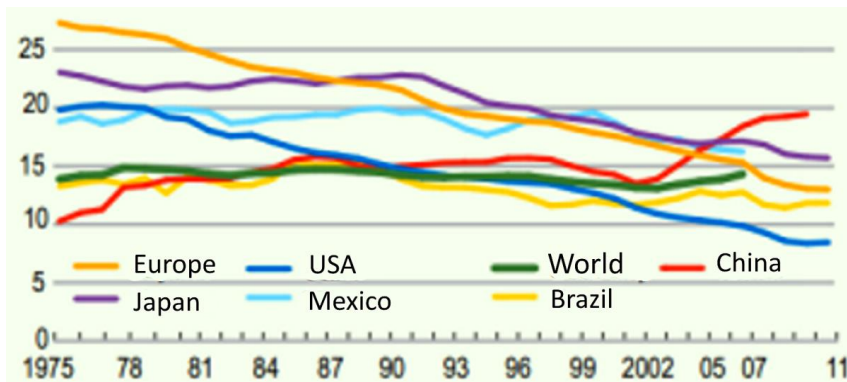


Figure 3.1. Worldwide Employed in Processing Industry (% to total employed) [10]

As the experience shows, if the workforce that lost its jobs in the US manufacturing industry wants to find a new job, he/she must agree to a relatively low salary [1]: Employees who lost their jobs in the result of import competition bear long-term losses that are reflected in the reduction of salaries and unemployment that is noticeable in many countries, including developing countries. This problem has also been in the past, but in recent times, it has exacerbated due to aging and large-scale volatility in developed countries in the context of the rapid growth of exports from China [8, p. 15].

In the case of international trade, the benefits of transboundary activity have fewer doubts. The impressive successes of the East Asian countries are closely linked to the export. The autarky, i.e. the state-sponsored policy of self-sufficiency to the detriment of foreign trade, from Africa and Latin America to South Asia, became an ineffective tool to combat poverty. According to G. Hafbauer and E. Jung [5], after the Second World War, the steady growth in trade provided an annual increase of US \$ 1 trillion in USA national income and a corresponding

increase in international scale. Even though trade may have similar impact on unequal breakdown of revenues as technological advancement has, the benefits of globalization for the economy are much higher than the loss of employees' dependent on imports. Thus, protectionism cannot be considered an exact answer to inequality. For redistribution of the overall growth of profit to the benefit of those who have losses due to trade, the taxation system and cost policy are functioning. The fact that so far this distribution is considered insignificant is a matter of policy rather than globalization. Because of the trade is so effective, resistance to trade has a negative effect. Negotiations on international trade in Doha ended in failure, the prospects for inter-Mediterranean cooperation were questioned, the signing of the Arctic Trade and Investment Cooperation Agreement entered into a deadlock. The British public, deciding to leave the European Union, showed indifference to the advantages of a single European market, or expressed its disagreement to accept migration as a price for EU membership. The US also demonstrates a reduction in trade support.

Such a negative reaction reflects a sharp drop in trade growth rates against GDP. During 1990-2007 international trade volumes grew twice faster than world production volumes, but since 2008, the international growth has been postponed. As with financial globalization, this tendency did not end even after overcoming the consequences of the crisis. In 2009 trade as a component of global GDP has dramatically reduced, while in 2010-2011, recorded a sharp increase. However, since 2012, these growth rates have stopped and then become negative (Fig. 3.2).

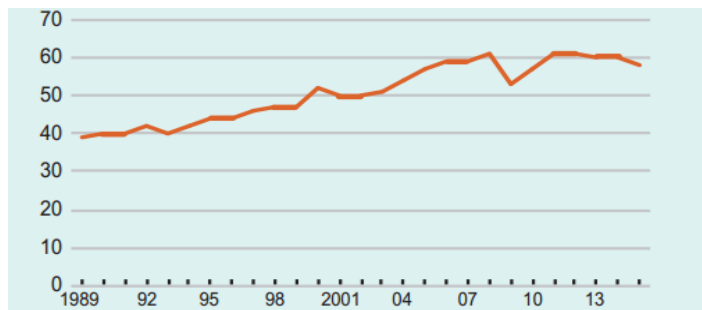


Figure 3.2. Volatility of international trade volumes in the world (% to global GDP) [7, p. 9]

Nevertheless, the blow to the prospects of constructive globalization is not as heavy as it seems. This slowdown is partly explained by the introduction of many invisible trading barriers, which G.Hafbauer and E. Jung call "micro-protectionism". The IMF has recently analyzed the



impact of such sponsorship growth and assessed them as "limited". Thus, the slowdown in trade growth is mainly reflected in the statistical factors which should not be considered as obstacles to the path of globalization. Partly this slowdown can even be considered a reflection of changes that confirm the effectiveness of the globalization process.

Let's consider, for example, the reduction of trade volumes from 60% of global GDP (2014) to 58% (2015), which is equivalent to a decrease of 4.5 trillion US dollars. Most of this decline is a statistical breakthrough – strengthening of US dollar positions, reduction of stock prices, i.e. volumes of trading in dollar terms decreased. This is evident, if we look at oil sample. In 2015, the oil price was 48% lower than in 2014, which led to a decline in the sales price of \$ 891 billion in spite of the increase in oil volumes expressed by barrels. Only this effect allows explaining 1/5 of the decline in trade volumes against GDP in 2015. Meanwhile, iron ore prices fell by 43%, and wheat by 24%. Those price drops provide visibility of trade uncertainty, but tell nothing about globalization overall situation [2].

At present, globalization is under the influence of politics, and supporters of left and right options are criticizing the proposed new agreements, such as the inter-Mediterranean cooperation in trade and investment and the Arctic cooperation [7]. The majority of those politicians thoughts is absurd. However, there are a number of in-depth reasons why globalization has ceased to exist, and the former set of items can not be returned by criticizing the wrong economic decisions.

Relatively important is that there are discrepancies between free trade supporting economists (Authority) and actual economic models. According to the textbook theory of trade, international trade makes the countries richer, and trade restrictions have the opposite effect. However, this theory also allows to make conclusions that any step besides extreme sponsorship is associated with relatively limited costs, and in this case, trade can have a strong impact on the distribution of income between countries, some of which will benefit, and some of them will lose.

Why is trade liberalization so popular with both economists and the government that determine the policy? In the case of economists, the answer is probably comparative advantage, and for the ruling elite it is noteworthy that after the Second World War, the free trade system is an unique example of successful international cooperation.

In fact, for a long time during 1940-1980, trade liberalization process was quite smooth. Groups with losses as a result of the trade growth were few and not so obvious, mainly because the main part of this growth was due to the incoming flows between similar countries and with minimal distribution consequences.

However, the situation has dramatically changed since the 1990s due to a number of reasons, including the decline in the price of transport and communication services and the

refusal from an import substitution policy by developing countries, the large trade volumes between the North and the South (i.e., countries with varying levels of development, have also differences in salary levels). This trade currently boosts the revenues of the parties, but has a greater impact on the employment level in different sectors, and most likely, on the distribution of earnings in labor and capital as compared to the trade growth in the 1950-1980s. Export from China has actually led to the loss of millions of jobs in the US processing industry. Import from developing countries is considered an important, but not the only reason for stagnation and reduction of the salaries of skilled employees [6].

Summarizing it should be noted that globalization gives everyone an opportunity to get economic benefits, but there are no guarantees that the potential can be realized in the protection of those who are negatively impacting this process without the government's decisive steps. From the beginning of the 1990s, radical changes at the global level, along with the chronic lower rates of economic growth due to the financial crisis, have deteriorated the situation of many people and countries. As a result, in a number of developed countries, occurs a dissatisfaction with further development and liberalization of trade. We cannot say that only trade and trade policies (perhaps they were not the most important factors) have led to these changes or that they were the reason for the slowdown in growth. Technical progress and development peculiarities of the countries also played an important role [8, p. 16]. It will not be possible to maintain the political consensus underlying on the basis of a post-war trade policy, unless a well-targeted policy-driven system of economic openness is developed, the labor market flexibility and the availability of an educated, dynamic workforce is assured, job search processes are supported, financial markets functions are improved and the issue of income inequality is directly solved. This system is also needed to address a number of other economic issues in the transitional period which may cause damage and require adaptation.

Trade has its unique role only in the illusion that governments can isolate themselves from the rest of the world when it becomes uncomfortable. But in the 21st century mutual dependence has ceased to be voluntarily selected.

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10. The long-term labor force involved in the processing industry of developed countries was diminishing, due to the transfer of production to developing countries or the elimination of jobs as a result of technical advancement. Source: EU-KLEMS, GGDC 10-Sector, ILOSTAT, OECD & RIETI CIP:

### **3.4 BRANDING AS AN INNOVATIVE COMPONENT OF UKRAINE'S ECONOMIC SECURITY**

The globalization of the economic system is characterized by the transformation of the forms and methods of competition of the competitive struggle of national economies. Formation of the national brand as one of the innovative components of Ukraine's economic security index can be considered as one of the key tools to increase its attractiveness for investors, entrepreneurs, visitors and tourists.

The development of brand management mechanisms creates the brand of Ukraine, which will ensure the advancement of national achievements in the global market. The use of such a strategic tool as branding involves realization of a complex of measures aimed at the purposeful formation of a positive image of the competitive brand of Ukraine. And this, in its turn, is an inseparable innovation component of spraying the level of economic security of Ukraine from the standpoint of its Euro-integration and general civilization priorities in a difficult socio-economic and geopolitical situation.

The problems of national branding and international marketing of the territories are studied by K. Asplund, S. Anholt, I. Burakovsky, T. Zavgorodny, J., Johansen, M. Kawartzis, N. Kaneva, F. Kotler, J. Christensen, J. Leifeld, M. Mylanen, V. Miroschnichenko, A. Pankrukhin, K. Ryerson, D. Rayesto, A. Starostina, G. Zondi, D. Traut, D. Heide, M. Khan, G. Hankinson, T. Tsygankova, R. Schuler, L. Shulgina and others. Despite the fact that studies of national identity problems and brands of countries of origin have been conducted before, national branding of Ukraine still remains a thoroughly studied field of theoretical and practical study.

Most Ukrainians support the idea of creating national branding programs. Moreover, almost 50% of the respondents agree with the statement that such a program should primarily be aimed at changing the attitude of the Ukrainians themselves.

The Law "On the Fundamentals of National Security of Ukraine" states that the national security of Ukraine, as "the protection of the vital interests of man and citizen, society and the state, in which the sustainable development of society is ensured, the timely detection, prevention and neutralization of real and potential threats to national interests" is achieved through conducting a well-balanced state policy in the political, economic, social, military, environmental, scientific and technological, informational and other. spheres [2]. In turn, according to the overwhelming majority of scholars, for determining the state of economic security of Ukraine, the functional components given in Table 3.7 are highlighted.

Table 3.7

Interpretation of functional components of economic security of Ukraine  
(formed by author [1] and [4])

<b>№</b>	<b>Component of the economic security</b>	<b>Characteristics</b>	<b>Weight factor *</b>
1.	Financial	Financial security and achievement of the most effective use of national resources	0,15
2.	Intellectual and staffing	Preservation, development and management of intellectual potential of the country; use of accumulated knowledge and professional experience, protection of the totality of intellectual property rights	0,08
3.	Technological and technological	The degree of conformity of applied technologies to the modern world analogues for optimization of expenses and resources	0,09
4.	Political and legal	Comprehensive legal support, observance of the current legislation	0,12
5.	Information	Effective informational and analytical support – absence of incomplete, inaccurate and contradictory information used in the process of approval of administrative decisions	0,1
6.	Environmental	Compliance with environmental norms of technology and product release, minimization of enterprise losses from environmental pollution	0,1
7.	Power	Physical and moral security of the population, preservation of the country's assets, observance of national interests	0,11
8.	Foreign Economic	Reliability of the interaction of the country with its counterparties	0,12
9.	Innovative	Preservation and development of the country's potential by forming a brand	0,13
<b>Total</b>			<b>1</b>

We propose to consider the brand "Ukraine" as a multifactor innovative component of the economic security of Ukraine, the structure of which consists of: financial, intellectual and personnel, technical and technological, political, legal, informational, environmental, power, external economic components. Under the innovative component of Ukraine's economic security, we propose to consider the combined set of perceptions, images, associations, and expectations regarding our country.

The financial component covers the economic value, specialization, trends of the financial system of Ukraine. Intellectual and personnel components prove that the formation of the brand "Ukraine" is possible only through the efforts of Ukrainians. In order for the brand "Ukraine" to receive a presentation form, it is necessary that citizens become its "bearers": when traveling abroad, they actively and with great respect spread, while remaining within their own country, distributed and inherited. The political and legal component should cover a legally favorable investment climate. Though, in the consciousness of 30% of Ukrainians, it is associated with political scandals. The information component should be realized through the personification of the uniqueness of our country. Techno-technological, ecological and power components represent the essential direction of the brand, and the external economic component implies the advancement of ideas in the global market. The brand "Ukraine" is the reason for constructive interaction between representatives of the country and various foreign target groups.

We consider it appropriate to present a conceptual model for constructing a successful national brand in the conditions of globalization proposed in the dissertation study Polishko G.G. (Fig. 3.3). The basis of this conceptual model is the hypothesis that successful national branding is the key to creating significant competitive advantages in global markets. This conceptual model includes three blocks:

1) goal-forming – the formation of a strategy based on national doctrine and national idea and its implementation through the state program;

2) functional – involvement of all stakeholders (national, private, public) with the coordination of their efforts to assess the national identity, the creation of brand identity, development of the image of the country;

3) executive – effective reputation management based on the emerging national idea and national doctrine, global tools for assessing the national brand, such as international indexes and ratings, reviews of international research institutions, representation in international organizations.

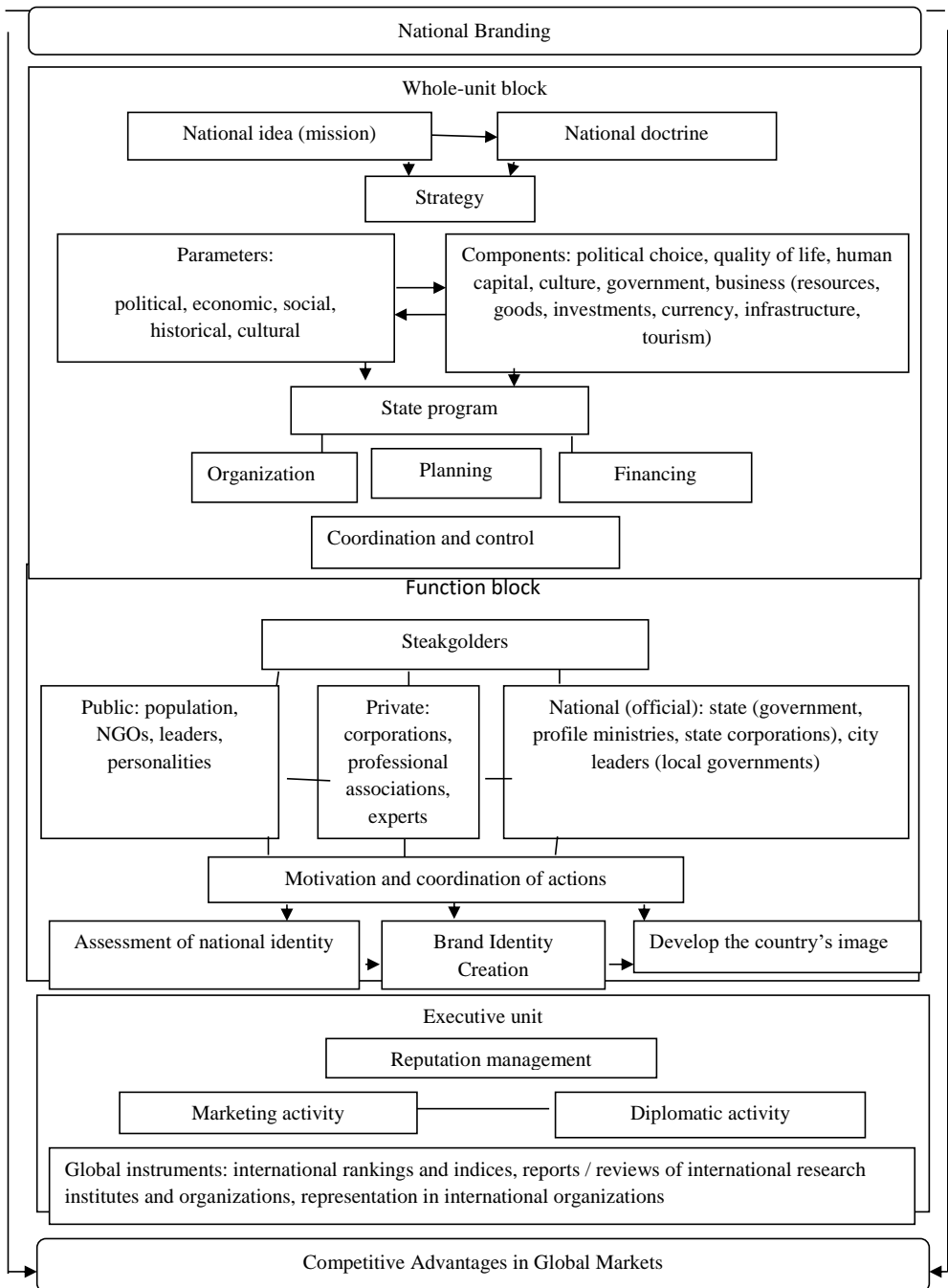


Figure 3.3. Conceptual model for building a successful national brand in a globalized world [3]

A conceptual model for constructing a successful national brand in the conditions of globalization, proposed in the dissertation study Polishko G.G., may be considered applicable, since, in our opinion, the complex of realization of national branding is represented by the expression:

$$S = \{I; M; R\} \quad (1)$$

where I – initial data for each of the blocks; M – mechanism of implementation of each block; R – resources for implementation of each stage.

In the context of practical branding, Ukraine's economic security reflects its ability to function effectively by countering the emergence of destabilizing threats by managing a combination of components that reflect the state of the internal and external environment of the country.

The value of each component of economic security is determined by equality:

$$k_i = \sum_{j=1}^{m_i} (\alpha_{ij} \cdot \frac{P_{ij}}{NP_{ij} \cdot m_i}), i = 1, n, \quad (2)$$

where  $k_i$  – the importance of the partial components of economic security of the country;  $\alpha_{ij}$  – the weight of the j-th indicator and-its component;  $P_{ij}$  – actual value of j-th indicator and-its component;  $NP_{ij}$  – the normative value of the j index and its component (the value is chosen on a state scale);  $P_{ij}^{nopo}$  – the threshold value of the j index and its component;  $m_i$  – number of indicators and-its component; N – the number of components of economic security of the country.

Let's turn to the analysis of indicators of the components of economic security of Ukraine (Table 3.8).

From data tab 3.8 shows that during 2009-2016 among all the components of economic security of Ukraine only intellectual and personnel were always in the optimal zone (80-100%), the value of the remaining components is unsatisfactory (29-60%). The largest reduction of the indicator of the financial component was fixed at – 19%, as well as foreign economic -18%. Indicators of information (+ 27%), power (+ 8%), intellectual and personnel (+ 7%), and ecological (+ 5%) components of economic security of Ukraine show positive dynamics.

In the dynamics of the last 6 years, the largest increase of + 48% provided the political and legal component of Ukraine's economic security, despite the high number of threats to the economic security of Ukraine – insufficient legal protection of the interests of the population; violation of legal rights; deliberate or unintentional disclosure of commercially important information; violation of the

rules of patent law. Associations with political instability and uncertainty of the foreign policy course of Ukraine frighten foreign investors and consolidate the image of a non-independent state, which is manipulated by more influential countries (Russia, the USA).

Table 3.8

Dynamics of Indicators of the Components of Economic Security of Ukraine for 2009-2012  
(formed by the author according to the methodological recommendations of the Ministry of Economic Development of Ukraine [4])

№	Name of the component of economic security of Ukraine	Significance of components of economic security of Ukraine by years								Dynamics over 6 years
		2009	2010	2011	2012	2013	2014	2015	2016	
1.	Financial	67	66	66	51	49	48	50	53	0,79
2.	Intellectual and staffing	87	86	85	83	84	90	92	93	1,07
3.	Technological and technological	61	64	62	58	55	53	58	53	0,87
4.	Political and legal	29	32	32	34	31	34	30	33	1,48
5.	Information	30	40	50	43	38	41	53	38	1,27
6.	Environmental	43	45	41	44	46	45	53	45	1,05
7.	Power	38	43	53	55	57	38	40	41	1,08
8.	Foreign Economic	48	45	40	36	40	35	40	40	0,83
9.	Innovative	38	36	41	41	41	34	35	36	0,95

The results of the survey also confirm the unsatisfactory values of the calculated indicators of economic security of Ukraine. Thus, according to foreigners, Ukraine is characterized by a democratic ideal: political and economic instability (43%), corruptions of the state apparatus (22%), poor management (23%), lack of legal culture (12%). Only 9 out of 100 offer Ukraine's brand potential to pay attention to its scientific potential.

The analyzed components of Ukraine's economic security are integrated into the integral indicator. Dividing the opinion of the representatives of the resource-functional approach [8, p. 69, 9, p. 99-101, 10, p. 12-16], we propose to determine the level of economic security of Ukraine  $z$  based on the assessment of the degree of utilization of the country's resources for each component:

$$z = \sum_{i=1}^n k_i d_i, \quad (3)$$

where  $d_i$  – the relative importance of the components of economic security of the country;

$$\sum_{i=1}^n d_i = 1, n - \text{the number of functional components of the country's economic security.}$$



From the data of Fig. 3.4 shows that the level of economic security of Ukraine is twice lower than the recommended methodically recommended optimal value. During 2005-2016 there was a steady increase in the level of economic security of the country from 47% (historic minimum) to 52% (historic maximum). In 2014, compared to 2012, the level of economic security in Ukraine decreased by 3%. This was primarily due to the slowdown in economic growth, the lack of investment resources, low lending activity and unfavorable foreign economic situation. In 2014, security was reduced to 48% and a 3% increase over the past two years.

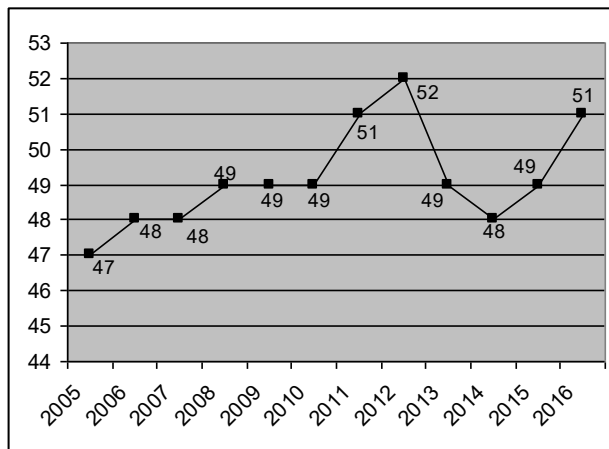


Figure 3.4. Dynamics of the integral indicator of economic security of Ukraine during 2005-2016 (optimal value is 100) (calculated by the author according to the Ministry of Economic Development and Trade [5])

Forecasting the estimation of the integral indicator of Ukraine's economic security in the context of changing external economic and macroeconomic components can be carried out in the form of a simulation modeling system. Provision of the target level of the integral indicator of economic security  $z$  is possible only taking into account the innovative component as a multicomponent.

Let  $X$  be a set whose elements  $x \in X$  form part of the economic security of Ukraine (financial, intellectual and human resources, techno-technological, political-legal, informational, ecological, power, with the exception of foreign economic);  $B$  – the set of elements, which  $y \in Y$  – corresponding possible directions of the state policy concerning the components of economic security;  $Z$  – the set of possible indicators of the economic security of Ukraine;  $R$  is the criterion for evaluating the state policy and the level of the indicator:  $R_x$  for the components of economic security and  $R_y$  from the point of view of the respective policies of the state. Thus, it is

envisioned that the state policy is transformed to improve the integrated indicator of Ukraine's economic security ( $y$  is considered as a function of  $x$ ).

The development of effective instruments of state policy on the components of economic security takes into account the state and forecast of the foreign economic situation  $y^*$ , which should be reflected in the model of economic security of Ukraine:

$$R[f(y^*)] = \max R[f(y)], y \in Y \quad (4)$$

The target economic security index of Ukraine  $z$  for the given  $x \in X$  is determined by the formula:

$$z = f(y^*) \quad (5)$$

Then, the direction of economic security development in Ukraine becomes optimal if there is a solution to the task of management:

$$\begin{cases} z(x) \rightarrow \max, \\ P_{ij}^{nopol} \leq P_{ij} \leq NP_{ij}, \\ x \in X, y(x) \in Y. \end{cases} \quad (6)$$

According to the conditions of the classical problem of mathematical programming (6), the change of possible directions of the state policy regarding the components of economic security ( $y \in Y$ ) will change its optimal solution, which can be used to find the gradient method. The general scheme of the solution of this nonlinear problem consists in constructing a sequence of solutions of the system of constraints  $y_1, y_2, y_3, \dots, y_k$ , on the following principle: for  $y_0$ , choose any point of the domain of solutions  $y \in Y$ , and the next value is determined from the previous by the formula:

$$y_{k+1} = y_k + \lambda \cdot l, \quad (7)$$

where  $l$  – some direction;  $\lambda$  is the length of the step.

The indicator  $l$  is chosen so as to ensure the convergence of the sequence  $y_1, y_2, y_3, \dots, y_k$  to the optimal solution. In general, the process of obtaining a sequence of approximations  $y_k$  is infinite, but sometimes it can also be completed for a finite number of steps, providing a local, but in problems of convex programming and a global optimum. Finding a derivative in a direction, one can determine if the direction  $l$  is favorable for approximating the optimum. Since the direction of the gradient of the objective function is the direction of its fastest growth, then when searching for the maximum of a convex function as  $l$  often take and then the formula (7) takes the form:

$$y_{k+1} = y_k + \nabla z \quad (8)$$

The parameter  $\lambda$  is chosen so that the extremum of the function  $= z(y_{k+1}) - z(y_k)$  is achieved. On differentiating the function, we obtain the condition of an extremum:

$$\nabla z(y_{k+1}) \cdot \nabla z(y_k) = 0 \quad (9)$$

If the optimum is achieved within the area of solutions of the constraint system, then one can guarantee that the point  $y_{k+1}$  will not exceed the limits of the constraints. The process continues until the inequality is satisfied:

$$|y_{k+1} - y_k| < \varepsilon, \quad (10)$$

where  $\varepsilon$  – the accuracy of the calculation is given in advance.

In some cases, it can be assumed that certain components of Ukraine's economic security may adopt numerical values that are less than the corresponding thresholds. This means that not all inequalities in task (6) should be satisfied, but this may contribute to the fact that the target function will take the maximum value that will dominate the optimal value. Then problem (6) will look like:

$$\left\{ \begin{array}{l} z(x) \rightarrow \max, \\ P_{ij}^{nopol} \leq P_{ij}(x) \leq NP_{ij}, \\ P_{dh}(l) \leq NP_{dh}, \\ x \in X, y(x) \in Y. \end{array} \right. \quad (11)$$

The optimal solution of this model is the basis for forecasting the optimal trajectories of economic security development in Ukraine (Figure 3.5).

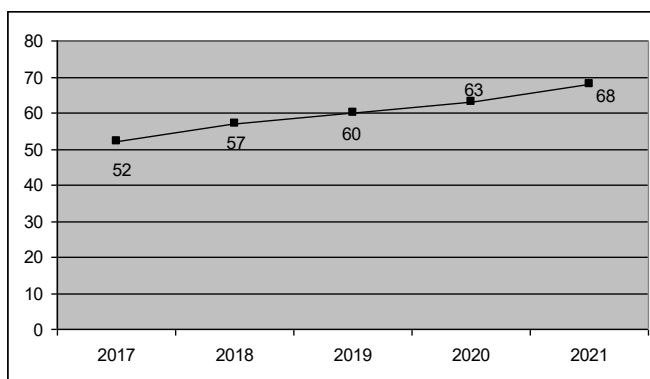


Figure 3.5. Forecast value of integral indicator of economic security of Ukraine in 2017-2021 (optimal value is 100) [calculated by the author] [ссылку по тексту](#)

Improvement of Ukraine's economic security index requires an integrated approach to the development of the innovation component of the mechanism, which is optimally implemented in the format of the national brand. Formation of the country's brand implies the simultaneous development of all components of economic security – financial, intellectual and human resources, technical and technological, political, legal, informational, environmental, power, foreign economic – will allow Ukraine to become an innovation center that will attract intellectual and financial capital, attract the attention of tourist flows, will improve the overall level of well-being of the population.

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### **3.5 INSTITUTIONALIZATION POLICY MAKING WITHIN THE NATIONAL SMART SPECIALIZATION STRATEGY (INTERNATIONAL CASE)\***

The innovation system should be considered as a set of institutions, whose activities are aimed at the creation and dissemination of knowledge, technologies and innovations. On the basis of this, we obtain the task of searching for an optimal national institutional strategies that will stimulate innovation development in the conditions of modern technological trends, namely:

– formation of state programs and the inclusion this process as one of the main strategic directions of economic development and international cooperation;

– growing the role of internal state policies and institutions aimed at maintaining and ensuring favorable conditions for innovation activities development;

– traditional forms of relationships in the innovation field both between the countries and between the companies are replaced by the global network structures based on international scientific cooperation and open innovation concept;

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– active intersectoral interaction, integration of technologies within the framework of sectoral (product) technological packages, intersectoral technologies transfer etc.

Within the all certain trends we see an expansion of innovation communications range. Under these conditions institutions (formal and informal) form an institutional environment that provides a certain level (quality) of interaction (innovation communications) between innovation-oriented economic agents and their various partners. This in turn results in transaction costs of intellectual property rights protection, costs of scientific and technical information searching, negotiating and contracting costs, product and process innovations market monitoring costs, etc.

In this context, the institutionalization of processes we can determine the situation when the management practices of innovation processes become sufficient and long-term, so that they can be represented in the form of economic institutions. So we came to necessity of obtaining efficient management practices at various levels and innovation processes, which will provide the necessary level of competitive advantages to protect the national security through the new quality of development.

So in order to create an institutional environment as an favorable environment for different innovation processes and their combinations, we propose to use institutional designing. It is based on the idea of technological specifics of individual technological areas analytics application. Also when implementing the methodology of institutional designing we propose to use the smart specialization concept, which can help to combine the technological areas analytics application with the strategically analysis of economic development.

Generally smart specialization is an innovation approach, which aims to boost growth and jobs, by enabling each nation or region to identify and develop its own competitive advantages. We propose to consider Smart specialization in more wider and concrete.

The smart specialization concept was firstly formulated by the expert group of the European Commission Knowledge for Growth as an innovation development strategy, involving the most effective application of countries and regions characteristics and developing their competitive advantages.

The potential of Smart Specialization within the institutional designing is caused by the fact, that it combines industrial, innovation and educational policies to select (scientifically justify) a limited number of priority areas for investment and incentive policies, focusing on strengths and comparative advantages. So it allows to identify the areas in which we need to develop a new management practices of innovation processes.

As a result of the analysis the smart specialization principle involves getting the answer to the strategic question – what needs to be done taking into account the existing strengths and weaknesses of the region (nation, sector) in order to take a worthy place in the markets of the future and how it is necessary to develop sectors of economy, including through their interconnection (interdisciplinary aspect).

All these point result in new policy approaches and within it according to OECD experts [9] smart specialization entails:

1. More effective spending of public resources, concentrating on certain domains of knowledge or expertise;
2. Creation of synergies between public support mechanisms for R&D and innovation, industrial promotion and training institutions;
3. Elimination of fragmentation and duplication of policy interventions that may result in a waste of public resources;
4. Identification of the strongest or promising domains for entrepreneurship and growth through a careful analysis of the existing capabilities, assets, competences, competitive advantages in a city, region or country;
5. Mechanisms to enable strategic development based on multi-faceted and multi-governance interactions;
6. Mapping and benchmarking of cluster including analyses of the role and influence of key players;
7. Evidence-based monitoring and evaluation systems to select the knowledge domains and innovation projects.

The key difference between the smart specialization approach and traditional industrial policy, even innovation based, is the interactive process, which can be identified by the list of authors as the “entrepreneurial search” concept, in which the market and the private sector explore the possibilities of new activity (in our study we call it the new combinations of innovation interaction), while the government supports these actors, which are the most able to realize the new development strategies.

In order to understand the whole point of institutionalization process, let us turn to the study [8], in which the necessity of creation an effective institutional environment for the interactions of participants in integrated models is underlined. The general task of this environment is connected with the creation of appropriate prerequisites for resolving the contradictions between the relations of cooperation and competition, between the relations of the intra-firm hierarchy and horizontal market interrelations, between the processes of territorial

(regional) and cluster development, between the interests of agents and principals within the framework of agency relations.

Cluster policy and smart specialization, being concepts aimed at innovation economic development, have a number of common features. First, they are focused on productivity and innovation as key competitiveness factors. Secondly, great importance is given to the role of the regions in deriving benefits from the benefits arising from the links between them.

As it is noted in the European Commission report "The Role of Clusters in Smart Specialization Strategy" [2], the latter is focused on specific innovation resource-intensive sectors, while clusters belong to a broader range of economic sectors. Smart specialization is aimed at using the links, that arise between the areas of economic activity and penetrating the traditional boundaries of clusters. This is very important in modern technological paradigm, when the different technologies become integrated within the intellectual production systems. Clusters are elements of an innovation ecosystem, while smart specialization is a much broader policy aimed at transforming the system itself.

According to institutional development theory it is only possible to improve the institutional system, where institutional development opportunities are combined with other factors of competitive advantages formation (and it is clear for the agents). Taking these facts into account, cluster development will be more effective if it follows the smart specialization principle through the identification and development of unique innovation industries and the formation of clusters or innovation networks (innovation ecosystems) around them. As a result of this the strengthening of cluster initiatives and relevant innovation projects directly influence the process of institutional change, which, in turn, will contribute to the strengthening of the linkage of innovation processes through the cooperation.

In the Fig 3.6 we have shown the general scheme of institutional designing for some innovation sector is shown. It is based on analytics, smart specialization and institutional project implementation and evaluation.

In this analysis we can note that a number of studies have shown insufficient attention to the international component of smart specialization methodology implementation.

The study [15] notes that over the past 25 years, the model of economic development, international trade and international economic relations has changed. Today, companies distribute their operations around the world from product development to production of parts, assembly and marketing. It has caused the emergence of international production chains that have changed the operation order of production and business models around the world.

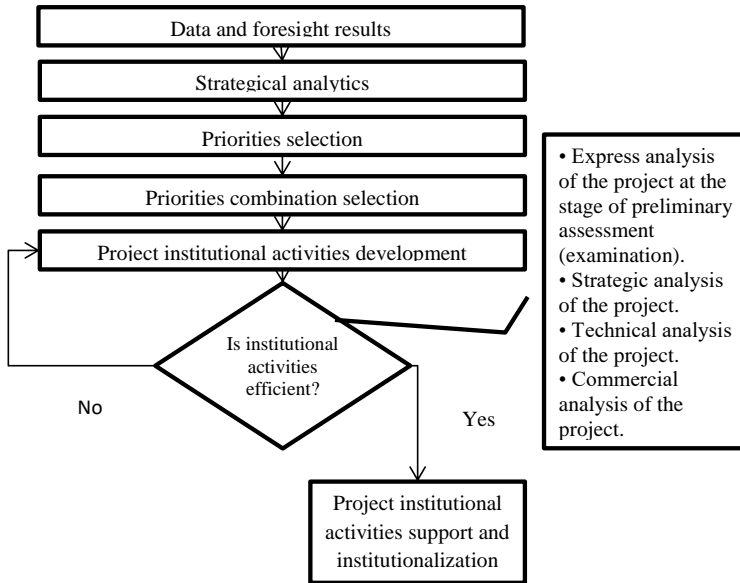


Figure 3.6. General scheme of institutional designing (author`s development)

The share of value added in the exports of each country indicates the dependence of its industry and exports on imports and shows what place this country holds in the global value chains (GVC). As an illustration, one can cite data on the share of foreign value added in the exports of some developed and developing countries (Fig- 3.7).

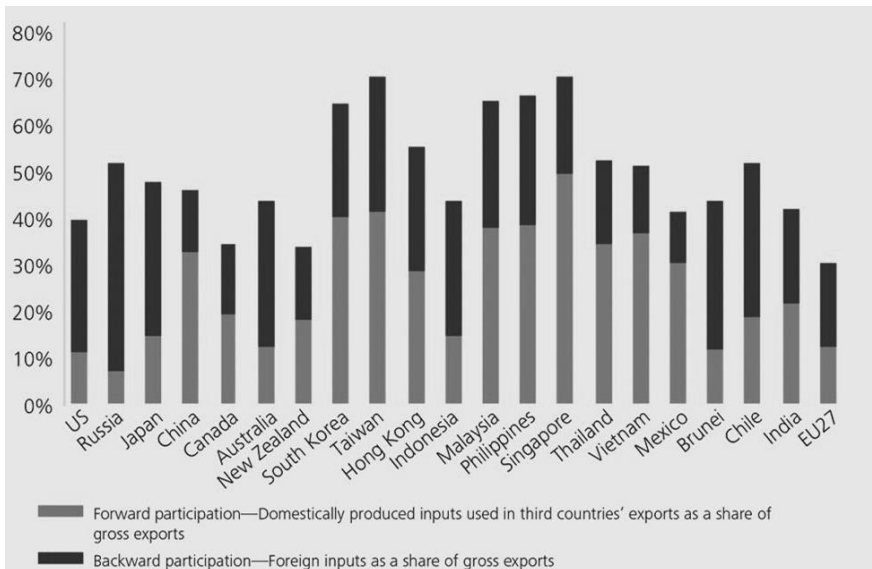


Figure 3.7. Participation in GVCs [Deloitte Global Economic Outlook, Q4 2015]



E.g. China may export a smartphone Apple iPhone 4 valued at \$194.04, although it may have contributed only \$6.54 in value addition (Fig. 3.8).

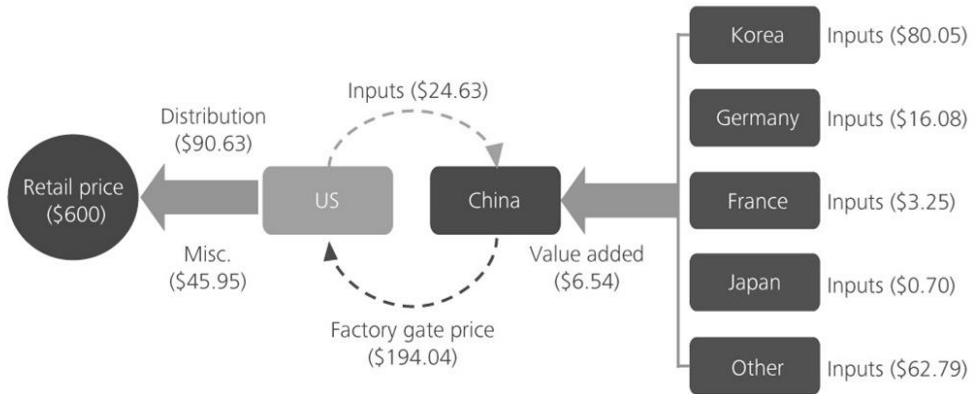


Figure 3.8. Value creation of Apple iPhone 4 [Deloitte Global Economic Outlook, Q4 2015]

To better understand the situation in the world economy, the OECD, together with the WTO, developed a model of inter-country cross-sectoral balances (ICIO), which allows detailed analysis of GVC and transactions between different sectors and countries by sectors of the global economy.

In this context, we come to the critical question, which links the specialization and its international dimensions: who gets the greatest benefit in the global value chain, because the latter are managed by large MNCs? Many developing countries fear that this agenda is determined by OECD countries, which are trying to make the world "safe" for the work of their MNCs and are wondering how they can benefit. They are afraid, that developed countries use the GVC to institutionalize their advantage in world markets [15]. There is also the question about the types of GVC advantages and about the corresponding strategies for the development of priorities and their institutionalization within the framework of the international context.

Therefore, it is important to understand the difference between getting into the value chain as such and extracting value in the chain within the national smart specialization strategy. This conclusion is caused by the fact that not all potential benefits of GVC materialize automatically.

In order for countries to take advantages of participating in the GVC benefits, they must be able to develop the appropriate production capacities, technologies and skills as well as the appropriate environment, which will create the time benefits. It is important to note that there is a

need for a more in-depth discussion as to whether there is a trade-off between participation in the GVC and a reduction in domestic value added, and to discuss possible development paths for countries participating in the GVC, not all of which receive the same benefits or outcomes.

We can consider such main points of GVC impact according to study [14].

So among the main opportunities received by countries, joining the international production in GVC, the following can be called:

- using its comparative advantages for the development of the national industry without the need to create vertically integrated industries;
- saving time and resources for the national industries development;
- access to modern technologies, which allows to quickly improve the structure of the economy;
- creating new jobs is extremely important for developing countries due to high population growth rates and the need to combat unemployment;
- accelerating the economic growth and improving the production structure;
- raising the standard of living of society and better meeting the growing demand in the national economy;
- growth of absolute value and improvement of the structure of national exports;
- connecting national producers to participate in the chain and the growth of localization in the national economy;
- tax revenues increasing and opportunities to address pressing socio-economic challenges expanding.

However, along with unconditional advantages and benefits from cooperation with GVC, host economies may face certain risks, among which are:

- probability for national companies to "get stuck" in low-technology stages of the production process with a small internal added value and not be able to move along the chain in order to increase the value added produced in the country;
- possible loss of competitiveness in case of entry of similar products from the countries with lower costs to the market;
- probability of being tied to the production processes of certain TNCs, which may limit the country's ability to choose other partners;
- possibility of losing production if the TNCs decides to leave the country.

Thus we came to expanding the smart specialization tasks

To select the areas of specialization, it should be borne in mind that the contribution of services to the creation of the added value of exported goods is currently 46% [17], that is, about

half of value added. It is important to emphasize that within the modern high-tech services area (technologies development, structures construction, operations financing, etc.) that the main opportunities for companies to increase the created value added are found.

In the global value chains development, some observers have depicted this process not as a linear one, but rather as “Smiley Face” where the value creation center in the manufacture or assembly of product is flanked on either side by higher value added services activities (Fig. 3.9). The general objective of firm (cluster) or state is to shift from manufacture and assembly into design, innovation, R&D, logistics, marketing and brand.

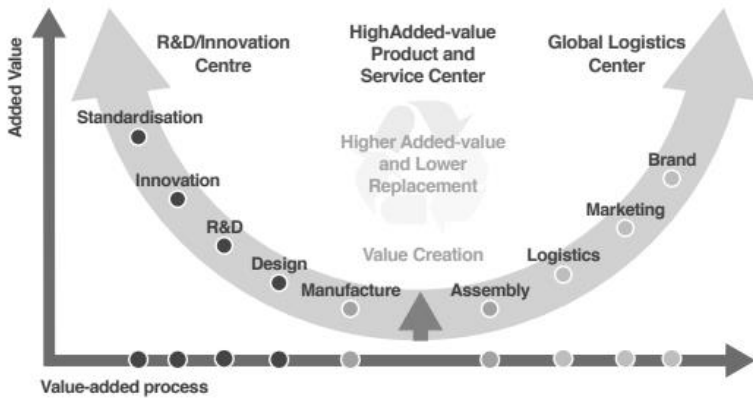


Figure 3.9. “Smiley Face”: conceptual model of the shift to a high value added, globally integrated, services economy [16]

Another approach can be found in [5], which considers the value added within the production cycle (Fig. 3.10).

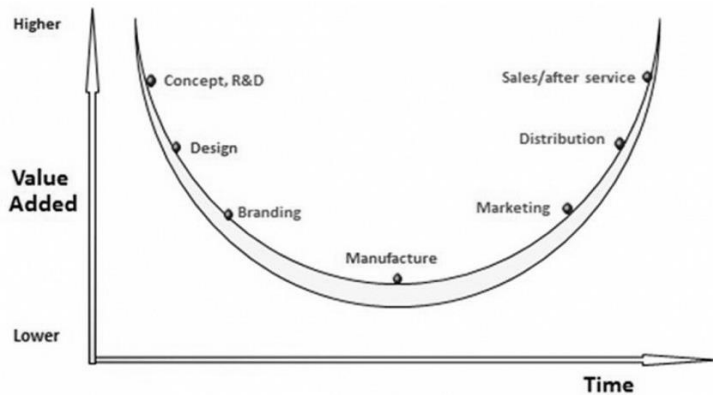


Figure 3.10. Global Value Chain within the production cycle [5]

In the figure and figure there are presented the various functions that firms (i.e. agents national economy) can perform within the GVC, and the economic rent they bring and their profitability. As we see, the most profitable functions are those that are most remote in time from the process of direct product assembly (i.e. design and after-sales services).

On the example of Ukraine, we propose to consider the features of the implementation of competitive advantages and innovation component within the smart specialization on the example of the agriculture complex. In Fig. 3.11 the value chain of agriculture is shown.

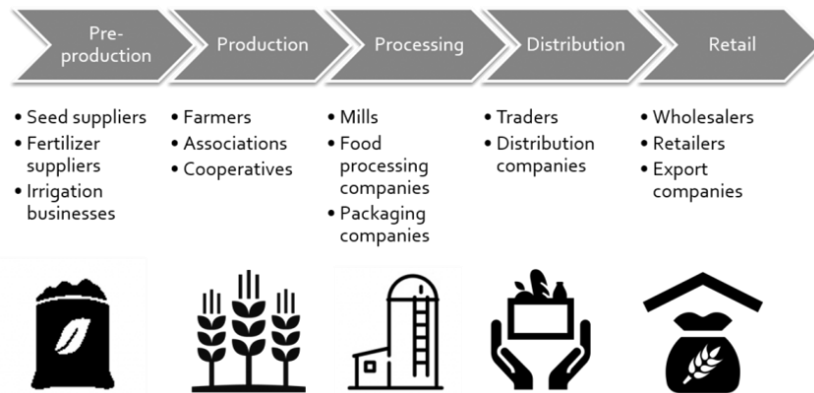


Figure 3.11. Value chain of agriculture [3]

Analysis along the value chain of agriculture includes three points:

- 1) dissecting impact across the agriculture value chain;
- 2) identifying world and domestic sectoral trends;
- 3) assessing the correlation between institutions, innovations, risk, financial return and social impact with a view to maximize investment efficiency.

Active development of Ukrainian agrarian business is facilitated by the third part of the world's humus, favorable geographic location, successful climate features and relatively inexpensive labor.

But when we analyze the international and value added dimension of Ukrainian agriculture we will see great problems.

First of all, we note the critically high percentage of the import component that has developed in recent years to ensure agricultural production (energy carriers, chemical fertilizers, plant protection products). The largest share of capital investments (more than 60%) is in complex agricultural machinery. Expenses for its import already exceed \$ 1 billion. The

implementation of ambitious plans to bring the production of grain to 100 million tons per year will lead to the fact that the foreign component in the structure of agricultural production will exceed 70% [4]. This creates a serious threat to the stable development of the competitiveness of the Ukrainian agrarian business.

Despite the industry rapid growth in recent years most of the technologies, used by farmers, are lagging behind today's requirements. Return in the sector of agricultural production in Ukraine at times (and sometimes in dozens of times) is less than that of competitors. In 2015, one worker in the agricultural sector of the EU accounted for 29.5 thousand dollars value added. At the same time, for example, in Germany – 43,3 thousand dollars, in France – 95,4 thousand dollars. And in Ukraine this indicator is only 6,3 thousand dollars [4]. Agriculture, whose share is 14% of Ukraine's GDP, will be able to give an impetus to the economy only by increasing efficiency through the development of advanced technologies.

At the same time the world practice shows that technologies can help at every stage in the agricultural value chain, from soil and water management, to seed hybridization, post-harvest logistics and improved market access. E.g. McKinsey Global Institute [7] estimates that applications of range of digital and agronomic technologies could have an economic impact of \$45-80 billion per year in Indian agriculture in 2025 and would help up to 90 million farmers raise their incomes.

As part of the analysis of necessary institutional projects for competitive and technological based agriculture development, Danylishin B. [1] considers the development of the property protection institution, as well as fiscal and tax incentives. These tools will allow planning the financial resources at a more qualitative level and concentrating them on priority directions of development of agro-industrial production in order to achieve maximum efficiency of investments. The need for institutional design is also due to the fact that Ukraine's resources are limited, so they need to be used primarily to promote the development of those companies that produce high tech products with high added value. This example clearly illustrates the necessary of smart specialization support through the institutionalization of innovation practices based on technology transfer in order to support the evolution of sectoral technological package with increasing of added value.

Thus, in modern conditions, we come to the need for a serious review of national economic policy with a view to integrating it with the strategic aspects of technological development. To do this, it is necessary to combine smart specialization policies and analytical approaches with the ratio of the evolution of the innovation-technological system at the national level and its relationship to the global context.

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## **PART 4. CONCEPTUAL MECHANISMS OF NATIONAL SECURITY INNOVATION PROVIDING**

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### **4.1 THEORY SYSTEM CONNECTIONS THE INNOVATIVE PARADIGM**

The high degree of people's cognition of unity and connection of the phenomena and processes is typical for economic laws. The system of economic laws contains four types.

The first type is general economic laws. They are peculiar to all the methods productions. This is the law of accordance of economic relations to the level and character of development of productive forces, the law of increase of the labour productivity, the law of economy of time, the law of advancing of growth of the labour productivity rates of by comparison with salary, the law of socialization of production and etc. Specific economic relations are peculiar to every public method of production.

The second type operates in a few socio-economic structures: the law of cost, demand and supply, and etc.

The third type is specific economic laws that operate only within the limits of one public method of production. Major from them is an economic law that expresses the deepest copulas between productive forces and productive relations, by the relations of property in co operating with the development of productive forces. The laws that operate only in one economic stage or degree of public method of production: the law of generation of monopoly by the competition of production, the law of nationalization of economics belong to the fourth type of economic laws.

General economic laws arise up and develop in the process of economic activity. They do not carry the hard determined character and show up as tendencies due to copulas and influences of corresponding factors. These laws recreate internal, necessary, to steady and substantial copulas, peculiar to the technological method of production. Actually, they represent the deep hidden copulas and relations that are expressed in the row of categories. In every economic category there is represented the dialectical co-operation of socio-economic connections and relations between people with technical-economic copulas and relations [1]. Interbranch copulas are characteristic for the processes of productive integration and depend on the technology of production. Such type of connections is the subject of actual research. They form the new structure of object which consists of connections between different intact, united and separate parts, united and set of parts, united and integrity. The cooperations act as that factor of activity,

that needs minimum of money, investments or operating expenses, at the same time they provide the most effective return on the inlaid facilities due to the display of synergistical effect.

It is possible to leave the system in an invariable elementary look, but only change the copulas and cooperations in it and get an additional effect. Practical experience of a receiver that is obtained from participating in working groups on reforming of separate branches of economics of the country testifies that the greatest effect is reached if there is changed a set and structure of elements and system of connections between them and an environment at once. Such transformations are the most effective and desirable. A tendency of research of structure of the economic systems ( elements, component parts, morphology of groupments, quantitative side of set of parts, proportions between them)is formed in scientific economic practice.Such tendency is justified, as an economy makes the conclusions based on measuring, and structural elements can be distinguished and estimated. Other case is copulas, streams, relations. This side of the problem of "vital functions of the economic system" is more difficult in detalisation and measuring, in choice of indexes for the estimation of quality of connections, in forming of evidential base for conclusions and recommendations, therefore we will stop on more detailed analysis of essence of concept "connection". A concept "connection" is multimaking and ambiguous as the amount of connections in the system ( inwardly and outwardly) it can be on an order, or on a few orders more than the amount of elements, that is asserted in the science of combinatorics in mathematics [2]. In philosophy the concept of "connection" is understood as an "interconditionality of existence of objects and phenomena delimited in space and time" [3]. The objective, general, substantial, necessary copulas of objects, phenomena and processes determine the laws in philosophy. All the objects, (objects, phenomena, things, processes) and each one separately always are in connection, co-operation and development. Every connection has the history and reasons of origin, formation and functioning. Copulas form integrity of the socio-economic systems. From the point of view of different scientific disciplines "connection" can mean:

- process of information (communication) transfer;
- limitation of motion (mechanics);
- co-operation between atoms (chemistry);
- signal transmission on distance (informatics);
- dependence between individuals (biology);
- parity of factors, elements, events, phenomena (analysis of the systems);
- interconditionality and interdependence (in different spheres);
- sequence, logic, keeping order in a language (pedagogics, literature);
- any relations between people: business, official, personal, domestic;



- component part of mechanism of co-operation of separate enterprises, of businessmen, industries (economy);
- component part of mechanism of cooperation of countries, political parties, public agents (politics);
- component part of mechanism of co-operation of diplomats (diplomacy).

In scientific literature mainly are examined social copulas, as the basis of existence of society. Social copulas are a display of natural properties of people that stipulate their common activity for the achievement of the goals, form relations in society from the personal to family, religion, state. Copulas are the "fastening" means of the system. From these positions we examine and estimate a content side and category importance of concept of "connection". Copulas arise up and develop in the society that is the system with corresponding subsystems political (A), social (B), cultural (C) and economic (D) (Fig. 4.1).

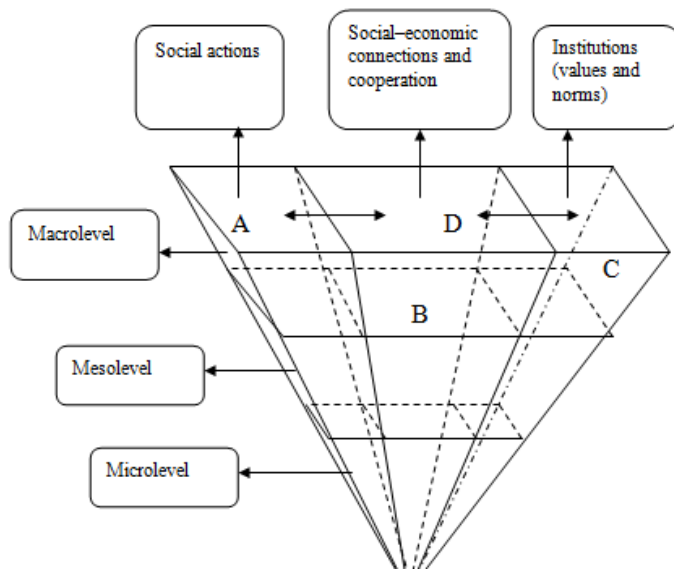


Figure 4.1. Society as system and place in her connections [author`s idea]

While examining the genesis of productive connections, on our opinion, it is necessary to analyse the stages of becoming of society and production on micro -, meso – and macrolevels. Changes at any level cause changes at the other levels. Connection is shown through totality of dependences between the elements of the system and between people and between the "rules of game" that are defined by the society, state or group. There are distinguished groups of connections [4]:

- naturally-biological (genetics, nation);
- psychological (sense, persuasion, options, governed).

From system positions, an element is structural, primary part of the system, the most simple, excreted part of the system. The system -it also separate (isolated distinguished element), but it already is difficult, aggregated, integrated from smaller elements. Element composition is the first base description of the system. The second base description is "connection". Connection determines the presence of relations between elements. Copulas connect clamp elements in the systems (internal copulas). External copulas connect the system with an environment. Connection is essentially an element of the system, but not material, even if material streams pass on communication channel. Connection is passive in the system of elements, it actively influences the structure (mode) of the system and its functional activity. The question of what is primary and what is secondary: element of connection has a basic value. The question of what is primary and what is secondary: element or connection has a basic value in the theory of communications.

Does an element: form copulas or copulas define the function of elements, process of their co-operation, structure model of elements? We will give a "chosen model" in material expression of connections – it's a thread. It can be in the form of a ball, and it can be in the variant of a jacket or a sweater knit from a thread. A thread as a material extent in space (copular fundamental principle) forms a ready product in master's hands (sweater), new system, new quality, new material form.

There is minimum such amount of connections in the real life, as how many pairs of elements they connect, and one element can be in certain copulas with plenty of elements. Therefore it is legitimate to use a concept "system of connections" as part of system of control of real or virtual object. It is possible to distinguish the great number of varieties of connections in the real world that has the real material systems:

- domestic copulas;
- copulas in military operations;
- diplomatic copulas;
- copulas of types of physical objects.

For example, a bridge (physical object) connects two river banks. A nodal point on a border (frontier post, customs) connects two countries. Investigating a perspective of communications it is necessary to define the characteristic of a system both really-material and virtually-material. In cybernetics sciences there can be distinguished "return copulas" that give information about changes in the system. The same connections are widespread in economics. A mechanism that finds out, for example, influence of factors on an object that is investigated is

monitoring. A feedback gives the grounds for making decisions on correction of plans and strategies, interference in a productive process, labour relations.

Copulas provide: process of cognition; process of development, changes, alteration; process of exchange; process of studies, notification, informing; a sequence of operations in technologies; influence, usage of efforts and etc. Concept "society" appeared in XVIII century and has got different interpretations. Depending on character of the philosophical or sociological system of looks it is defined: as a wide community of people, form of the most general social connection; as a system of relations of individuals, group, community in some integrity on the base of general activity and culture; as totality of social institutes, that provide organizational satisfaction of necessities, maintenance and development of culture; as the rationally organized form of joint activity that is based on convention of closeness of interests; as public social groups, institutes, initiatives independent from the government and the state.

Within this definitions it is possible to claim that "the society as a system is a set of all the methods of communication and forms of unification of people in which there their interdependence from each other which is based on certain communications finds manifestation and it has been developed historically" [4]:

- community of territory, where people live and communicate between each other;
- stability of society as a single unit;
- autonomy, self-development and self-revival;
- ability to support and revive internal communications;
- sufficient level of development of culture with the certain system of norms and values that are the basis for social connections between the people.

Copulas are set, lined up, fastened and used (realized) as a priority resource of administrative activity in economically-thrifty activity. At their absence, imperfection there is loss of control in management. A rupture of productive connections as a result of "market converting" in Ukraine in the end of the twentieth century resulted in the collapse of all economy of the country. In the system of connections there is a whole complex of negatives: noise effects, obstacles, curvatures, breaks (diplomatic copulas), dead-end directions, roundabout routes. These features are investigated in institutionalism (transaction charges), in logistic (optimization of routes), incompleteness of information, in the theory of making decision (incompleteness of information). Features of connection are the key moments of secret service, guard of scientific-technical and commercial secrets, investigation in the system of economic offences and abuses. All control system (hierarchy, functional activity, analysis of situation, making decisions, control

of motion of process and results of activity) – is a sphere of establishment of exploitation and development of connections. From this reference follows a theorem about terms of realization of mission of elements in the system: elements in the system execute the mission only in the conditions of proof and reliable intracommunications, and success in execution this mission depends on quality of the system of connections, including external environment.

In the period of decrease of effectiveness of economical system the risks and negative influences increase, the obstacles appear, the handling capacity changes, the connections are ruined, crossing the borders become complicated. A problem of measuring and estimation of influence of connection (increase of his quality or decline) on the economic system that must be certain in such parameters acquires an important value: force of influence, useful effect of the usage, losses, remote consequences, targeting of influence.

There exist certain features of connections, depending on the spatial placing of economic subject in the regional system: the competitive relations in the region with the region itself increase, in border conditions there are stronger influences of interregional character. Especially it shows up during focusing on the foreign markets. The intercountry co-operations are typical for the majority of Ukrainian regions (with Poland, Hungary, Belarus, Russia, Moldavia and other countries). The frontiers aren't an essential obstacle for interaction, but there is certain specifics in the vectors of cooperation : certain copulas can have the priority, for example, in the scientific-technical field, ecological co-operation, productive cooperation, market exchange .

With the help of copulas all variety of relationship and interference is carried out, is shown the reaction to a signal, situation and behavior of another. In the economic system it is normative, legislative, infrastructural, formal and informal copulas. At the same time the relations form the steady, standard, often recreated models of interaction and interference. Such kinds of the relations can be an example: respect, confession, neglect, support, implementation of duties, codes of conduct, productive relations, partner, competition, cooperative, personal interest in the achievement of aims and other. Copulas form relations, and values come forward in the basis of forming of relations. The dynamics of development of relations is defined by rules and terms of distribution of values between people, groupments.

In the process of life and activity due to the copulas there are numeral exchanges of values and control above them. The logistic approach to the system of assessment of communications gives the chance to allocate a substantial part of information that allows to create the system of indicators for program, project development, engineer – administrative technologies, strategies of development and to apply regulatory measures. Without understanding of the system of connections it is impossible to decide the tasks of logistic. With the help of copulas all variety of

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1. Copulas are category base elements of perception and world arrangement and concretely economic systems.
2. The system of connections is inalienable and base part of integral object of socio-economic nature (region, industrial complex). It's role is the informative and resource providing of co-operations between the participants of economic relations.
3. Structurally connection as constituent of mechanism of management of the economic system includes informative and economic agents, channels of exchange, stream and impulsive mechanisms of exchange, that carry out the role of integrating force in the vital functions of the system together.
4. Copulas have the complex system of varieties, need systematization research, have descriptions of direct, or indirect influence, hierarchical deference to rank, or functional appointment, can answer proof tendencies, or have spontaneous genesis.
5. Through the system of connections there are contacts between the agents of economic relations, cognition of reality of the phenomenon or process, exchange, co-operation, influence, transformation, attitudes of participants and attitude to a problem, or situation.
6. The organized and coordinated activity of the economic system is the result of use of communications, it's transformation and development, there appear dependences and regularities, the mechanism of integration and unification becomes stronger.

7. Violation of connections unbalances the system, inflicts losses in its functioning, is considered to be a pathological symptom (if it is not envisaged), or appropriate necessity, if it comes true concordantly reformation programs of its integrating to a higher level. As initial degree of integration of managing subjects copulas are characterized envisaged from one side, and avagueness from another, as except market economic factors, their existence is influenced by political factors of which the instability and unpredictability is characteristic. Further the main attention will be paid to communications between business, scientific institutions, the government and the public, as they are most significant in formation of the competitive enterprises and regions.

The economic system is an integration of economic subjects, that have different types of structural connections, which influence on its development. In different dictionaries set of elements which are in the relations and communications and form a certain

The system is often examined as organization of certain component elements for performance of certain task. Evolutional and innovative processes assist to development and complication of their structures, that are characterized as self development of the system [5]. Within the known theories of the system analysis and scientific developments there is no uniform concept of system, but the set of its properties characteristic of the system of any nature is provided.

The main quality which defines the characteristic of system is its form of interrelation inside and with the environment. There are opened and closed systems. The important characteristic is the integrity. This quality arises and exists due to interaction of elements which is shown through internal communications of the system. Owing to such association the system has new qualities which aren't owned by its elements separately. The origin of such properties is known as emergentness of systems. Integrity of the system is provided by permanent internal copulas that depend on a structure and constituents of the system. This characteristic of the system is defining in formation of the strategy of interbranch regional communications.

For their providing next to accordance of objects to each other due to equality of their structures is needed informative cooperation of elements of the system . Quantitative changes cause quality transformations that find a reflection in hierarchicalness of their construction. The hierarchicalness means a presence in the system of levels, each of that is in a corresponding submission, has the zone of responsibility, resources and local aims. Maximum possibilities of the system are represented by such as its quality, as equifinalness, that means feature of the system to get such state, that does not depend on time and qualificatory terms, but defined exceptionally by parameters systems. The provided list of general properties of the system is not exhaustive, but is sufficient for obtaining the characteristic of social-economic

system from a position of system approach to formation of the main objectives of development of interbranch cooperation. Cooperation copulas develop and exist within the limits of certain regions, each of that has the characteristic features and level of development. Regions are socio-economic systems. The regional socio-economic system includes the incorporated resources and hierarchical mechanisms that are able to provide development of region, using copulas between the producers of material and nonmaterial welfares and services. Integrity means possibility within the limits of the separately taken economic system to carry out all totality of reproductive cycles. For the system of any nature is characteristic omorphism, that means accordance to each object of which it consists. Due to equality of their structures and features of organizational construction of the systems, copulas can execute the basic functions. The change of patterns of ownership, processes of privatization and market transformations radically influence on the mechanisms of their realization. Subordination of enterprises of one industry to the different competitive business-formings created a new system of competition environment and mutual relations, and efficiency of their activity more depends on economic space and institutional providing. Efficiency of functioning of regional socially – economic system depends also on establishment of inter – communications between it's different participants and features of innovative spheres.

Integrity is also provided due to hierarchicalness of the regional socio-economic systems. A hierarchy is seen not only in territorial arrange and system of general reproductive process but also in organization of procedures of making decisions in relation to optimization of mutual relations. Integrity of such hierarchical system is provided by the special mechanisms of coordination and adjusting on all levels and is a totality of hierarchically well-organized institutes, that provide norms, order and procedures of economic activity. The kernel of such system are institutes of power, property and property responsibility. Inter-branch copulas in a general view are an attendant system of corporate activity, that integrates the specialized chains of productions and their participants that belong to different industries and have general economic interests in innovative activity, production or marketing. In the conditions of action of external factors participants show tolerance and support, what the scientific and technical, economic and abour resources of innovative development are complex formed due to. Inter-branch copulas provide activity of growing scale on different levels: enterprises, corporations, intercorporate level, regional, levels of cluster forming, and also levels of state administration. This activity takes place due to the corresponding mechanisms of management. The mechanism of management inter-branch copulas is organizational model of the administrative system and set of normatively-legislative acts, market receptions and instruments, that create the system of

cluster type, that is able to develop with the certain measure of flexibility, form general and private strategies of development of inter-branch associations, facilities of their estimation, realization and control, actively and time to react on the changes of external and internal environment, change organizational culture and behavior of participants of process of economic development of region on the basis system approach. An important role in forming of inter-branch connections belongs to the production, and productive copulas represent all the stages of process of recreation of products of every industry and combined public product. Their quantitative description defines the size of proportions between industries. Mean the serving system of corporate activity which integrates specialized links of productions and their participants by interindustry communications. Interindustry communications are communications of production, scientific and technical, marketing, information, logistic and any other character which have arisen between producers of certain areas. These copulas are component part of scientific theories of placing of production and territorial organization of economy. The systematization of interpretations of concept "inter-branch copulas" conducted within the limits of category analysis allowed to realize them as copulas of different industries that have general economic interests. They create the system of cooperation between industries of material production, scientific–production infrastructure that assists formation of only economic mechanism and directionally on providing of necessities of society and receipt of additional cost [5,6]. Formation of the general economic interest is influenced by a set of factors.

The analysis of scientific works [7,8] has shown that the most essential factors which influence genesis of production intran-branch communications is the economy, policy, ideology, culture. Throughout many centuries culture defines ideology and policy, together they cause basic approaches to the choice of methodology and practice of economic development. Objective management of genesis of economic development and inter-branch connections is given by the theories of organization of economic space and territorial organization of production [9-12]. Existent realities testify that productive enterprises, financially-industrial groups and business-formings belong to the different proprietors that are supported by those or other political batchwises and groups. Therefore political factors can decide the choice of forms of productive connections. The forms of integration are distinguished in creation of modern inter-branch connections:

- economic integration that is based on a not price competition;
- technological integration that is based on general technological platforms and technological reengineering of productive basis that envisages development of technological connections;



- cluster integration, that envisages creation of the socio-economic environment, directed on cooperation of power, business and science;
- organizationally -economic integration that is expressed in development of corporations adjusting of development of small and middle business;
- socio-economic integration, the aim of which is solving of social tasks;
- legal integration that envisages co-operation within the limits of certain legal field;
- international integration the aim of which is providing of participating in the processes of international division of labor;
- informative integration that is based on the use of information technologies and access to modern hi-tech technologies for the use of them in the projects of technological reengineering.

The forms of integration are the base for methodological approach in determination of tasks that decide by means of inter-branch connections. In accordance with the marked forms of integration of task of inter-branch management in a region:

- creation of organizational structure of management, that is able to provide the concordance of interests of different parties after the composition, setting aims and tasks;
- bringing in participants of the regional innovative-engineering cluster forming a relation to participating in state-private partnership;
- forming of general technological platforms.
- development of strategic dialogue plans of complex development of the territories concerted with the corresponding plans of business and science;
- development of principles of self-government in activity of integrating enterprises, that are included in an only inter-branch complex with pointing of responsibility for socio-economic end point that pierce all the branches of the cluster forming;
- fixing of mutual responsibility of integrating enterprises on the contractual terms;
- forming of the single system of economic stimuli and encouragement.

Inter-branch connections are one of forms of productive integration. Reasons and consequences of integrations in an economy were investigated by neoclassicisms [13-17]. A theory, that was worked out by them, presents the newest conception of financially-industrial capital and allows to analyse copulas between managing subjects and financially credit institutes of the integrated organizational forms of functioning of financially-industrial capital. Scientists distinguish four basic economic processes that stipulate integration: concentration of capital, concentration of production, bringing in the facilities for financing the activity of the integrated structures. Actuality of this theory is confirmed by the processes of change of patterns of ownership, that flow in Ukraine and for which

monopolization and absence of alternatives of choice of market contractors are characteristic. There are also other approaches.

Among the supporters of scientific approach in an institutional economic theory in relation to determination of expediency of productive integration on the basis of criterion minimization of a trance are A. Alchain, H. Demsetz, K. Arrow, R. Coase, D. North, O. Williamson and others [18-23]. One of the theoretical approaches is a contract theory of firm of R. Coas in determination of expediency of integration, who paid attention to existence of a trancheaction expenses charged and pulled out a theory according to which the firm is interested in their minimization. A trancheaction of expense it is straight related to the competitiveness that depends on the level of economy on these charges. Integration takes place. "...at level of national corporations" [24], in this connection under economic integration it follows to understand the development of connections between them.

In our opinion, studying of the institutional theory of processes of production integration as forms of minimization of transaction expenses doesn't give complete idea of an essence of these processes. Out of attention of institutsionalist there were essential factors of integration from which it is necessary to distinguish aspiration to the economic power. Achievement of this purpose demands considerably big expenses, compared with transaction expenses. Despite it, market subjects at any cost achieve the objective. It is characteristic of Ukraine of the end XX – has begun XXI of a century. Numerous business formations which exist in economic space use bribery of officials and statesmen for mastering is market attractive objects. Especially it is noticeable in power, metallurgical and machine-building complexes.

These processes are considered within the institutional direction of the economic theory which is based on the theory of the economic power. Fans of this approach are such scientists as J.K. Galbraith, E. Toffler, A. Movsesyan and others [25-26]. This direction is developed on the basis of association of neoclassical behavioural model of the rational choice of the new institutional theory and the reference about social, economic and political inequality of economic agents and their interactions in the conditions of inequality. Authors consider the power in the economic theory as an invariable part of process of production and claim that it is the truth for all economic systems. Positive in this approach authors see a possibility of concentration of resources of the economic power and their active application. The relations of the power, according to scientists, include the organizational power of management in each of subjects which are included into the integrated structure, the power of the central element of structure over other parts, the market power and influence on the political and social phenomena.

At the same time specific own space in which the central integrated structures control the main aspects of activity of all agents is created. In Ukraine such central elements are known as "the main office". Such offices control cash flows of all power "Ukroboronprom" corporation, for example, controls financial flows of subordinates of the enterprises, having practically deprived of them independence in decision-making.

A. Popov allocates several different directions in a research of integration of economic entities from a position of functional economies. Among such is marketing and information and financial directions [27]. The author notes that the analysis of the separate parties of integration which are factual real practice, including the analysis and assessment of a state and prospects of development of demand, the offer, the price, the competition in market segments where creation of the integrated structures, the analysis of advantages and shortcomings of integration is expected to acts as a subject of each of concrete economic sciences. Usage of marketing approach is directed on formation of effective structure and the optimum list of subjects of managing.

The given different approaches of schools of sciences to understanding of integration processes create an overall picture of the intereconomic relations, the chia confirms communication of processes of integration and interindustry interaction. The analysis of scientific works concerning their essence has confirmed unanimous opinion of almost all researchers that the reasons of decline of the Ukrainian economy consist in the termination of interindustry interactions. Scientists and practice claim too that restoration of such communications on old technological base doesn't make sense and isn't possible at all. In interindustry integration the technological compatibility is crucial. Primary is the technology and the equipment, secondary or accompanying – interindustry cooperation.

Technological reengineering which methodology is offered by the author in the doctoral dissertation [28] is aimed at it's providing. The concept "technological reengineering" which is introduced for scientific use, emphasizes a strategic problem of the present stage of the domestic industrial enterprises.

Term "re of engineering" that it is entered M. Hammer and D. Champy, the succession of main principles of to offer methodology means in the off ere methodology, firstly,, and, secondly, idea and aims -revolutionary scenario of transformations. Under technological re of engineering (TI) fundamental revision of knowledge understands and radical feather planning of basic technological processes of productive base of enterprises and them logistical support for the achievement of substantial improvements of indexes of effectiveness on the basis of complete change of structure and procedures of productive processes with the successive recreation of cooperation productive connections. The term "reengineering" which is entered ии M. Hammer

and D. Ciampi in the offered methodology means heredity of the main principles, the idea and the purposes – the revolutionary scenario of transformations. Technological reengineering is understood as fundamental reconsideration and radical redesign of the main technological processes of production base of the enterprises and their material – technical providing for achievement of significant improvements of indicators of effectiveness on the basis of radical change of structure and procedures of productions with consecutive reconstruction of cooperation production communications.

The methodology of technological reengineering is the system of marketing, engineering, organizational and economic, social and logistic actions of a strategic importance. It proceeds from a postulate that the technology is a basic competition making basis of production and is considered as the concept which is designed to unite all links of production sector of the country in realization of strategy of complex development as the industrial state. Introduction of methodology of technological reengineering is based on the idea of tendencies of development of world mechanical engineering and their influence on the domestic industry and are based on confession of a priority role of a machine-building complex of Ukraine. Implementation of technological reengineering at the present stage becomes complicated, the fact that branch institutes which performed this function in decline earlier or are disbanded, and new organizational forms are created very slowly and irregularly.

Providing of synchronization of standards of innovative profile, bringing them over is needed to the requirements of foreign services and productions. It needs creation of effective legislative environment of innovative and investment activity, development of education and science, maintenance and support of intellectual capital, providing of sponsorship of innovative activity, scientific researches and development of high-tech, input of effective institutional mechanisms for development of hi-tech industries, creation of modern matively-communication infrastructure, increase of export of hi-tech products, stimulation of development of the newest breach and passing ahead technologies, reduction of dependence on an import of home hi-tech sector. So? There is a system of measures of state support of hi-tech industries and enterprises able to produce products needed, containing the achievements of science with high maintenance of value added and mechanisms of achievement of strategic aims.

Methodology of technological reengineering provides creation of new maintenance of regional industrial politics and development of new models in the context of forming of inter-branch co-operation, it's better to examine management in an alternative branch principle. An important role in making the decision of these tasks is played by the institutes of development, that is able to form a corresponding environment and support steady development of the socio-

economic system. These requirements are in a complete measure answered by innovative-engineering industrial clusters. Structural copulas that carry out influence on the development of economic are formed exactly in clusters.

During the last ten years question of the scientifically-methodical providing of development of the cluster forming in Ukraine acquire a national value. Basic directions of cluster development are founded in Program of activity of Cabinet of Ministers of Ukraine the "Ukrainian breach: for people, but not politicians", ratified by Resolution of Government of Ukraine from January, 16 in 2008 № 14. In the Program Government among the basic strategic reference-points of economic politics distinguished next priorities:

- "...economic stimulation of creation of competitive productions, bringing in of resource potential of regions, providing of development of scientific – technical and innovative potential, overcoming of depressed territories, conditioning for forming in every region a hi-tech economic complex, including on cluster basis;

- determination at legislative level and input of insurance of risks of realization of innovative projects, creation of an innovative and ecoinnovative clusters;

- development of national conception of international scientific and technical cooperation, that will provide for: directions of participation of home subjects of managing international scientific and production cooperation, in particular in transnational innovative-investment clusters;

- encouragement of association of small and middle enterprises in business networks and forming of regional clusters of enterprises and institutes;

- optimization of regional and interregional industrial complexes; assistance to creation of regional industrial clusters, foremost in the most knowledge-intensive and hi-tech industries and productions capable cardinally to change economic and scientific-technical potential of industry".

Realization of the tasks put in the program of activity of the government demanded consolidation of all Ukrainian society around certain ideas and paradigms of social development which have to promote worthy entry of the country into the global world, optimum participation of our country in difficult global processes. Use of cluster approach has already occupied one of key places in strategies of social-economic a development of a number of subjects of Ukraine and municipal units.

These processes should be regarded as manifestation of informal industrial policy which comes from "bottoms", and "top" though obviously it isn't supported, but also aren't perceived. It is necessary to carry the most powerful to it in Ukraine an innovative-engineering space cluster "Mechatronics" which is created in Kharkiv at the beginning of 2016. In scientific literature such types of policy mainly are considered: industrial, investment, innovative, personnel, social, policy of small business.

The concept of cluster policy of Ukraine has been for the first time offered by scientists V.G. Fedorchenko, A.M. Tugay and V.B. Dzhabylo in 2008 [ 29, with. 5–15]. Taking into account branch specifics authors of the concept allocate the following types of clusters: Discrete, process, innovative and "creative", tourist, transport and logistic, construction and clusters of the mixed types. Within realization of a goal the main tasks of cluster policy scientists have offered the following:

- formation of conditions for effective organizational development of clusters;
- ensuring effective support of the projects directed to increase the competitiveness of participants of a cluster, especially by development of small and medium business;
- carrying out active innovative and technological policy;
- improvement of educational policy;
- formation of purposeful policy of attraction of investments;
- formation of policy of export;
- formation of policy of development of transport and power infrastructure;
- formation of development of branches of economy;
- providing of effective methodical, information and consulting and educational policy at the regional and branch level.

The list of tasks generally covered the necessary areas of work in creation of cluster policy in Ukraine. Unfortunately, at the state level the concept hasn't got support. At the same time China and India are focused on cluster development of economy. A typical cluster is Silicon Valley in the USA into which are integrated 8 thousand enterprises (5 science and technology parks) which specialize in creation of the electronic equipment . In a similar cluster in India work 140 thousand people . In Catalonia where 13% of the population of Spain live, nearly 20% of GDP and about 40% of industrial export are produced. The given examples show that clusters began to define industrial policy of many developed countries of the world. These countries could provide 70%-90% of a gain of GDP. The analysis, carried-out by A. Noyen, T. Leonova and some other researchers demonstrates that the cluster policy in different countries has the differences [30]:

- differences on financing scales: from considerable budgets (Northern Rhine-Westphalia, Scotland), to financing of separate not big projects (France);
- differences of state policy of support of the plan: the policy in certain countries is significantly focused on support of network interactions between participants of a cluster (Luxembourg (Netherlands), Tampere (Finland));
- differences in forms of support in the countries which have big resources support of networks is carried out by the state (Scotland);
- organizational differences.

On the basis of international experience of clustering there are allocated different models of formation of clusters. Five models of clustering are allocated by Granik I. M.: Italian (on the basis of association in association of big number of small enterprises); Japanese (merging of the enterprises around firm – the leader); Finnish (model of sector of research and development acts the base); North American (the competition between the enterprises) and Indian-Chinese (with a leading role of the state is characteristic for this model) [31]. Dmitriyeva V. O. allocates Scottish, Danish, Soviet, East European and model of the consolidated cluster . Besides, all the models of cluster policy on organizational sign can be divided into two groups: "continental" model (Japan, the Republic of Korea, Singapore, Sweden, France and some other), and Anglo-Saxon model where the role of the state is defined by elimination of barriers to development of clusters .

The cluster economic policy as the concept which integrates regional economic and industrial policy has gained broad development in the 1990s. Doringe P. and Terkla D. have found out the main maintenance of industrial clusters with geographical concentration of the branches getting advantages of functioning thanks to a close arrangement [32]. In the methodological relation the program document in which the main tasks of regional cluster policy are formulated is the European cluster memorandum of member countries of the European Union (2006) [33]. Generally the document has regulatory character, providing the methods directed to removal of obstacles in development of clusters and defines functions of the state as a leader of cluster formation:

- strengthening of cooperation between participants of a cluster and creation of conditions of effective interaction of all the members of a cluster;
- development of related sectors of economy;
- formation of the state orders;
- elimination of formal barriers to the organization of innovative activity, production, introduction and replication of innovations;
- stimulation of external relations and export orientation of production activity;
- protection of intellectual property rights, implementation of infrastructure and investment projects, including ones with use of public-private partnership;
- information, methodical and educational support of processes of activation and development of clusters;
- creation of the promoting mesoeconomic and institutional structural conditions of business;
- support of small business.

Intercommunication of factors, stipulating creation of institute of regional cluster politics schematically represented on Fig. 4.2.

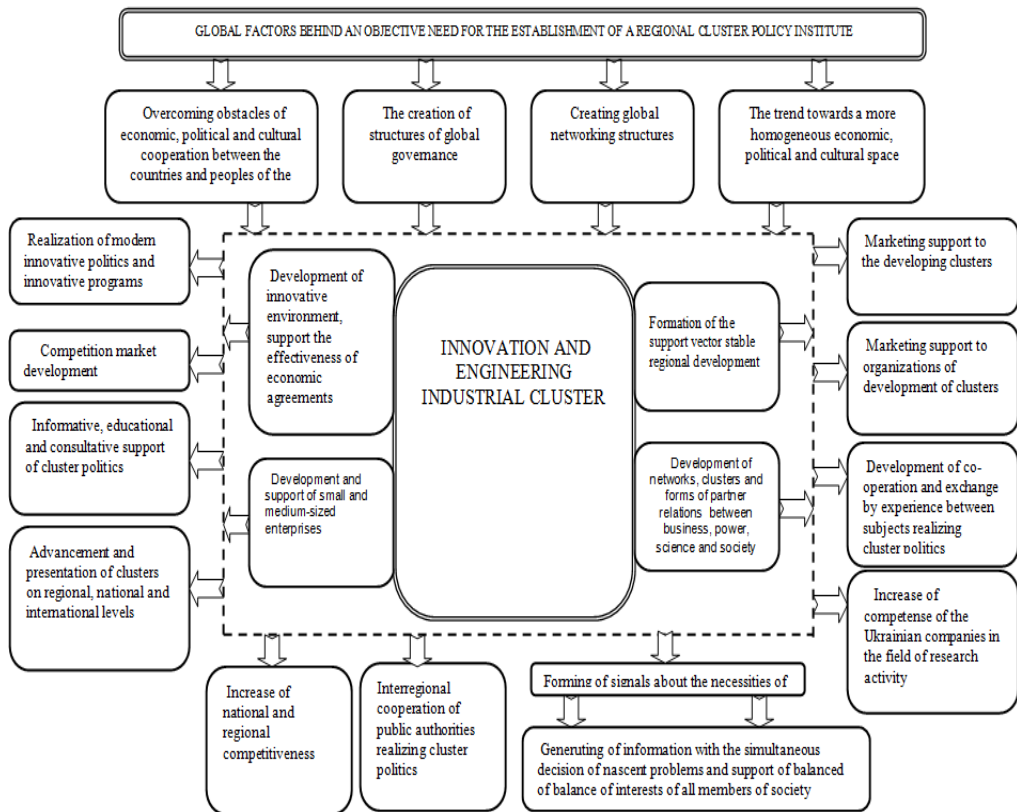


Figure 4.2. Intercommunication of factors, stipulating creation of institute of regional cluster politics schematically represented [author`s idea]

Specialization of economy of the states on development of the big integrated structures which have captured the main share of economic activity and export became the result of effective cluster policy in world practice. The analysis of 160 clusters which is carried out by Enright M. researches and other scientists has revealed that thanks to realization of the principles of cooperation development about 60% of clusters became world or national leaders [ 34]. Enright M. allocates four types of regional cluster policy: the catalytic cluster policy (functions of the state are limited to mediation) supporting (investment is added to mediatorial function of the state), directive (the state develops programs of development of regional cluster system on the basis of cluster approach) and interventional (the state bears responsibility for decisions which concern creation and development of cluster). According to us, in Ukraine it is necessary to apply elements of all these types depending on the region and problems of development. At the same time it is necessary to take the supporting cluster policy as a basis.



The new institutional paradigm of economic science interchanges the position of cause and effect, claiming that problems of economy of such countries as Ukraine, first of all, are connected with shortage and imperfection of institutes, and secondly, with outdated ways of production.

The analysis of international experience and national peculiarities of economic space allows to formulate the basic principles and tasks of regional policy in development of regional interindustry communications on the basis of technological reengineering.

**Integrity.** This principle is implemented by identification of the level of development of technology of the enterprises of different branches for the purpose of reduction of regional economic space in condition of possibility of creation of a full production cycle from the idea to production of the finished product with obtaining additional cost. It provides a possibility of cooperation of all the elements of the economic environment by restoration between them of production communications.

**Adaptability.** Transformational processes owing to globalization permanently change technologies which have advantages effective use which of in old conditions of managing becomes impossible. There is a need for creation of the corresponding innovative environment which adapts to new working conditions. This process is mutual and cyclic.

**Universality.** The policy has to be universal concerning the enterprises of different branch accessory, fields of activity and forms of ownership. The selective policy doesn't provide creation of full-fledged social and economic system.

**Complexity:** provides development of standardly legal, economic, social and other aspects which are directed to formation of interindustry communications in a complete infrastructure complex.

**The increasing return.** It is known that not all kinds of activity create economic growth. The increasing return depends on the type of production and technologies. Technologies form additional cost. Interindustry communication have to provide increase of the outputs and at the expense of additional offers lead to the effect of the increasing return.

**Reengineering approach** provides tools for modernization and technological policy concerning region economy. Introduction of new technologies in conditions of physically and morally worn-out fixed assets demands not superficial modernization, but radical restructurings of a production basis.

**Collaboration.** Cluster formation provides a possibility of creation of coordination council with participation of representatives of business, power and science, and also participation of public associations. Effective dialogue at this level creates new opportunities for involvement of financial and industrial groups, corporations, holdings, representatives of scientific institutions and the universities to participation in programs of cooperation and regional development.

Interactivity. Two qualities are characteristic of interactive planning: it as much as possible mobilizes creative abilities of participants of the organization and provides that the future is subject to control. This principle provides a possibility of design of future and is based on forecasting.

Continuous modernization. This principle is directed to formation of the attractive regional economic environment. According to the official state concept of regionalism the regions have the right to independently choose the strategy of modernization of their own economic system. The innovative investment attractiveness, activity in creation of cooperation alliances, the system of the budgetary stimulation, reengineering implementation and so on depends on the regional power. Considering that scientific-technical progress and manifestations of globalization, process of modernization is objective, constant and inevitable for regional economic system.

Emulation. This principle directs system to attempt being leveled with others, or to being ahead of them in any achievement or quality. The comparative analysis of branch and regional discrepancies in development of a certain region with others is provided by the mechanisms connected with controlling and monitoring.

Economic validity, adjustability and rational ratio of indicators. This principle promotes the solution of task which provides assessment of the level of development of an indicator of regional opportunities to create interindustry communications, assessment of their effectiveness, compatibility of indicators.

Coherence of interests. The modern regional economic environment is characterized by existence of a big number of different business formations, each of which has owners and the views of business and participation in regional programs. The regional power and science also have the interests. Interests have to be aligned for the sake of achievement of a definite purpose. Carrying out cluster policy promotes this process, and interindustry communications add level of credibility and mutual understandings.

Synergy. The regional policy of development of regional interindustry communications has to be accurately entered in a regional context of productive forces and the existing technological charter, the culture of business and so on. Such approach will provide diffusion of relationship on the basis of cooperation and will create synergetic effect and the accelerated development owing to evolutionary shifts.

Information inclusivity. This principle means that processes of regional development have to be included in world information space and answer dynamics of information changes. It means that production cooperation at the interindustry level creates production of new knowledge and technologies and has exponential dependence in time. Measures for creation of production

communications have to consider these information trends and introduce the corresponding amendments in formation of regional scientific and technical and information policy.

Controlling. The system of controlling has to be superstructural system and make the constant independent analysis of key indicators which characterize realization of policy of development of interindustry communications.

According to the formulated principles we will define main objectives of regional policy assistance to creation of interindustry communications:

- providing organizational and economic conditions and ensuring production cooperation for the benefit of all subjects;
- contribution to development of network interaction of all subjects of business on the basis of the cluster concept;
- priority development of the industrial enterprises with the increasing return;
- maximum use of economic, resource, labor and natural opportunities of the region;
- contribution of implementation of programs of technological reengineering of a production basis of the industrial enterprises;
- development and implementation of programs of replacement of export;
- development of the engineering companies of small and medium business on the basis of double technologies of military-industrial complex;
- development of programs of a deproduction on the basis of the operating enterprises of military-industrial complex and the enterprises of machine-building branch;
- creation of attractive institutional conditions for development of regional interindustry communications.

Proceeding from goals, efforts of the regional power have to be concentrated on the solution of the following tasks:

- development of the regional program of creation of complete social and economic system;
- development of the regional program of use of the cluster concept in social and economic development of the region;
- development of the strategy of development of the industry regional economy on the basis of revival of machine-building branch;
- development of the regional program of creation of the enterprises of a deproduction in branch of mechanical engineering and machine-tool construction.

The analysis of domestic and foreign practice of definition of industrial policy demonstrates that participation of the state in support of branches and the separate enterprises by

stimulation of their participation in programs of the general national meaning, implementation of the state order with the corresponding financing and the general ensuring support of business is characteristic of industrial policy of the western countries.

National peculiarities of formation and realization of industrial policy which has to consider influence of processes of globalization and needs reconstruction of the industry on a new technological basis are characteristic of Ukraine. For the solution of these tasks nonconventional institutes of development which organically fit into regional social and economic systems are necessary. The research of problems of regional policy has shown that new methods of management unite the branch principles with regional tasks and requirements. For their providing it is offered to found the institute of regional cluster policy (IRCP), to provide it the status of institute of development and to define the main role in restoration of interindustry communications on the basis of technological reengineering and in restructuring of regional economy.

IRKP is a complex of economic, legal, organizational, social projects, the phenomena and mechanisms of their regulation. It is put in action by the interconnected system of the methods and tools developed for achievement of definite purposes in management of social and economic development of regions. Subjects of management are bodies of state regulation, the enterprises and the participating organizations of cluster formations, financial and other intermediaries, suppliers. Object of management is process of formation, support and development of clusters .

Focus of IRKP:

- processes of technological and logistic transformations with use of new institutes of development and defense industry enterprises;
- socio-political interests and needs of people;
- economic and political institutes which exert impact on economic activity;
- economic and political norms and traditions;
- own-administrative and organizing activity of people;
- creation and support of formal and informal institutes of development;
- renewal of interindustry and interregional production communications thanks to cluster policy;
- support of the integrating processes (collaboration) of the power, business, science and the public in creation of strategy of regional development and providing effective industrial policy.

As the important direction of actions of IRKP should be defined support of public-private partnership, technological platforms, technological reengineering, a network transfer of technologies, development of small and medium business, programs for use of double

technologies, development of infrastructure, support of institute of regional cluster policy and chain influence on economy. It is appropriate to develop methodical providing regional cluster policy by creation of new forms of cluster interaction. IRKP is an institute which influences on development of the innovative environment, provides support of a vector of sustainable development of regions, causes existence of network and other forms of partnership between business, science, the power and the public. It covers economic processes, social, legal processes in the sphere of innovations, business and science. IRKP is intended for creation of the legislative and regulatory base of support of reengineering, development of cluster networks where partnership between business, the power, science and the public on model of "a threefold spiral" is formed. The cluster policy is events which are held by bodies of the state or regional power for creation and support of clusters in certain territories. Specialization of economy of the states on development of the big integrated structures which have taken the main share of economic activity and export became result of effective cluster policy in world practice. In the new century the cluster policy has gained character of a global economic trend in countries and regions. The system of complex support of clusters it is created in Europe. From 31 European countries 26 have national cluster programs, and 24% of clusters are world leaders, 12% – the European leaders, 37% – national, 24% of clusters are in the lead as economic subjects with high labor productivity level.

From branch model to cluster has passed public administration in Finland.

The document in which the main objectives of regional cluster policy are formulated is the European cluster memorandum of member countries of the European Union [35]. The system analysis of the directions of state policy in Ukraine is stated in the monograph by the famous scientist Y.V. Kindzersky [36].

The offered concept of new industrial policy in Ukraine is based on provisions which are formulated in the following hypotheses.

Hypothesis 1. Insufficient development of interindustry and interregional communications in modern conditions is one of the main stopping factors of economic development of the country and regions.

Hypothesis 2. The machine-building complex of Ukraine owing to his historical role, universality, the high level of development remains a priority object of new economy and any attempts to give it a supporting role in economy are wrong and as a consequence, will have loss of economic potential, sales markets, will negatively affect the standard of living of the population and will lead to considerable overexpenditures on correction of these mistakes in the future.

Hypothesis 3. The most progressive and productive institutional model of reorganization of a machine-building complex of Ukraine taking into account regional specifics of territories, is

the institute of development in the form of the cluster organization, bringing to the design level of development of associations of participants, communications between them both in a cluster, and at the interregional level.

Hypothesis 4. For reorganization of a machine-building complex on a cluster basis such components of new institutional tools have to be used: public-private partnership, technological platforms, technological reengineering, networks of a transfer of technologies. Only together these components are capable to provide necessary conditions of development of the industry, machine-building complexes and regions where the industry is the main component.

Hypothesis 5. DPP as a part of systems of tools of institute of cluster policy, demands development in different forms and its main task is association of resources, efforts of the power, business, science and regional societies for formation of new model of economy in the industry.

Hypothesis 6. TP is an organizational and technical element of the DPP system which are designed to create and develop points of investment growth in different regions of Ukraine on the basis of industrial complexes of dual purpose "military industrial complex – multinational corporation".

Hypothesis 7. TR is the uncontested administrative tool which together with technology of project management and cluster models is aimed at providing high level of competitiveness in world market space of machine-building branch of the country. TR creates objective need of all participants of cluster formation for production interaction, providing these stability of processes of technological transformations with manifestation of synergetic effect in the business environment of the region.

Hypothesis 8. In the strategy of innovative development the important mission is carried out by the mechanism of transfer of technologies which has reached high level in Europe. Tasks of the power and business are to adapt this network system to national conditions by means of domestic institute of development of IIPK with assistance of the regional innovative system (RIS).

Hypothesis 9. Practical tasks of reorganization of a machine-building complex have to be defined, designed and fulfilled on organizational and economic local model of creation of the innovative and engineering industrial clusters (IEIC), relying on the first experience of his work in Kharkiv the region during creation of a space cluster "Mechatronics".

Proceeding from the theory of the organization, the essence and a role of communications in the mechanism of management of development of economic systems (complexes of regional level) is that communication is category basic element of perception and a system of the world and specifically economic systems, and the system of communications is the integral and basic unit of a complete object of the social and economic nature (the region, an industrial complex).

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## **4.2 TECHNOLOGICAL SAFETY IN THE INNOVATIVE SYSTEM OF UKRAINE**

Nowadays among the main aspects of globalization a technological one is rightly called which is connected with the fact that the solution of social and economic contradictions is impossible on the basis of a technological way of production that is based on raw material resource and destruction of the environment. Neoliberalization, informatization, emergence of new technologies and the mobile automated hi-tech productions – all this leads to essential changes which have influence on formation of economy of the developed countries and create challenges for developing countries. The fourth industrial revolution ("Industry 4.0") is particularly intensifying, which is the integration of high-tech equipment (a hardware complex), software and human knowledge and experience, and is leading to radical changes in branch of production technologies, production management and labor resources [1].

The specified approach demands more thorough examination of a question of technological safety as a component of national safety which is conditioned by the influence of innovative factors, especially technological innovations. The course of the events caused by periodic global financial and economic crises and their consequences only increases need of research of features of this safety's type.

World practice shows that a strong position on the international scene can be claimed by a country that has the corresponding technological achievements. Therefore, it is so important to provide technological development, not only to support its own national safety, but also to influence on the course of world history, political and other economic processes. At the same time, the use of more difficult technologies modernizes the society, promotes the improvement of the management process at all levels and increases competitiveness. In the long term orientation to simpler technologies, even more profitable, does not promote a victory in global competition.



In this context, all of these provisions stabilize the modern requirements to rates and quality of growth of the Ukrainian economy which are necessary for strengthening of country's economic role in the world and reduction of lagging from the developed countries. A major challenge for Ukraine is rapid spread of a new wave of technological changes, the leading role of innovations in social and economic development and a noticeable decrease in influence of many traditional factors of growth.

From these positions, an important component of the state technological policy is technological safety, which can be represented as a technological level of production that provides not only the existence of the national economy but also the international standard of the life's level and its quality, excludes the mass poverty received from own resources without restriction of interests of future generations, the competitiveness of the national economy, that is, an ability of economy to produce and sell goods and services with a level of science intensity that is at least 6% in world markets in the conditions of global competition. At the same time, a result of this development has to be reflected in the growth of living standard of the population at respect for the international environmental standards. In a more general sense, Ukraine's technological safety consists of the introduction of the latest technologies, reproduction of such level of domestic scientific, technological and production potential which provides functioning of national economy through the using of own intellectual and technological resources, maintaining independence of the country. That is, development of a national innovative system (NIS) of new format.

Our researches show that from positions of assessment of technology factor's influence, there are such threats for the Ukraine's technological safety:

1. *Failure of meeting the requirements* of the Law of Ukraine "About Scientific and Scientific and Technical Activities" concerning appropriate financing of scientific activity [2]. In recent years, there has been a reduction of specific weight of expenses on scientific researches and development from the state budget in cumulative GDP. In 2002 this share amounted 1,37%, in 2010 – 0,75%, in 2016 – 0,48%. (For comparison: in general across the EU the figure is 2,03%, the highest indicator's level– Sweden-3,26%; the lowest level – Cyprus, Romania, Latvia and Malta (from 0,46% to 0,77%).

2. *Degradation of the scientific sphere.* The biggest problem of science is even not the low level of financing, but its unclaimedness. The macroeconomic analysis of scientific and technological development has shown that the share of new scientific production in GDP in recent years hasn't exceeded 1%, activity of the enterprises for production of scientific and technical products – 2,3%. All these years the science has been almost excluded from process of

economy's reforming therefore it hasn't provided the consistent creation of a subsystem of knowledge generation as a component of NIS that is essential for the activation of economic growth factors.

3. *Brain drain*. Proven fact is that the excess of "the critical mass" of the national intellectual potential, its further improving and development (through the creation of a large-scale education system, information centers, scientific schools, scientific and technological infrastructure, etc.) leads to effective using of national natural, material and human resources, the successful solution of internal social and economic tasks, an active inclusion in world economic communications. Because of Ukraine's staffing, according to data of the Ministry of Economic Development and Trade, the country became the world's fourth exporter of IT services and products in 2016 [3]. During 2011-2015 the export-oriented segment of this market increased by 2.5 times, from 1.1 billion dollars up to 2.6 billion dollars, and its contribution to country's GDP from 0.6% to 3.3% respectively. More than 70% of IT-services export of Ukraine are made by software development (software) on request. According to data, released by the European Business Association, the IT export brought 5.8 billion UAH of direct taxes to the budget in 2016, that is 30% more than in 2015. One of the obstacles of the IT industry development is a critical situation in the sphere of providing the copyright in Ukraine: domestic experts have no incentive in creation of their own IT product, that is why they usually realize their potential in foreign projects as freelancers, producing for them so-called intellectual "raw materials". In addition, creative domestic experts seek to register their businesses and intellectual property rights in other countries, using the same hired Ukrainian workers for further development and promotion of their ideas. As a result, all rights for the final product, which is actually created by Ukrainians, belong to the third party (the employer or the customer) outside Ukraine. It is obvious that it does not correspond to national interests as it leads to significant expenses for the state budget, domestic business and the international image of Ukraine. In addition, the inability of effective protection of their intellectual property is the reason of "brain drain" (according to the educational SmartMe University online platform, only during 2014-2015 about 9 thousand IT specialists left Ukraine) [4].

In conditions of absence of an effective state policy for the formation, development and realization of an intellectual resource, it is quite natural to have an extremely low state of investments in intangible assets, in particular, 3,36% of the total amount of capital investments in 2014, and some increasing (up to 6, 7%) in 2016. There is no motivation for innovators on the one hand, because of unformed demand for innovations of domestic enterprises, on the another – the lack of policy of domestic market's formation, including the market of domestic innovations.

4. *Reduction of patent activity.* The situation which has developed in the sphere of protection and protection of intellectual property rights in Ukraine and a deformation of the national innovative system interfere with formation of the civilized market of intellectual property. In particular, referring to results of activity's audit by the Accounting Chamber connected with the protection of intellectual property rights, should be noted that due to the unregulated legislation the state budget annually loses about 70 million UAH. An opaque system of financing of the sphere and lack of appropriate control from appropriate authorities of the government create conditions for corruption schemes. And some negative phenomena have become irreversible and pose a threat for the economic and technological security of Ukraine. So, the activity of the industry in the direction of submission of applications for inventions (patents) for ten years is actually reduced to zero. Among other problems are uncontrolled transfer of scientific and engineering developments abroad is essential and drain of Ukrainian applications for perspective inventions from Ukraine.

5. *Unstable dynamics and low level of innovative activity of the industrial enterprises.* According to official statistics [5] the share of the enterprises that implemented innovations during the period from 2000 to 2014 and the average result was 10-12%. In 2015 this indicator was 17,3% in 2016 – 18,9% (it should be noted that the limit in 20% is considered like critical).

In Ukraine, scientific and technological development remains extremely uneven: on the one hand, there are achievements in some spheres caused by scientific developments and appropriate breakthrough technologies, and on the other hand, problem spheres of technological lag prevail that deepens process of destructive changes, especially in the national industry. It significantly has an influence on dynamics of the introduction of new technological processes: an increasing of their quantity in their number during 2006-2011 (it was essential during the crisis period), although the share of implementation of low-waste and resource-saving technological processes decreased during 2009-2013, that demonstrates not only the lack of effective state incentives of industrial modernization in this sphere, but also reflects its structural feature – high level of sphere's indicator of low-conversion enterprises in the technological complex, who are not interested in modernizing their technological base in conditions of obtaining high rent at a favorable environment in foreign markets. In 2014 the total of new technological introductions has increased, however the quantity and share of low-waste and resource-saving have decreased. Some activation of this process took place in 2015-2016 that caused by reproduction of Ukraine's defense-industrial complex.

6. *Low technological level of the industrial enterprises.* Because of the government's ignorance of the implement structural policies needs, the investment attractiveness of Ukrainian

industry is limited by internal properties that complicates growth of its efficiency. These properties include: lack of production, technological and organizational structure, which is shown in discrepancy to requirements of the market and modern forms of business; impossibility of using of the defensive focused capacities in the civil purposes; excess and also obsolescence of fixed assets, their active part; dependence of investment resources on an environment in the world raw markets etc. For Ukraine, in the case of foreign direct investment (FDI) in the process of production according to the technological rules, during 2010-2014 was noticeable a tendency of their share increasing in low-technology production (18.6% and 18.5%, compared to 8.8% in 2009), decreasing in the share of FDI in medium-technology production: according to statistical observations, this process began in 2005 (in particular, the stage of large-scale technological modernization of the food industry has ended), and a sharp decreasing of FDI in high technology production in 2003 – as a result, their almost total loss. This tendency is caused by mentioned circumstances: domestic businessmen's possession of the rent logically encourages them to make investments in technological base upgrading of production to remain competitive in the foreign markets (that is becoming more difficult today) and not to lose a source of income in domestic markets.

The research of economic development level of hi-tech production, the dynamics of technological shifts in structure of an industrial complex show that the integrating element, within which the sector of hi-tech sector would receive a stable positive development tendency, has not been created yet. This is confirmed by the indicators of innovative development of an industrial complex and results of the international comparisons: in the countries which have recently built a social and economic structure identical to ours, the share of hi-tech production is about 40% in global GDP while in our country the similar indicator, starting with crisis 1998, remains at the level of 3-4%.

*7. Condition of a technosphere as one of the most intensive and powerful sources of new types and risks generation.* Implementing technological and industrial policy of the state the great danger is constituted by objects of potential risk. On the other hand, the problems inherent in the backward states are increasing – import of the fulfilled technologies, import of waste and dangerous productions, etc. The lack of restoration of the equipment, including environmental protection, leads to the fact that even with a possible revival of economic activity the negative impact on the environment will grow with rates exceeding economic growth..

Generally, the deformation of the Ukrainian innovative system is not eliminated (the Concept of NIS development has been adopted [6], but measures to its implement have not been approved), that is manifested in the absence of a strategy and model for innovative

development of economy; weak development of small and medium-sized innovative enterprises, almost total absence of intermediary organizations that work for innovation and also venture financial potential; low orientation of financial system in support of innovative development of the domestic economy, the lack of state financial support for innovative activity; the passive approach of many scientific institutions to commercialization of scientific results, insufficiently active using of national scientific and technical potential by power structures for the benefit Ukraine.

Structures of scientific accumulation and technical information, institutions and structures of fundamental and applied researches, intellectual property items, a know-how are critical for technological safety. A safety problem in this sphere is closely connected with activities of industrial intelligence service, an unauthorized interference in confidential networks and systems, cybernetic (hacker) wars of specialized subdivisions of the certain countries, the competition in the world markets.

In the context of European integration policy realization for objective assessment of Ukraine's innovative development condition, influencing on the level of technological safety, definition of its relative position is important within the EU countries using the European Innovation Index and the European Innovation Board (EIB). Ranging of the countries on the basis of this complex indicator of innovative development has value as this indicator defines how economic growth of the country is based on innovations. The indicators of innovative development are divided into input data (estimate resources of scientific and innovative activity) and output data (reflect the effectiveness of scientific and scientific and technical works and innovative activity). According to the EIT in 2016, Ukraine is in the fourth group of most innovative group, the "countries with catching-up development" with value of index 0.23. This group is made of: Hungary – 0.24, Russia – 0.23, Ukraine – 0.23, Latvia – 0.22, Poland – 0.21, Croatia – 0.20, Bulgaria – 0.19 Romania – 0.16, Turkey – 0.08. In comparison with other EU countries Ukraine's lag is: from the "leading countries" – approximately by 3 times (Sweden – 0.68), from "countries followers" – 2 times (Great Britain – 0.48), from the countries "moderate innovators" – by 1.6 times (Norway – 0.35). Generally, Ukraine's innovative activity comparing with EU has decreased from 38% in 2008 to 34% in 2015 [7].

Ukraine has low rating almost at all points: level of education of the population, development of scientific publications and the organizations, introduction of innovations in production, integration of science into world cooperation, investments into the scientific and innovative sector by the state and business etc. (Fig. 4.3), except one indicator – a tertiary education (training which continues senior secondary education with final examination).

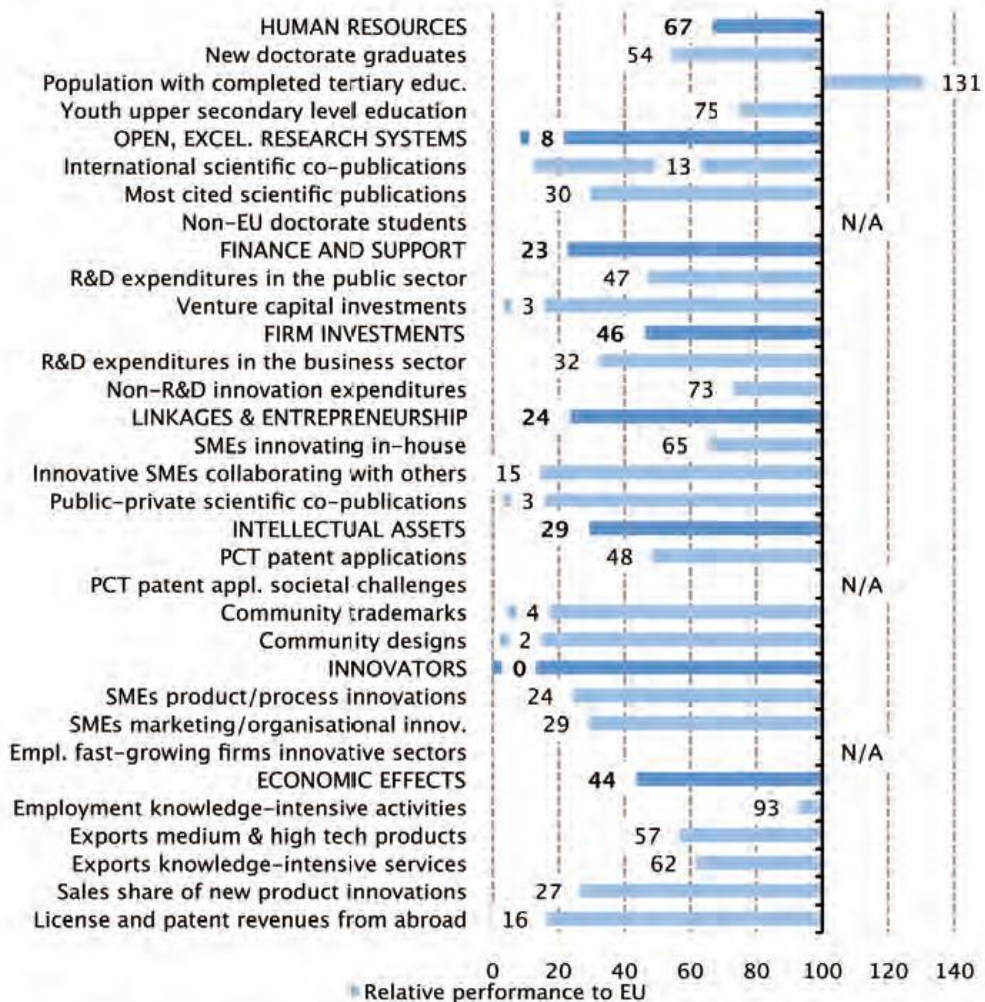


Figure 4.3. The ratings of Ukraine in compliance of components of the Innovative index in comparison with the EU (EU=100) [7]

Estimating our country in coordinates of the international ratings, we can see a contradictory picture. For example, according to Global Innovative Rating compiled by the Bloomberg agency, Ukraine is among 50 countries – leaders of the world in the level of innovative development (the 42nd place following the results of 2017). The strengths of Ukraine, from the point of view of innovation, are recognized: coverage of the population with the higher education (the 6th place in the world), patent activity (the 17th place), intensity of NDDKR (the 39th place), technological capabilities of the industry (the 34th place). Factor that prevents our country from rising higher in this rating is total low efficiency of economy (the 69th place) [8].

The general conclusion that can be made, commenting results of ratings that include innovative factors is that the intellectual potential of the Ukrainian nation is at a high level, but there is no role of the state in creating a sphere for its realization as a main innovative factor of social and economic development of the country and increasing its competitiveness and safety level. In this situation, the state can not solve the problem of entering into cognitive society (a society where the role of continuous cognitive (informative) activity of the economically active population is the determining factor for increasing human capital).

An important activation factor of innovative and technological development of the country in the last two years is the modernization of defense industry complex. Proceeding from a long-term goal of association with European safety system, taking into account the nature of relevant threats to national safety, the main directions of reforming of Ukraine's defense industry complex are implementation of the latest military technologies, creation of the maximum possible closed cycles for the development and production of the most important types of weapons, special and military equipment, using of opportunities of military-technical cooperation with the states that are strategic partners of Ukraine; support of financial improvement of scientific institutions and manufacturing enterprises and their functioning through the creation of actions complex and economic mechanisms of targeted state support and the state protectionism on a direct purchase line from enterprises of defense industry complex of production to meet priority state needs within the state defensive order etc. Nowadays, the defense-industrial complex is important for the country from the point of view of maintaining national security, and from the side of promoting innovative development of economy in general.

However, in general, in Ukraine, the problems of scientific and technological and innovative development in the last period do not cause particular interest (in Strategy 2020 the innovative factor is declared as a factor of pride, opposed to economically developed countries, where it is a factor of economic growth). On the one hand, experts note the achievements in the defense industrial complex caused by scientific developments and corresponding breakthrough technologies and intensified by the latest military events, and on the other hand – the problematic issues of the technological lag left behind in connection with the sluggish development of the domestic industry that deepens the process of destructive changes.

Among the reasons that cause slow realization of a role of innovative and technological factor in improving safety of the country, in particular, are the following: insufficient demand of innovations as the Ukrainian economy in its present state does not form an active interest of the majority of economic entities in results of scientific developments that aren't able to use innovative developments effectively; absence of the institutes

development that providing functioning of economy of innovative type in all its components (the organization and management of development; their financing, marketing, commercialization, etc.) the small number of the highly qualified specialists who are able to work in the innovative sphere; lack of coherence of the educational, scientific and technological, industrial and innovative policy.

We agree with the opinions of those scholars and practitioners who emphasize the need of development and implement of the Program for ensuring technological safety of Ukraine, which requires an appropriate mechanism, that includes: creation of an informational, including statistical, basis for objective and comprehensive monitoring of the state technological safety; procedures for adjusting state program documents to take into account detected and predicted threats to the interests of technological safety objects for the neutralization of these threats; procedure of control and coordination of program activities; examination of decisions taken by state authorities and their coordination with the Program.

The principles of solving technological safety problems of the Ukrainian economy should be considered: balancing the system of measures to stimulate the integration of domestic enterprises with world technological complexes, ensuring their international competitiveness and development of the national innovative system; a combination of measures of production and technological, financial and economic order; coordination of measures on expansion of consumption, on which the expansion of domestic demand with large-scale modernization of production and technical apparatus, stimulation of domestic production development, which requires investments increasing; effective coordination of various state regulation measures, from tariff protection of the market and stimulation of export to direct financial support of R&D and technological modernization financing; allocation of the most probable breakthrough points for individual technologies and products; interdisciplinary (rather than sectoral), character of priorities, in connection with that there should be justified directions of scientific and technical development and technologies of homogeneous generation.

In conclusion, timely formulation of the question about technological safety will give an opportunity to avoid useless and expensive attempts to reanimate the obsolete branches and to direct main resources to perspective spheres which form a new social and economic system based on results of the fourth industrial revolution and contribute reduction of Ukraine's lagging from the advanced countries of the world.

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2. Law of Ukraine "On Scientific, Scientific and Technical Activity" [Electronic resource]. – Access mode: [http://search.ligazakon.ua/l\\_doc2.nsf/link1/T197700.html](http://search.ligazakon.ua/l_doc2.nsf/link1/T197700.html)



3. Can IT services become the basis for Ukrainian exports [Electronic resource]. – Access mode: <https://softserve.ua/ua/press-center/news/it-ukraine-export/>
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### **4.3 ECOLOGICAL-INNOVATIVE MECHANISMS OF SOCIETAL SYSTEMS MANAGEMENT FOR ENSURING ECONOMIC SAFETY**

The analysis of societality allows to give a qualitative characteristic of social life and formulate the main strategic directions in the policy carried out by government. In this regard, studying the societality of society, revealing of causes and forms of manifestation of crisisness, has theoretical and practical importance. The necessary condition for overcoming the ecological crisis is to overcome the crisis of the traditional, anthropocentric system of values. In order to develop an economic policy of making effective economic decisions it is important to know the ecological value of natural resources and services. Underestimation of ecological parameters distorts the measurement of economic development through traditional indexes of GNI, GDP, GRP, etc., the growth of which hides the degradation of the environment.

Reforming of the country's economy, its transition to market relations inevitably affected the sphere of nature management. Thus, to solve many economic-ecological problems one should use a new kind of human activity in the field of nature management, new social systems – societality of the system of sustainable development, the goal of which will be to satisfy the ecological-economic needs, the decrease of consumption of the natural resources and environmental damage, and the theory of government management, involving the basic concepts and principles. Every specific structural unit of the societal system is always a combination of the six components – economy, politics, sociology, ecology, ideology and culture. The structure of the societal system as a functional unity of the combination of elements, is regulated only by its inherent laws and regularities, and it has its own determinism. The societal theory as a system of principles and concepts, describing the emergence, composition, functioning and change of society.

The analysis of the latest studies and publications demonstrates that the issue of the societality of the society system does not include the ecological aspects, and when considering the sustainable development the problem of ecological government policy is absent. Therefore, because of its multiaspectness and interdisciplinarity there is a necessity to form a new concept uniting social-ecological-economic and political, ideological, moral directions into one societal system.

The development and implementation of the national strategy for sustainable development provides the strengthening of the ecological component of the economy, the harmonization of environmental, social and economic interests of society. The social-ecological-economic system, i.e. the sustainable development, may be considered as part of the societal or public system, which also includes the organization of political power, the complex of relations between society and government, characterizes the flow of political processes including institutionalization of power, the nature of political participation, moral and educational aspects, etc.

The societal system (from latin *societas* – community) – is a system of relations and processes considered at the level of society in general. The term "societal" was introduced by A.G. Keller, who attributed it primarily to the organizational aspects of social life. As a societal system, it is considered a social formation, which includes functional interaction of its main structures – economic, social, ideological, and political. T. Parsons, in his book *The System of Modern Societies*, regards the societal community as an integrative subsystem of society whose main function is "to determine the obligations arising from loyalty to the societal collective", and the highest position in the hierarchy of loyalties belongs to the cultural legitimation of the normative order; in other words, it is the core of the large society, integrated as a community based on socially approved values and norms [3]. In a broad sense, the object of societal sociology is society as an integral system. But in a narrower sense, its object is the integrated core of this society – the societal community. The societal theory as a system of principles and concepts describes the emergence, composition, functioning and change of society. The core of society as a system is a structured normative order through which the collective life of a population is organized. As an order, it contains values, differentiated and particularized norms and rules, and all must correlate with culture in order to be meaningful and legitimate.

Each of the structures of the societal system, as its complex, not only performs a certain function, but also in the process of relations with its other structures it gives this system a new (systemic) quality that is irreducible to the qualities of its elements. The societal system constantly reproduces the social quality of its structures. In this regard, economic, political, ideological, moral, social and ecological components should be considered as elements of one

system, and depending on what relations develop between them, a single structure of this system is formed. And in such system there are no separate economic or ecological or political elements, but there is a united system comprising such elements.

Whatever the forms of social production are, the natural and historical conditions of the life of society always remain its factors. But, being separated from each other, these factors (ecological, demographic and technological) remain factors of production only potentially. Human and technological factors combined form the productive forces of society, characterizing the relation of man to nature. The relations of people regarding possession, exchange and distribution of production products, are called economic. Only within these relations a relation of people to nature exists, and production takes place. Economic relations is the way people of a certain society produce means for life and exchange products between themselves (since there is a division of labour). The unity of the material elements of labour and economic relations forms the mode of production. This mode of production results in, firstly, a certain social-class structure of society, and secondly, a certain attitude of people to nature. Empirical observation must reveal, in each case, the connection between the economic, ecological and political structure with production.

Social-ecological-economic and political systems should be considered as parts of the societal system, and with this approach one can speak about the sustainable development of the country and society. With the transition to the system management of the national economy, an in-depth theoretical research of the complex of possible management levers is needed based on the study of the objective economic-ecological processes and actual commodity-money relations.

Taking into account ecological components, the societal system has a number of defining characteristics:

1. Integrity – necessarily includes a complex of connections or relations between the elements of the system;
2. Synerginess – a quality indicating that the system is not equal to the sum of its constituent elements, an arbitrary component of the system is considered together with its connections with the surroundings;
3. Structuredness – (the possibility to divide parts) – the structure of the system dependent on a certain order of relations, which can be identified and fixed. If the system exists, it is ordered, but as soon as it or its components, elements begin to interact with other systems and surroundings, then the structure of the system changes and, consequently, another (new) ordering occurs;
4. Partibility – a quality of the system to possess its inherent and corresponding only to it composition (set) of subsystems and parts;

5. Goal-orientation (or goal-setting, without a goal the system does not exist).  
Functionality: the structure of the system and its functions should be considered in conjunction with the priority of the function over the structure;

6. Development – it is necessary to take into account the changeability of the system, its ability to develop, expand, replace components, accumulate information;

7. Orderliness – the structure of the system, dependent on a certain order of relations, which can be identified and fixed;

8. Principle of connectivity: an arbitrary component of the system is considered together with its connections with the surroundings;

9. Principle of modularity: in many cases in the system it is expedient to realize decompositions into components (modules) of different degrees of universality and to consider it as a set of modules and connections between them;

10. Principle of hierarchy: in most cases in the system it is expedient to realize a hierarchical formation and (or) ordering of its components by importance;

11. Principle of uncertainty: uncertainty and randomness must be taken into account when determining the strategy and tactics of the development of the system.

The structure of the societal system is a complex of stable relations between the main elements of the system (branches of government, public administration institutions and external to them surroundings), usually formalized in legislative acts, the tax code and other legal documents.

The differentiation of systems into simple, complex and large emphasizes that in system analysis not all, but complex systems of large scale are considered. In this case, the structural and functional (computational) complexity is accentuated.

There is no universally recognized boundary dividing simple, large and complex systems. However, it is noted that the term "large system" characterizes only one feature of complexity – the dimensionality of the system. In addition, complex systems are characterized by three main features: the property of stability and functional anisotropy – the inequivalence of the elements and ties of the system, the different organizational resistance and sensitivity to impacts, the asymmetry of the potential for functional and dysfunctional changes.

Complex systems have the property of stability – the ability to maintain partial operability (efficiency) when individual elements or subsystems fail. It is explained by the functional redundancy of a complex system and manifests itself when the degree of degradation of the performed functions changes, depending on the depth of the disturbing actions. A simple system may exist only in two states: full operability (working) and total failure (non-working).

In complex systems, in addition to a considerable number of elements, there are numerous and diverse (heterogeneous) connections between the elements. The main types of relations are the following: structural (including hierarchical), functional, causal (cause-and-effect, relations of truth), informational, and space-time relations. On this basis we will distinguish complex systems [7].

Taking into account that almost all systems belong to the class of multi-product (multi-goal) systems, one should consider simple (particular) goals of a system and compound (complex) ones.

The formation of goals is a complex and complicated process. One of the reasons for such difficulties is that between the goal (the abstract and final model) and the actual system there is no and can not be any one-to-one correspondence: to achieve a given goal, one can choose different means – systems (we will come back to this difficult point more than once); on the other hand, the given real system can be used for other purposes not directly envisaged during its creation (for example, it is worth remembering the classic example of hammering the nails with a microscope).

To a great extent the irrational and inefficient use of natural resources and the environment can be linked to the malfunctioning of markets, their defects or total absence. Prices formed in such markets do not reflect the true social costs and benefits of using resources. Such prices are misleading about the deficiency of resources and provide insufficient stimuli for the management, efficient use and conservation of natural resources.

Environmental management, setting as its main task meeting the constantly changing economic-ecological needs of consumers, reflects the ideology of modern entrepreneurship, aimed at finding reserves for gradual development and long presence in the market. The main goal of modern entrepreneurship is the search for reserves of reproductive development at all stages of the movement of the social product from factors to final goods and its constant presence in the market. Therefore, the consideration of ecological components in the societal system will contribute to the sustainable development of society.

The main criterion, by which one can judge the efficiency or inefficiency of the structure of a given system is the degree of its correspondence to the external environment. Thus, an efficient structure is a structure that allows the system to interact optimally with the external environment, meets its needs and challenges. Therefore, resource and environmental components are the connecting elements of the national economic and political complex of the country. Through the adoption of laws and bylaws, the purpose of which is to determine the rights of economic entities to environmental resources, a resource-environmental policy is implemented.

Societal development of society should be aimed at improving the quality of life of people (strengthening health, increasing life expectancy, obtaining the necessary education, guaranteeing freedoms, rights, etc.). Development should be realized in such a way as to provide equal opportunities to meet the basic life needs as for present as for future generations while preserving the environment.

Conservation of the nature should be an integral part of the development process and must not be viewed separately from it, economic development, fair development of the social sphere and environmental safety should be united into one, i.e. the principle of responsibility for future generations, the principle of equal opportunities for development and satisfaction of the needs of different generations. In today's conditions, within existing models of consumption, production, and attitude to the environment the further development of society is impossible. Responsibility to the future, in the transition to a model of sustainable development, becomes the basic life principle for every person.

There is a complex hierarchy of social systems that differ qualitatively between each other. A supersystem, or, according to our terminology, a societal system, is the society. The most important elements of the societal system are its economic, social, political and ideological structures, whose elements interaction (systems of less general order) institutionalizes them into social systems (economic, social, political, ideological, etc.). Each of these most general social systems takes a certain place in the societal system and performs (well, poorly or does not at all) strictly outlined functions. In its turn, each of the most general systems includes in its structure, as elements, an infinite set of social systems of less general order (family, work team, etc.).

With the development of society as a societal system, along with the mentioned, there arise other social systems and bodies of social influence on the socialization of the individual (upbringing, education), on his aesthetic (aesthetic upbringing), moral (moral upbringing and suppression of various forms of deviant behavior), physical (health, physical education), scientific and philosophical development. This organized system as a cumulative whole has its own premises, and its development in the direction of wholeness consists precisely in subduing all the elements of society or creating from it still missing parts. This way, in the course of its historical development the system becomes a wholeness.

The efficiency of the system is determined by its ability to keep the indicators when a part of the system is damaged. This index can be characterized by a relative number of elements (or relations), with the destruction of which the remaining indicators do not exceed the permissible limits.

In nature, in self-regulation contours any self-regulating system has, to a certain extent, an enclosed, localized, to some extent closed pattern (atom, molecule, cell, organism, population, solar system, etc.) and objectively (regardless of the desire and will of man) is determined by internal, immanent to this system regularities and sources (impulses) of existence, movement and development. A man has to learn the secrets of such systems and introduce them into his life only with an obligatory consideration of their patterns, forms and possibilities. Here, the subjective, conscious manifestation of man's will and influence is very limited.

Types of economic activities that damage the environment can be regulated through the introduction of a permitting system, which is a set of requirements for the quality of the environment, which are usually expressed through the maximum pollution indicators for soil, water and air basins. Normative indicators are defined in such a way that long-term average values of emission concentration can not be greater than short-term ones or be equal to them. Requirements for the quality of raw materials are determined by the maximum allowable concentrations of harmful substances in it. In the process of making decisions on the implementation of environmental projects that affect the nature, there should be provided the information on the economic side of their ecological effects. Comparison of losses and benefits will allow to make the right strategic decision. The cost of the environment can not be determined directly on the basis of prices and physical volumes that would appear in ecological deals. People do not buy or sell directly the quality of the environment. However, people's preferences regarding the environment can be determined indirectly, by examining their behavior in the markets, i.e. people prefer environmentally friendly goods, services, equipment and technology, as well as quality, environmentally sound living conditions.

An important cause of damage to the environment is the failures of politics. The list of market failures does not mean that the environment can not suffer from the actions of politics makers. Here are the following examples of the failures of politics:

- imperfection of the tax system in terms of granting benefits to nature users initiating the rational use of natural resources and protecting the environment, as well as tax incentives and subsidizing loans for agricultural producers, etc.;
- inefficiency of the financial mechanism for compensation of damages to the environment by nature users and an inefficient system of environmental fines;
- unsatisfactory legal discipline of nature users;
- bureaucratic obstacles to the establishment of rights to land ownership and one-sided land reforms that create insecurity of land ownership;

- low payment for the right to use natural resources;
- lack of cadastres of natural resources and territories, etc.

The political-economic-ecological system can be considered as part of the societal or social system that includes a complex of relations between society, government and the natural resource potential, including the institutionalization of power over environmental issues, the nature of political participation, and so on. Social-ecological-economic, political, and moral systems should be considered as part of the societal system, with this approach one can speak of a sustainable balanced development of the country and society.

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#### **4.4 CONCEPTUALLY-INNOVATIVE DIRECTIONS AND ORGANIZATIONAL MECHANISM FOR PROVIDING THE ENVIRONMENTAL AND ECONOMIC SAFETY OF AGRARIAN NATURE MANAGEMENT**

Today it is widely and reasonably acknowledged that the necessity to find innovative strategies for sustainable (balanced) agrarian nature management is indispensable and indisputable [1-5]. Innovative technologies of agrarian nature management that increased its efficiency and volumes of agricultural production depleted the agroecosystem, which also led to the need to find more environmentally oriented methods of agrarian land use. Concerns about the use of pesticides, biotechnologies and other socio-environmental problems have focused public attention on the environmental quality and food safety, causing an interest in alternative, environmentally oriented and balanced food production methods [6]. Environmental sustainability of agrarian nature management should mean that the agrarian and natural resources must be renewed by the process of their use. In order for the agrarian nature management system to be sustainable, it should be based on the natural processes of the local ecosystem, regardless of



the external resources or systems of ecologically destructive technologization. Environmentally sustainable agriculture must operate indefinitely without exhaustion of land-resource potential in the spatial-territorial dimension [2].

Implementation of the concept of sustainable environmentally safe and balanced agrarian land management requires a fundamental conceptual departure from the economic management perspective that has led agrarian science over the last hundred years. The ecologically safe prospect of land management is determined by the complexity of the factors that are included in this system, as well as the long-term nature of their analysis and control. There is a complexity of natural ecosystems in the ecological system of agrarian nature management and the traditional economic approach simplifies them. Without the use of an ecosystem approach to agrarian and environmental management, long-term improvements in the effectiveness and efficiency of agricultural land use will be impossible. Consequently, if institutions of agrarian development can not ensure the environmental sustainability of various agricultural methods, they actually cause damage to society, individual industries, households and citizens.

It is important to note that the productivity of land use should be improved according to the population growth rate by increasing the productivity and intensity of cultivating crops. Most scholars believe that land productivity can only be increased through the introduction of innovative technologies, which are based mainly on the use of chemicals for agrification. According to such industrial model, the main criteria for success is technical and economic efficiency. Supporters of the environmental model of agrarian nature support the development of more effective low-resource agroecosystems based on the biological cycle of energy and chemical elements. The criteria for the effectiveness of this model include indicators of ecological and economic efficiency of land management, socio-environmental sustainability and energy efficiency of agrarian nature management [7, p.76-77].

Thus, the ever-growing need for productive and sustainable ecologically safe and balanced agriculture leads to the necessity to introduce a new vision for the development of agrarian nature management and, in particular, land management on the basis of resource conservation and reducing its riskiness. This position requires understanding of ecological principles of environmental and economic security of agrarian land use, as well as the formation of organizational and economic mechanisms of ecosystem agrarian nature management.

We consider environmental and economic safety of agrarian land use as a state of development of the use, reproduction, preservation and protection of land-resource potential and functioning of land capital, which, based on the system of institutional and innovative measures, provides the optimal level of agrarian land management in accordance with the prevailing socio-

ecological– economic criteria (rules, parameters, standards, separate indicators). Irrational use of land-resource potential (capital) due to imperfect land relations and the use of environmentally dangerous innovative agrarian technologies lead to the emergence of various environmental risks.

Solving the problems associated with ensuring the sustainability of agrarian management, the environmental safety of agrarian land management requires the recognition of the integrity of nature and agro-systems. Agroecology should ensure the efficient circulation of energy and materials within agroecosystems. In this case, there is a need for a holistic approach, which would include agricultural research at the enterprise or ecosystem level, a comprehensive analysis of its resources and their logistical flows [8]. This approach allows us to implement integrated ecological and economic relations in agriculture. For example, instead of improving one species at a time, a holistic ecological perspective involves the search for a set of plants and animals that together give a high ecological, economic and social results [7, p.79].

Holistic ecologization of agrarian nature management (land management) is objectively determined by the process aimed at more rational use of agrarian and natural resources in the spatial and temporal dimension by reducing the negative impact of agrarian production on the environment and avoiding violations of ecological balance on the basis of ecologization of reproductive processes. The main purpose of ecologization of agrarian nature management is to solve ecological and economic contradictions in the interaction of society and nature by transforming the existing technological process of agricultural production in the direction of maximizing the output of high quality and environmentally oriented agricultural products, while preserving the environment. At the same time, ecologization of agrarian production should be considered not as a separate isolated area of activity, but to be a component of the integrated mechanism of agrarian management.

Taking into account theoretical and methodical positions on the construction of a mechanism for agrarian management, presented in [9-13], *the organizational and economic mechanism for ensuring the ecologically safe and balanced agrarian nature management* is defined by us as a complex and holistic system of forms, methods, tools and methods of organizational and economic and social influence on the ecological behavior of individuals of agrarian management in the direction of increasing socio-ecological and economic efficiency of use, reproduction, preservation of land capital [14].

*The general objective of the organizational and economic mechanism for ensuring ecologically safe and balanced agrarian nature management* as a part of the integrated economic mechanism of agrarian business is the effective organization of reproductive processes in use, reproduction, protection and conservation of natural resource potential and

functioning of natural capital on the basis of the ecosystem approach to environmentalization of agrarian nature management.

*The integrated function of the organizational and economic mechanism for ensuring the environmentally safe and balanced agrarian nature management* is the harmonization of agro-environmental, socio-ecological and economic needs and interests of economic entities of different hierarchical levels, society as a whole, and individual citizens in the process of practical implementation of principles of the environmentally safe and balanced organization of sustainable use of natural resource potential and functioning of natural (land) capital.

The realization of the overall objective of the organizational and economic mechanism for ensuring environmentally safe and balanced nature management is associated with the implementation of *tasks* at various hierarchical levels of land ecosystem management [15, p. 139-140]:

1. Increasing the socio-ecological and economic efficiency of spatial organization of natural resource potential on the basis of the formation of an optimal ratio of agricultural lands, water and forest lands at the level of individual land users, and at the territorial level, taking into account the functional composition of the ecological infrastructure [16], and as well as the implementation of integrated environmental protection measures.

2. Organizational and institutional ensuring of effective implementation of state and regional programs of ecologization of agrarian economics in conditions of self-organization of territorial development.

3. Development of business-entrepreneurial and cluster initiatives in the direction of the development of environmentally safe and balanced nature management.

4. Address motivation and stimulation of entities (individuals) of agrarian nature management for the implementation of ecosystem and environmental innovations.

5. Development of preventive and compensatory mechanisms for reimbursement of environmental and economic losses.

6. Regional activation of the development of mechanisms of economic and legal and socio-environmental responsibility for environmentally safe and balanced agrarian nature management.

The formation of the organizational and economic mechanism for ensuring ecologically safe and balanced nature management involves the interaction of the regulatory subsystems of the external organizational-institutional mechanism and the internal economic mechanism of enterprises (organizations) using the principles and tools of ecosystem management, which provides motivation for environmental behavior of agricultural entities.

The determinative component of the organizational and economic mechanism for ensuring ecologically safe and balanced agrarian nature management is the performance-target subsystem, which implies an integral result of the interaction of the external mechanism with the internal one and determines economic, ecological and social results of the nature management.

The external *organizational and institutional mechanism of the environmentally safe and balanced agrarian nature management* includes the following components: providing institutional and resource subsystem (submechanism), subsystem (submechanism) of organization and planning of ecologically safe and balanced agrarian nature management, subsystem (submechanism) of financial and economic regulation, subsystem (submechanism) of analysis, control and controlling.

Providing institutional-resource subsystem (submechanism) includes normative-legal, resource (financial, logistical, informational, personnel), infrastructure support (in particular, it concerns the activities of credit institutions, innovation-investment funds, environmental insurance companies, consulting agencies, etc.)

*The subsystem (submechanism) of organization and planning of the environmentally safe and balanced agrarian nature management* is aimed at implementation of mechanisms of state regulation of balanced spatial and territorial agrarian nature management on the basis of project, integrated and cluster-corporate governance. Regional forecasts and programs of use and preservation of natural resource potential are important because they include a scientific analysis of the ecological destructive state of agrarian nature management, tendencies of negative processes in agro-landscape formations (erosion, contamination by heavy metals, decrease of soil fertility), as well as the main ways of their effective prevention [17, p.72-73]. Also, the ecological zoning of the territory, which should define territories with the status of limited nature management, and also form the ecological framework of the spatial development of nature management, is of particular importance.

*The subsystem of analysis, control and controlling* in the external organizational and institutional mechanism of regulation of environmentally safe and balanced nature management should have a programmatic target orientation on agroecological and socio-ecological and economic indicators of agrarian nature management. This, for example, requires monitoring of the ecological destructive state of land-resource potential, monitoring of the ecological quality of agrarian products on a logistical basis, etc.

It is important to emphasize that the practical harmonization of economic interests of the business-entrepreneurial structures of agrarian business with the ecological and economic

interests of the state and regions requires the development of not only administrative and regulatory mechanisms, but also the formation of effective motivational and stimulating systems. The administrative-regulatory subsystem should be aimed at ensuring the formation of a system for limiting ecodestructive economic activity.

*The subsystem (submechanism) of financial and economic incentives* for regulation in the organization of environmentally safe and balanced nature management should be somewhat cost-compensatory, in particular, in the form of rent payments, and also provide for the transfer of payments to environmentally responsible entrepreneurs. Of course, the financial and economic mechanism is associated with the methodology of the formation of territorial natural resource potential [8].

*The cost-compensating submechanism includes the following main components:*

1. Subsidies for implementation of ecosystem management system.
2. Partial reimbursement of underspent income, in particular, in the form of rent payments in the case of land conservation.
3. Compensation (reimbursement) of expenses for works on conversion of the intended use of agrarian and natural resources.
4. Compensation (reimbursement) of the share of capital and current expenses for the implementation of environmentally oriented investment projects.

It should be noted that the system of financial and economic incentives as an important component of the external organizational and institutional mechanism should include various tax and credit privileges, as well as public investments in the implementation of territorial ecosystem innovations. The effectiveness of the functioning of motivational-stimulating mechanisms requires the availability of an economic and legal mechanism of environmental responsibility, its functions are: stimulative, compensatory (reimbursement), preventive, estimated, regulatory (managerial). The mechanism of economic and legal responsibility for negative environmental impacts in the system of organization of environmentally safe and balanced agrarian nature management involves compensation of ecological-economic damage and compensation of losses as a result of the manifestation of external and internal ecodestructive factors in the system of agrarian management (Fig. 4.4).

It should be said that the share of compensatory payments for compensation of environmental and economic losses should be accumulated within the special fund of ecosystem agrarian nature management, which should be formed at the regional level for solving general regional problems of nature management.

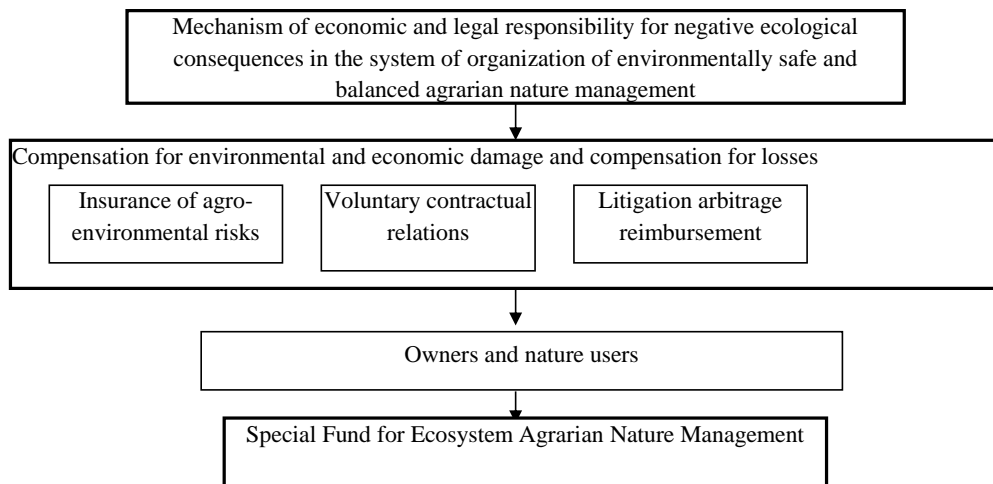


Figure 4.4. Organizational-economic bases of reimbursement of ecological and economic losses and compensation of losses in the system of environmentally safe agrarian nature management (developed by I.Ye.Yarova, taking into account [14,15, p.153; 19, p.93])

With regard to *social and environmental submechanisms*, they are related to the construction of a socio-ecological responsible nature management and ecological culture by forming the «green» image of innovation-oriented agricultural business-entrepreneurial structures. It is important to note that the agrarian nature management is the most important source of income for most poor people, and the quality of soil resources has a significant impact on its ability to achieve social and food safety.

Consequently, the national agrarian policy should focus not only on increasing the productivity of agrarian business, but also on the social status of households of different sectors of the population. Obviously, the strategy for improving the efficiency of agrarian business and reducing rural poverty should also focus on the development of non-agricultural employment in rural areas. An effective search for institutional mechanisms will be very difficult, but not necessarily impossible. Identification and support of institutional agreements, increase of innovation and investment attractiveness of rural territories and agrarian nature management, as well as assistance in the development of markets for environmentally oriented agricultural products should become a key component of national agricultural policy, as well as policies of sustainable spatial development of nature management.

Implementation of the environmentally safe and balanced agrarian nature management requires the introduction of mechanisms of ecosystem management of natural resource potential

(capital). Ecosystem management should be carried out not only within the framework of sustainable spatial use of natural resource potential, but also from the standpoint of the functioning of territorial natural (land) capital. Organizational and economic mechanism for ensuring the environmentally safe and balanced agrarian nature management should be based on increasing the motivation of environmental behavior of business-entrepreneurial structures of different hierarchical levels under the influence of external organizational and institutional mechanism, which has a dynamic regulatory influence on the internal mechanism of the entities of agroenvironmental management.

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## **4.5 MANAGEMENT OF FOOD SECURITY AND MODERN AGRARIAN INNOVATIONS**

The innovations of the last two decades have changed radically all elements of productive forces, caused the fourth technical revolution, raised challenges for the development and security. Under the modern conditions of globalization the management of food security as a part of economic security is based on the efforts of society at national as well global levels.

The 2030 Agenda for Sustainable Development, adopted at the United Nations Assembly on September, 25, 2015, sets out “a plan of action for people, planet and prosperity” [12]. Among its core 17 Sustainable Development Goals (SDGs) there are such goals as “Zero hunger”, “Good health and well-being”. These SDGs are directly related to the food security, The SDGs “No poverty”, “Clean water and sanitation”, “Affordable and clean energy”, “Decent work and economic growth”, “Responsible consumption and production”, “Climate actions”, “Life below water”, “Life on land” are connected to the agricultural and food production, development of rural areas. All of these goals are influenced by agrarian innovations.

The goals and tools related to the food security have been included in the national laws in many countries (for example, in Farm Bill in the USA, in the Law of Ukraine “On Main Principles of Agrarian Policy for the period until 2015”) and in the legal frameworks of the integrations unions (Rome Treaty). But innovations form new challenges for food safety, and respectively management of food safety requires the revisions of its concepts, approaches, objectives of monitoring and control, instruments.

Theoretical issues of innovative development of the agrarian sector in modern conditions in Ukraine have been reflected in the publications of Yu. Lupenko, O. Shubravska, L. Fedulova [3, 4, 15] and many other scientists. Considerable attention to the problems of food security was paid by Ukrainian scientists B. Paskhaver, O. Shpichak and many others. [10, 14]. A lot of analytical papers on the problems and assessment of food security were prepared by the experts of FAO [17, 18].

The purpose of this chapter is to identify the current challenges of innovation for food security management and their impact on the state of food security in Ukraine.

The analysis of scientific and normative approaches to food security [7, 8, 18] and the necessity to take into account the manageability of solution of the problems of food security have provided grounds for considering food security at the national level as the such condition in the national economy when the state provides guarantees for all people to have the stable and regular access to enough quality food to lead healthy and active life.



The food security management system must include following functional blocks:

- forecasting, planning (strategical, tactical, operational), programming;
- normative, organizational, coordination and financial provisions of food security;
- monitoring, diagnostics, control of trends in the state of food safety;
- motivation, correction.

The impact of innovation on the food security, the opportunities and the threats that arise from the generation and implementation of innovations have to be considered and reflected in all functional blocks of food security management. At the same time, the complexity of food security as a phenomenon, which includes a set of components, also must be taken into account.

Various components of food security are distinguished in the scientific and normative documents. We consider the following main components of food security:

- sufficient supply of food to support the active life of the population, satisfaction of their food needs at a level not less than rational norms;
- physical access to food for all groups of population in the sufficient quantity;
- economic availability of food for all groups of the population in the sufficient quantity;
- stability and regularity of supply of food and its availability;
- the quality of food, its safety and usefulness, the rational structure of its contents for the human nutrition.

Innovations have the impact on all components of food security, and this impact may be controversial. In particular, the increase of food supply may be achieved by deterioration of its quality, while improving the quality of food – through increase of food prices with a threats to economic availability. Comprehensive automation and robotization of production processes lead to the reduction of employment in certain industries, form the threat of the reduction of the employees in some industries and the economic availability of food for their families.

The monitoring and diagnostics, which are the starting points for the development of corrective measures, play an important role in food safety management. The results of food security monitoring as a comprehensive system of observation, collecting, processing, systematizing information on the supply and availability of food, the level and structure of the population's consumption of main food products, their economic availability, the sufficiency of the state food resources and the quality of food provide information support for the diagnosis of food security, application of measures to neutralize threats in time. The basis for such diagnosis is the appropriate indicators of the food security components.

It should be noted that normative acts of Ukraine contain certain differences of the composition of food security indicators, methods of their calculation and limit level [6, 7]. Some

other components and indicators are highlighted in the program and analytical documents of Food and Agricultural Organizations of the United Nations (FAO) [17].

In the methodology of FAO there are aggregated following determinants of food security [20]: availability; physical accessibility; economic access; utilization; vulnerability; shocks. Accordingly, the indicators of food security are grouped due to these determinants (Table 4.1).

Table 4.1

The suite of food security indicators [17]

<b>Determinants</b>	<b>Dimensions</b>	<b>Indicators</b>
Static and dynamic determinants	Availability	Average dietary energy supply adequacy. Average value of food production. Share of dietary energy supply derived from cereals, roots and tubers. Average protein supply. Average supply of protein of animal origin.
	Physical Access	Percentage of paved roads over total roads. Road density. Rail lines density
	Economic Access	Domestic food price index
	Utilization	Access to improved water sources. Access to improved sanitation facilities.
	Vulnerability	Cereal import dependency ratio. Percentage of arable land equipped for irrigation. Value of food imports over total merchandise exports.
	Shocks	Political stability and absence of violence/terrorism. Domestic food price volatility. Per capita food production variability. Per capita food supply variability.
Outcomes	Access	Prevalence of undernourishment. Share of food expenditure of the poor. Depth of the food deficit. PI; prevalence of food inadequacy.
	Utilization	Percentage of children under 5 years of age affected by wasting. Percentage of children under 5 years of age who are stunted. Percentage of children under 5 years of age who are underweight. Percentage of adults who are underweight. Prevalence of anaemia among pregnant women. Prevalence of anaemia among children under 5 years of age. Prevalence of vitamin A deficiency (forthcoming). Prevalence of iodine deficiency (forthcoming).

But this suit of indicators does not include the indicators of the quality and balance of nutrition components; it only contains some indicators of the consequences of low quality nutrition (in the group of outcomes).

According to the project of the Law of Ukraine "On Food Security" (28.04.2011 №8370-1) following indicators of food security were offered [7]:

1) the daily energy value of food consumption (the limit (floor) for this indicator is 2500 kcal per day);

2) the provision by basic food products, defined as the ratio between the actual consumption of the product and its rational norm;

3) the adequacy of grain supplies in public food resources (the limit for this indicator is planned at 17% level, it is corresponding to 60 days consumption by the population);

4) economic availability of products, which is defined as the share of food expenditure in the total household expenditure (the offered limit for this indicator is 50%);

5) differentiation of the expenditure for food between the social groups;

6) the capacity of the domestic market of the main food products;

7) food independence (defined as the ratio of the volume of the product import and the capacity of the domestic market of this product).

But the relation between the actual consumption of the product and its rational norm does not reflect the adequacy of food provision by own production, which is appropriate for assessing the food security of countries with a strong agricultural resource potential

In the Methodological recommendations for calculation of the level of economic security in Ukraine, approved by the Order of the Ministry of Economic Development and Trade of Ukraine No. 1277 on the 29-th of October, 2013, the following indicators are foreseen for assessment of the state of food security [7]: daily caloric content of human nutrition; percentage ration of production and consumption of meat and meat products, milk and dairy products, eggs, oils, sugar, potatoes, vegetables per person; grain production per person per year; the level of cereal stocks at the end of the period (as the percentage of consumption); the share of sales of imported food products through the trading network of enterprises.

However, this list does not include indicators of the economic availability of food, its balance and quality.

So, effective food security management requires the revision of the suits of food security indicators in order to adapt them to the changes in the state of food security under the influence of innovations.

Agro-innovations have become a significant factor of the growth of agricultural production. The modern stage of development of agriculture and food production is characterized by the complex nature of innovations. Society has got production and product innovations (new techniques; technologies; seeds, fertilizers; plants, animals, soil, sources and modes of delivery of energy and water, fuel, etc., new agricultural and food products); economic and managerial; social and ecological innovations. Modern agricultural and food industry innovation really impressed: information-based decision making agricultural system; technology of electronic solutions against agricultural Pest, ops-smart traceability solution; smart water management; “hand free hectares”, molecular kitchen, 3D food printers and many other.

We defined following main signs of modern innovation development stage of agriculture [9]:

- investments in the technics, equipment, and technologies of 5 and 6 technological waves;
- low carbon technologies, wide use of alternative sources energy;
- biotechnologies;
- complex automaton, robotics, development of information networks and management systems;
- radical reduction of physical work; increase of complexity of labor and labor value;
- growth of efficiency of land use, crops yields, productivity of animals,
- reduction of volatility of production results;
- new technologies of shipping and logistics, new foreign markets.

Agriculture has become a sphere of active implementation of the potential of biotechnology. "Green" biotechnology has an agro-food direction and gives the opportunity to get new products and products with new properties, increase crop yields, animal productivity, protect plants from pests, animals from diseases and parasites.

Implementation of low-carbon technologies gives chances to reduce the use of non-renewable energy sources, energy dependence, expenditures on the energy resources, harmful emissions to the atmosphere, contributes to the sustainability of the agro-food production. Agricultural producers actively implement the technologies of energy self-sufficiency, use of various types of biofuels, and agricultural machines with low fuel consumption. The costs of oil products, electric power and fuel amounted to 18.4% of the material costs of agricultural production in Ukrainian agricultural enterprises in 2012, 14.5% – in 2016 [16]. The significant reduction of use of energy resources happened in vegetable production in greenhouses in Ukraine. As well-known, the production of the vegetables in greenhouses is very sensitive to temperature regime and microclimate. Greenhouses consume a lot of energy resources to keep necessary conditions for plants growing. The increase of prices on gas (2012-2013) caused the growth of energy costs of greenhouses, financial losses, reduction of production of this product in Ukraine. Due to the implementation of innovations the costs of oil products, electric power and fuel in the structure of production costs were reduced by vegetable producers significantly (for example, from 53% in 2012 to 23,3% in in 2016 in Zmiyv vegetables manufacture in Kharkiv region). This reduction of energy costs gives possibilities to increase profitability, sustainability of production and contributed to the food security.

According to FAO's experts' monitoring, in the regions of Europe and Central Asia the problems related to the physical accessibility were rare, and they were significant only for the certain sub-regions of the Caucasus and Central Asia in 2016 [11, p. 7]. But the problems of the rational nutrition with the proper content of elements still remained.

In Ukraine, due to the available resource potential of the agro-food sector the satisfaction of food needs is based mainly on the domestic agricultural and food production. The increase of agricultural production is the foundation for solving the problem of sufficiency and physical availability of food. Fig. 4.5 shows a graph of the dynamics of gross output of agricultural enterprises in Ukraine in 2005-2016.

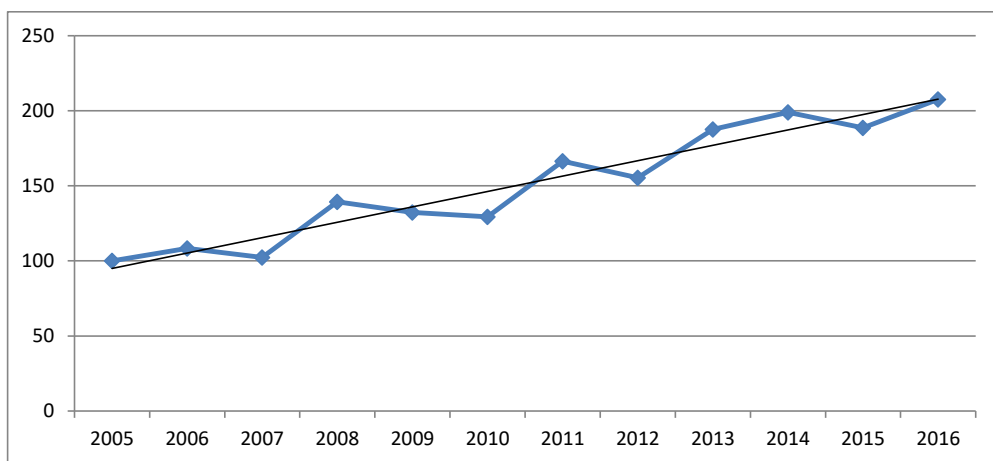


Figure 4.5. Indexes of gross production in agricultural enterprises in Ukraine in 2005-2016 (2005 – 100%), % [17]

The volume of production in agricultural enterprises in 2005-2016 doubled (the index of gross output at constant prices is 207.6%), in agriculture as a whole increased by 1.5 times during this period. Such growth was primarily due to the innovation factor. If the area of agricultural land in the use of agricultural enterprises remained almost unchanged (20.86 million ha – in 2010, 20.75 million ha – in 2016), the number of hired workers decreased by 21.3% (from 647.3 thousand persons to 509.5) [17].

The introduction of new sorts and hybrids of plants, breeds of agricultural animals, fertilizers, plant and animals protection products, new agricultural machines, soil cultivation technologies, irrigation, harvesting, soil mixtures and process control systems led to an increase of labor productivity in agricultural enterprises in Ukraine (Fig. 4.6), growth of agricultural crop yields and productivity of farm animals (Table 4.2).

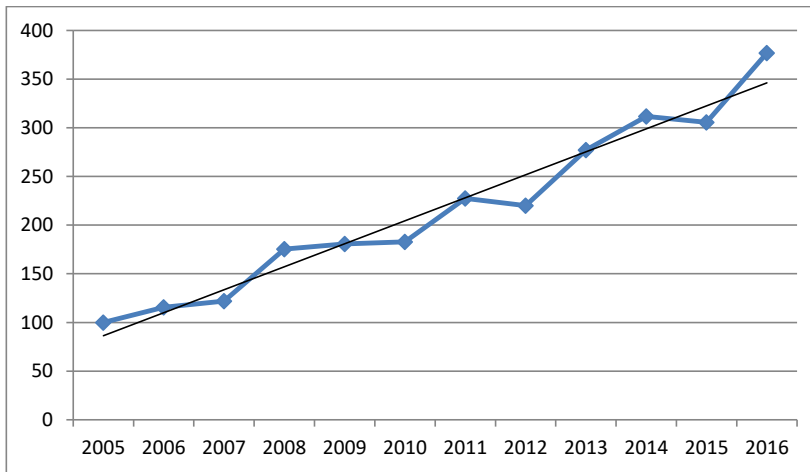


Figure 4.6. Indexes of labor productivity in agricultural enterprises in Ukraine (2005 – 100%), % [17]

Table 4.2

Yield of some agricultural crops and productivity of cows in agriculture in Ukraine [17]

Indicator	2010	2015	2016	2016 до 2010, %
Yeild, centners/ha				
Grain	26,9	41,1	46,1	171,4
Sugar beets	279,5	435,8	481,5	172,3
Sunflower seeds	15,0	21,6	22,4	149,3
Productivity of cows, kg				
Average productivity of cows per year	4082	4644	4735	116,0

In the agricultural enterprises the yields of grain, sugar beets, sunflower and many other crops (except fruits and berries) were higher than in the agriculture total. In particular, the grain yield in agricultural enterprises reached 50.0 centners / hectare, sugar beet – 494.0 centners / hectare, sunflower – 23.5 centners per hectare in 2016 [17]. The average annual productivity of cows reached 5643 kg in agricultural enterprises in 2016 [17].

In 2015 the average daily caloric consumption of the Ukrainians was 2713 kcal, in 2016 – 2742 kcal, and it is higher than the limit of this indicator (2500 kcal) [17]. Thus, according to this indicator, the nutrition of average Ukrainian corresponds to the criterion of sufficiency of food consumption. But if we estimate the ratio of domestic production per

person and the recommended consumption rate, it accounts for only 64.0% (243.3 and 380 kg, respectively) for , milk and milk products, 68.1% (54.5 and 80 kg, respectively) for meat and meat products [17]. These facts show that the solution of the problem of food sufficiency in Ukraine has a structural aspect, in fact, the domestic production of some important agricultural and food products does not provide the sufficient amount of them for healthy and rational nutrition of the population.

One of the directions of modern agronomy innovation is the reduction of the tight dependence of agricultural production on the weather conditions, biological factors, and thus contribution to the sustainability of agriculture and food production, reduction of the volatility of their results. Experts notes: "Today the adaptive technologies, that allow to move from mitigating the negative effects of climate change to the maximum adaptation to them, are the most popular in the world of agronomy. First of all, these innovations are in the field of agrarian biotechnology, which make possible to obtain varieties of agricultural crops that are more resistant to the effects of climate change, and thereby create the prerequisites for the stable growth of crop production [15, p.68].

According to our calculations, the coefficient of variation of the average annual grain yield in Ukraine in 2002-2007 was 0.095, in 2012-2016 – 0.144. So, the growth of crop yields in Ukraine has not yet been supported by decrease of its fluctuations in the production of many agricultural crops

The stability of food production affects not only the sufficiency and stability of the volume of its domestic supply, but also the economic availability, which factors are also prices of agri-food products and consumer income. Innovative technologies, leading to productivity and production growth, are expected to have to lead to the reduction of food prices, and the reduction of the share of food expenditure in the consumer budget. But in Ukraine the price dynamics of food was significantly influenced by macroeconomic factors, prices of the world market during this period. In Ukraine in 2016 compared to 2014 the grain prices increased by 89.5%, oilseeds – by 113.1%, vegetables – by 56.1%, fruit and berry crops – by 141.4%, milk – by 52.2%, while the average monthly wage in the economy – by 48.9% [17].

An important indicator of the economic availability of food is the share of food expenditure in household income / expenditure. In 2016, Ukrainians spent 47.8% of their money expenditures on food and non-alcoholic beverages [2, c. 60]. In fact, half of the expenditures of Ukrainians are aimed for buying of food, and this indicator is much higher for low income groups of population. Consequently, the economic availability of high-quality food is still low in Ukraine.

An integral part of food security is the provision of quality, useful, and healthy food for human life. Innovative development also affects the quality of food, gives opportunities for the supply of products with new properties, but not only with good ones. Modern technologies give chance for producers to offer genetically-modified products, a wide range of artificial substitutes for natural food. In connection with this, there are threats of replacing quality food products by artificial and dangerous for human health. Food quality analysis should be carried out for all product groups and producers. But modern methods of calculation of food safety indicators do not include indicators of quality and safety of agricultural product.

Thus, modern innovations have a significant impact on all components of food security: sufficiency, accessibility, stability and quality.

Innovative transformations in modern agribusiness in Ukraine were secured primarily by the existing innovative potential, export orientation of Ukrainian agrarian production, favorable price situation on the world agro-food market, favorable dynamics of exchange rate for exporters, tax incentives for agricultural producers and profitability of agribusiness. According to our calculations, the correlation coefficient between the amount of funds from tax privileges for agricultural producers and investments for the period of 2005-2014 was 0.816, which indicates the close positive relationship between these processes. The combination of all mentioned factors has positively influenced the increase of investments in agriculture in Ukraine, updating the material and technical foundation of agricultural production. But with scarce financing of innovation in the country, the abolition of tax incentives for agricultural producers, lower prices for agricultural products on the world market the innovative potential of agricultural production will be reduced, and it will negatively influence on the growth rate of agricultural production, the state of food security. Data Table 4.3 indicate a significant reduction of state expenditures for agriculture development, and Table 4.4 shows the relative reduction of total expenditures for financing of innovation in Ukraine.

Scenario analysis of ERS specialists of USDA confirms, there is a strong long-term link between public R&D and productivity growth. ERS estimates that if R&D spending is raised by 1 percent each year in real terms, the annual rate of agricultural factor productivity growth will increase to 1.46 percent during 2010-50. So, the reduction of financing of agrarian sciences will slow down the innovation progress in agriculture in Ukraine; decrease the possibilities of food security provisions on the base of innovation.



Table 4.3

Expenditures of State Budget of Ukraine for Ministry of Agrarian Policy and Food,  
approved by the Laws of Ukraine "On State Budget", bln. ukr.hrn.

Indicator	2008	2009	2010	2011	2012	2013	2014	2015	2016
Budget expenditure	12,2	6,4	5,8	10,5	8,5	8,7	6,4	2,2	1,5

Table 4.4

R&D expenditure in Ukraine, % of GDP [13]

Indicator	2010	2011	2012	2013	2014	2015	2016
Ratio total R&D expenditures to GDP	0,75	0,65	0,67	0,70	0,60	0,55	0,48

So, the innovations of the last decade have become a major factor of solving the food security problems in many countries and in the world. The innovations made the largest contribution to the growth of agricultural production, labor productivity in agriculture. In Ukraine in 2005-2016 the volume of agricultural production increased by 1.5 times, and more than doubled in agricultural enterprises, while the agricultural land in use does not change, amount of labor reduced. Labor productivity in agricultural enterprises increased by 3.7 times. Such processes directly influenced on the solution of the problems of physical sufficiency and availability of most types of food and contributed to the stability of its supply. But in Ukraine, as in many countries, the problem of economic availability of food, especially for the low-income groups of the population, remains. Its solution depends not only on the development of the agro-food sector, but also on macroeconomic conditions, social policy of the countries. The innovations have risen new challenges for such component of food security as quality of food. The provision of the good health of the population requires the improvement of the structure of nutrition and its quality, the adoption of responsible consumption and production practices.

Food security management systems both at national levels and global, have been created by the model "catch up" rather than "go ahead". Such systems are oriented at best cases for the overcoming of the negative effects of emerging threats, rather than for the warning them. The systems of indicators of the monitoring and diagnostics of food security have not yet taken into account the possible changes in the quality of food after implementation of agro-food innovations. The development of the food safety management system requires the development

of all its functional blocks (planning-forecasting, organizational-coordination, control-diagnostic, motivational-corrective) due to the influence of innovations on all components of food security. The countries' experiences show the importance of social protection and state nutrition-enhancing interventions, policies directed to the generation and implementation of innovations, growth of agricultural productivity and sustainability, long-term commitments to mainstreaming food security and nutrition in public policies and programmes, replacement of the existing "catch up" model of the management of food security by the model "go ahead".

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## 4.6 IMPLEMENTATION OF REGIONAL INNOVATION POLICY THROUGH CLUSTER MODEL

World globalization processes cause the formation of a globe information, finance, trade, infrastructure space together with a complication of relationship and interdependence between nations. Globalization objectively leads to the depreciation of usual regulatory functions of a national state, which doesn't protect the domestic economy from adverse external influences as it used to. National and global economic relations are changing roles in a globalized world. In the past, the leading role belonged to the first. In the last decade, the world economy is gradually turning into a single hunting field for big business, where the geography of the location of productive forces, the sectoral structure of investment, production and distribution are determined by taking into account the global situation. National economies are experiencing the increasing pressure from uncontrollable and unpredictable global factors.

The processes of globalization are contradictory. On the one hand, globalization creates incentives for economic growth for majority of countries. At the same time, globalization is accompanied by negative consequences, among them are the following:

1) *Increasing of social and economic inequalities* between countries and nations due to the collapse of major structures – the colonial empires and multinational states – that caused a global asymmetry, when the major actors (states, multinational corporations, associations, integrations of developed countries) are opposed to poor developing countries. Globalization has transformed from the objective process to the project of domination of the group of countries in the world economy. As a result, the "chronic diseases" of society – terrorism, separatism and extremism – are exacerbated;

2) *The deterioration of social security*: globalization has led to a redistribution of resources between private and public sectors. Markets succeed in capital making, but they don't implement social programmes;

3) *Strengthening the interdependence of countries* on a global level that leads to a potential global instability, to susceptibility of the financial markets to the crisis;

4) *The destruction of the environment* as a side effect of reckless pursuit of profit;

5) *Destruction of national identity*: Globalization provides market-driven, 'branded' homogenization of the political, economic, social, cultural spheres of people's life, destroys stable localities, displaces people, obliterates the differences between locality-defined lifestyle.

Global economy crisis 2007-09 demonstrated an intensification of contradictions of globalization. A society in which the global economy is subject to the idea of profit maximization

for limited number of global actors is doomed. Modern society is moving towards a new "post-global" phase of development, whose motto is "think globally, but act locally". Effective use of regional specificity, which is determined by unique climatic, historical, cultural, social and economic features of a region, becomes a crucial minimizing factor of the negative consequences of integration into the global economy. The phenomenon of global and local combination in modern literature is called "glocalization" [11]. It turns national regions into global actors and key determiners of national competitiveness.

Crisis processes in the global economy caused an increased interest to the clusters as to the sustainable economic modules with prompt and effective reaction on changes in local and global economies. Thus, economists who analyzed the impact of the Asian crisis 1997-99 on the Asia-Pacific region [21] concluded that in countries, where was the highest level of clustering of regional economy, the impact of the crisis was minimal or almost intangible. At the same time, the economies of several Asian countries did not survive under the onslaught of this deadly crisis because of their microeconomic weakness, lack of domestic competition, ineffective governance and weak banking system.

The concept of a cluster is not a phenomenon for the world economic science. Analysis of theories, which are assumed as a basis of cluster approach to the regional development, has found an evolution of key factors of their formation from traditional factors, based on historical development of a certain region (favorable geographical location, labor, infrastructure, developed market), to innovation factors. Innovation as a production function was introduced by J. Schumpeter (1911), and later theories emphasize the crucial role of innovation in the process of cluster formation. More recent theories, including the Ph. Cooke's (2002) theory, emphasizes the role of social capital in the formation of a cluster, the growth of trust between members of a cluster, that, to the point, A. Marshall (1890) mentioned in his studies. G.-J. Hospers (2004), the representative of the Neo-Schumpeterian theoretical school, draws attention to the limitations of the approach that provides a support only for high-tech clusters, and indicates the necessity of harmonious combination of traditional advantages of a region and innovation. Evolution of theories of a cluster approach to the regional development reveals the dilemma: does a region provide the competitive advantages for a cluster, or vice versa? This collision in the formation of economic activity centers has been discovered by the P. Krugman (1991). A region as a factor of competitiveness is supported in theories of I. Tyunen (1826), A. Marshall (1890), A. Weber (1909). According to these theories firms are concentrated in a region, which has necessary factors for firm's development. At the same time, a cluster as a factor of increase of region's competitiveness is developed in theories of J. Schumpeter (1911), F. Perroux (1950), G. Bekattini

(1980s), M. Porter (1990), Ph. Cooke (2002). According to these theories, a cluster as a “growth pole” is set up in the economically underdeveloped region with the aim to intensify the economic activity in this region. That is where a tendency of disurbanization, which is revealed by P. Krugman (1991), comes in: while the majority of enterprises concentrate in a certain region, which is favourable for their development, an enterprise that isn’t included into the cluster has an opportunity to become a monopolist in a less attractive region and become a “growth pole” for this region. Gradually, accompanying enterprises and companies will concentrate around this enterprise, and this concentration of enterprises will transform into a cluster, which will provide a development of this unattractive region [7].

The analysis of theories of cluster development reveals that the increase of a cluster’s competitiveness and the increase of a region’s competitiveness are conditional on each other. On the one hand, every region is unique and has its own set of competitive advantages, which is used by a cluster for its development. On the other hand, a cluster provides additional competitive advantages for a region.

Etymology of the word "cluster" is derived from the English language, which means accumulation, concentration, set, group, etc. [16]. The concept of a cluster is used in various fields of knowledge, and although the interpretation of this concept is different, the sense remains the same: cluster – is a union of several homogeneous elements that can be considered as a separate unit with its specific characteristics. In the economic field, cluster – territorial and sectoral voluntary association of companies that work closely with academic institutions and local authorities to increase the competitiveness of its products and economic growth in the region [18].

Required features of clusters of all types, are the following: 1) symbiosis of business, science, education; 2) support of local authorities and central government; 3) presence of common goals and ideology; 4) presence of a cluster brand; 5) development of innovation and effective communication.

The enterprises-participants of a cluster receive such advantages as: productivity increase, adoption of innovations, promotion of entrepreneurial initiative, development of effective communication, diffusion of knowledge and information. At the same time, every of these advantages stipulates benefits for the region. Productivity increase in the companies provides an effective usage of resources, GRP growth, employment increase in the region.

The adoption of innovations, diffusion of knowledge and information within cluster participants cause an innovation development of the region, realization of its innovative and scientific potential, and, importantly, enhance the practical relevance of research and

education. Researches of scientific and educational institutions in the cluster are practically applied on the enterprises that is possible due to joint funding of research within the cluster. The development of the cluster enterprises on the innovative basis increases the share of high-tech products in the export of the region and the country as a whole, and opens new world markets for them.

Increased entrepreneurial initiative stipulates the creation of new work places, promotes foreign investment, tax base, development of infrastructure in the region. The traditional industrial policy, which provides subsidies for uncompetitive industries, attracts unproductive investments, is changed.

Development of effective communications within the cluster becomes possible due to informal contacts and trustful relationships between people who live and work in the same area and share general purposes of the cluster.

One of the major advantages of cluster development for the region is the balance between market efficiency and social harmony that leads to improvement of life quality in the region. For example, the adoption of innovations on the cluster enterprises causes the environmental safety of their activities. Innovative basis of cluster development requires an increased attention to the development of social capital. This confirms that the cluster approach to regional development meet goals and objectives of sustainable development.

The mechanism of cluster impact on the region's competitiveness can be represented by the law of physics about the mechanism of rays passing through the collecting lens: all rays that pass through the collecting lens are refracted and collected at one point. It is known, the sun rays, which pass through the collecting lens, are concentrated at one point that is able to light a subject on which this point is directed.

The mechanism of cluster influence on the region's competitiveness is similar. It should be noted, that models in Fig. 4.7 has some simplification, namely, they consider only enterprises with foreign economic activity; the model of the region's presence on the world market is represented only by one cluster, but in practice there are more than one cluster in a region. Competitive advantages of a region are determined according to Fathutdinov's works [22].

Fig. 4.7 illustrates two models of the region's presence on the world market. In the model of the region's presence on the world market without a cluster (Fig. 4.7.a): each company enters the world market independently that disperses the region's competitive advantages, which are used by companies, and, as the result, the region is represented on the world market not with its full capacity. As the world practice demonstrates, independent and isolated use of regional

competitive advantages by a separate enterprise for taking its place on commodities and capitals markets is impossible. Therefore market participants tend to co-operate with each other and to collaborate with the state, science and public. Such associations – clusters – allow to obtain a high level competitiveness on the basis of joint introduction of innovations, the increase of labour productivity and synergy effect.

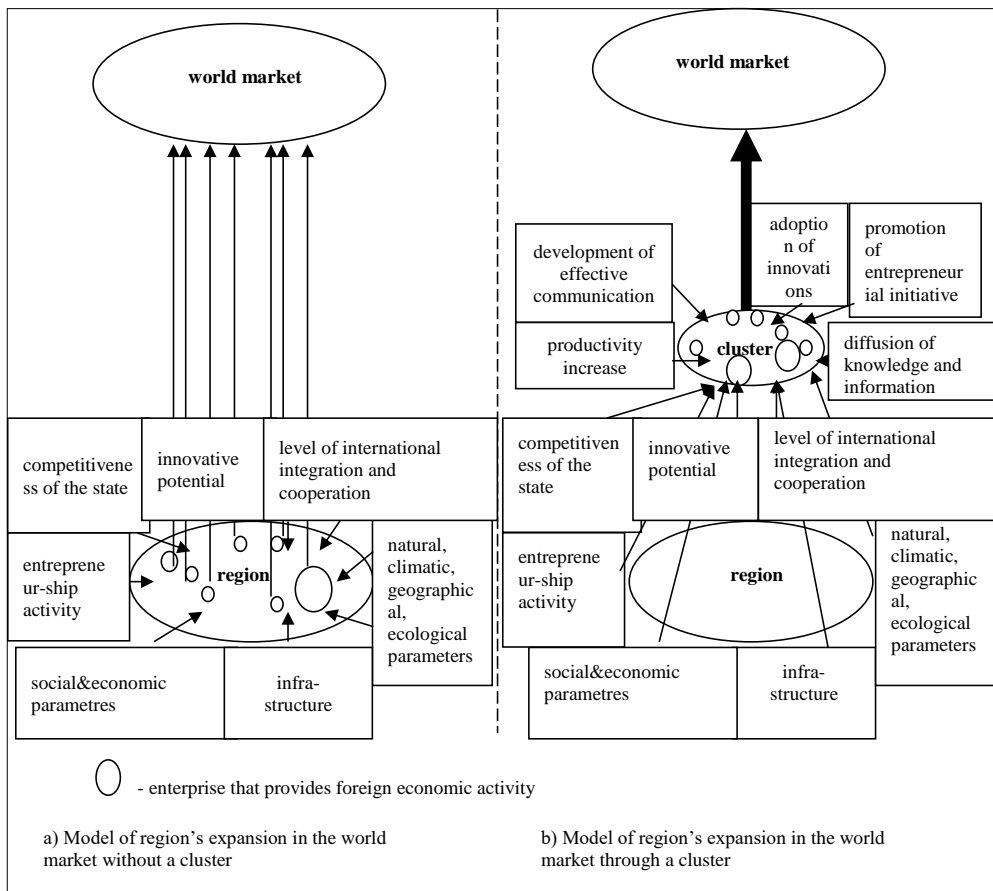


Figure 4.7. Models of the region's presence in the world market [developed by the author]

When the cluster functions in the region (Fig. 4.7.b), the enterprises of the cluster use not only region's competitive advantages, but also those advantages that are created within the cluster. The region is represented on the world market through the cluster, which as a lens focuses region's and cluster's competitive advantages, and becomes a powerful tool for the increase of the regional economic impact on the global market.

Clusters' functioning in a region needs an estimation of their influence on the economical development of a region. The majority of the existent scientific and methodical approaches of the analysis of cluster's effectiveness are oriented on the estimation of the dynamic of cluster's development in a region. At the same time, it is important for the complex estimation of the cluster's functioning in a region to determine interconnections between the economic results of cluster functioning and factors that stipulate results.

According to the regional export specialization theory [1], regional growth rate depends on export dynamic directly. Due to this theory the external demand on regional export products is a function of price on export goods, profit rate and price on goods-substitutes on the world markets, and also of products quality and after-sale service. Moreover, factors that determine the level of production costs, among them are salary, raw materials, amortization costs, technology development, operational costs, also influence on the region's place on world markets. If these factors influence on regional export growth, the levels of the Gross Regional Product and, consequently, well-being of local people increase gradually.

The cyclical theory of cumulative competitiveness of a region [9] also determines a key role of export in the region's competitiveness. Due to this theory the cycle of the region's competitiveness growth is the following: growth of Gross Regional Product (GRP) – promotion of innovation activities – increase of labour productivity level – decrease of relative salary costs – decrease of production cost on export goods – increase of the demand on export goods.

These theories are proved by the empirical research of competitiveness factors of the NUTS-2 level regions of the EU countries, which was conducted by the European Commission Directorate-General Regional Policy [24].

The additional economical effects that strengthen competitive advantages of a region are developed within a cluster. Enterprises-participants of the cluster receive an additional synergetic effect due to joint resource exploitation (the strategy of technologies and costs), market infrastructure (joint merchandising) and fields of activities (synergy of planning and management). The sense of the synergy strategy is a possibility to receive higher production profitability due to interrelations between enterprises within the cluster than in the situation when they function separately. An additional social and economical effects are received due to the cluster-type placement of production and service enterprises according to their transport and geographic allocation; sustainability of cross-sectoral linkages, that is especially important in terms of unsteadiness on world markets; reduction of transport costs; complex usage of all resources.

There are following economical effects that enterprises receive due to their participation in the cluster:



1) effect of joint adaptation of innovations: technological exchange increases significantly the cluster's competitiveness, because new ideas, business processes, technologies become accessible for all enterprises within the cluster;

2) effect of outsourcing: an enterprise deliver supporting business processes and production functions to a specialized company that helps to concentrate organizational, financial, human resources in top-priority fields;

3) effect of risk costs distribution between the cluster participants: enterprises provide joint risk management to decrease a size of possible losses;

4) effect of joint usage of the infrastructure: deepening of a production technologic specialization and cooperation, setting up of service and support enterprises and infrastructural objects;

5) effect of transaction costs decrease due to joint usage of knowledge and information data base within the cluster;

6) effect of forming of a joint goods-distributing base on each kind of cargo flow: this base helps to decrease costs on immobilization of circulating assets when they are in a process of delivery.

The methodic approach to estimation of economical effects that receive enterprises due to their participation in the cluster is based on the following methods: method of determination of social and economical effect of forming of maritime complex [17]; innovation activity [23]; usage of joint goods-distributing base [20].

Influence of a cluster on the region's competitiveness we have proved on the basis of the cyclical theory of cumulative competitiveness of a region. As it can be seen on Fig. 4.8, the additional economic effects within the cluster strengthen the increase factors of the region's competitiveness.

The effect of joint adaptation of innovations within the cluster influences on promotion of innovation activities in the region that in its turn causes an increase of labour productivity level in the region. The effect of outsourcing within the cluster helps to decrease salary costs in supporting production processes and functions of enterprises. The effects of risk costs distribution between the cluster participants, joint usage of the infrastructure, transaction costs decrease influence on the production cost. An effective satisfaction of demand on the region's export is provided by the forming of a joint goods-distributing base on each kind of cargo flow within the cluster that speeds up cargo deliveries.

Thus, the proposed methodic approach of complex estimation of the cluster's functioning effectiveness in a region gives an opportunity to investigate the sources of synergetic effect of the cluster for enterprises-participants and for the region where this

cluster functions. This methodic approach is universal, takes into account the additional synergetic effect, is easy to use, decreases the time for the analysis that is especially important in conditions of changeable external environment.

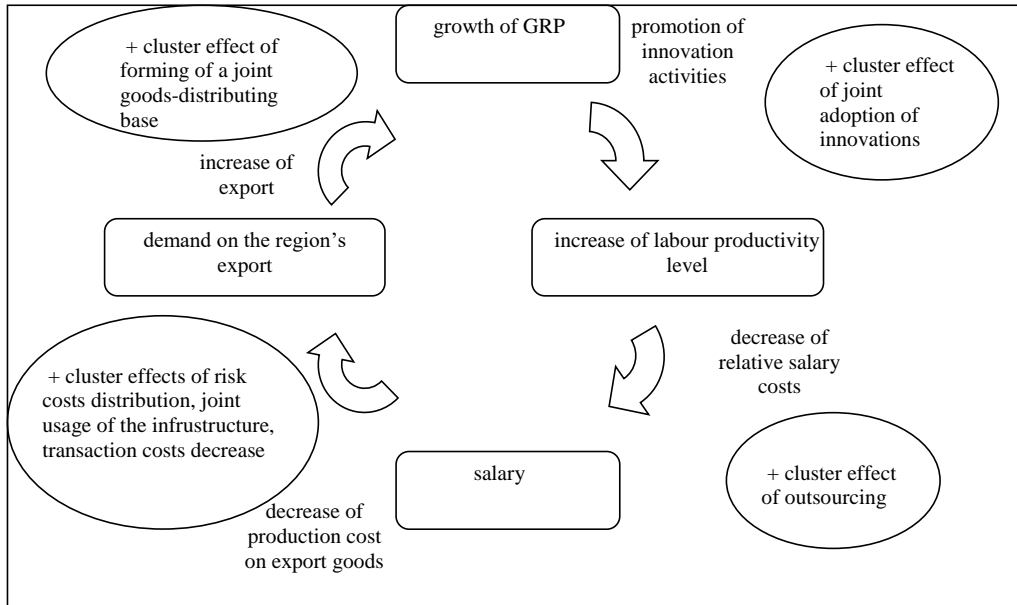


Figure 4.8. The influence of cluster effects on the factors of the region's competitiveness increase [worked out by the author]

### Concluding remarks

Due to the effective influence of a cluster model on the competitiveness of enterprises-participants, regions and states, it should be supported and stimulated by the governments. There are two generations of cluster policy [4]. Cluster policy of the first generation includes measures of identification of clusters, general cluster policy support, which are undertaken by state and regional authorities. It provides generally accepted "rules" for the clustering process. Cluster policy of the second generation is based on knowledge of existing clusters in the country and provides an individual approach to the development of each cluster. State may stimulate the development of clusters, conducting various measures: 1) "broker" policy – a platform for dialogue between different actors of a cluster, 2) diversification of a local demand through placement of government contracts in local companies, 3) training the local workforce through the implementation of special educational programmes and 4) creation of a "brand" of a region to attract foreign investment.

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## **PART 5. MANAGEMENT OF FINANCIAL AND INVESTMENT BASIS OF INNOVATION SECURITY**

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### **5.1 THE MAIN FEATURES OF FUNCTIONING OF INNOVATIVE AND INVESTMENT COMPONENTS OF FINANCIAL SAFETY IN THE CONTEXT OF BALANCING OF UKRAINIAN FINANCIAL SYSTEM**

Financial safety in Ukraine, as a part of its economic safety, defines a condition of state security in financial sphere from influence of multivectorial threats, which are conditioned by insufficiency and disbalance of financial resources. Thus, it is expedient to examine financial safety not only from position of achievement of certain condition of the financial system, that is good according to row of criteria, but also from position of process of achievement and maintenance of the necessary financial system condition at the due level [11, p. 209].

Besides, it is expedient to consider financial safety as an extraordinarily difficult multilevel system that is formed by row of subsystems, each of them has an own structure and logic of development [15]. In scientific economic literature there are similar approaches that envisage the selection of financial safety of innovative, investment, bank, currency, money-and-credit, budgetary, fund, and insurance sectors.

Financial safety in Ukraine characterizes dynamic development of its financial system. It is reached by realization of reasonable financial politics in accordance with the accepted conceptions, strategies and programs in innovative and investment spheres. Research of financial safety of the state needs both the complex study of priority national interests and base threats that arise up on this basis.

Works of such domestic and foreign scientists as O. I. Baranovsky, M. M Ermoshenko, B. V. Gubskij, V. I. Mutijan, M. M. Ohrimovich, T. V. Paentko, V. K. Senchagov, V. T. Shlemko, A. I. Sukhorukov, O. S. Vlasjuk, etc. are devoted to research of problems of financial safety.

However questions of consideration of innovative and investment financial safety in Ukraine in context of balance of financial system still remains insufficiently considered because of ambiguousness and system of close intercommunications. But the analysis of present scientific works gives an opportunity to define, that problems of innovative and investment financial safety in Ukraine remain sharply actual in the conditions of long financial and economic crisis in the country and require a thorough analysis and an adequate estimation.

The aim of the research is consideration of descriptions and threats of innovative and investment financial safety in Ukraine; and also research of influence of the above-mentioned components of financial safety on the balancing level of the financial system of the state as one of indicators of financial safety in Ukraine.

Components of safety of finance (including innovative and investment components) occupy an important place among the numerous constituents of economic safety of Ukraine (Fig. 5.1). It is expedient to take into account that Ukraine meets with most of current financial problems at first time, as a national financial system is formed in a tandem with economic transformations and modification of system of state administration.

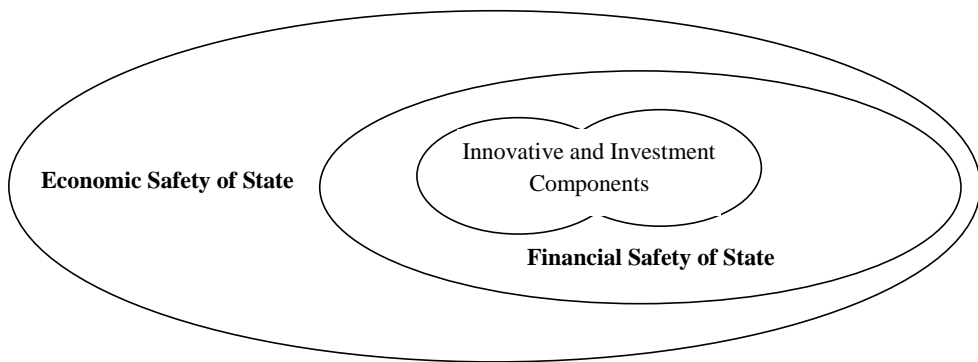


Figure 5.1. Structure of subordination of innovative and investment financial safety of state  
[author's research]

Ukraine in the process of passing to open economy has got under influence of some powerful external economic factors that additionally influences on safety of its finance. Applying regulation measures, Ukraine influences on innovative and investment components of financial safety with the aim of effective recreation of economy and providing of desirable economy growing.

Despite the attention given by foreign scientists to various aspects of innovative component of safety of finance, all of them demand the further researches. Actuality of innovations research continues to grow in Ukraine because of proclamation of innovative model of development of economy by the base of strategic course of the state that leans against working out, bringing in and introduction of new knowledge.

And the category of innovations, which is in process of constant development, is characterized by presence of a wide spectrum of definitions. There are authors who consider an innovation as exclusively practical realization of innovations; others – all cycle: from occurrence

of idea to its commercial development; and some – “all new”: each idea, activity or the material result, which considerably differs from existing forms.

According to the Law of Ukraine “About innovative activity” [17], an innovation is a new created (introduced) and (or) advanced competitive technology, production or services, and also organizational-technical decisions of industrial, administrative, commercial or other character which essentially improve structure and quality of manufacture and (or) social sphere.

Among researchers the static approach to definition of innovations essence prevails. But the founder of the innovative theory J. Shumpeter considered innovations in dynamics, in his researches he wrote about “introduction of a new method”, instead of a new method; about “development of new market”, instead of direct about the market; about “carrying out of reorganization”, instead of reorganization [14].

There are researchers which do not deny, that the innovation is process with complex character, and it unites a science, technics, economy, business and management. So, according to O. Zvjagintseva, “the innovation extends on a new product (service), a way of their manufacture and realization, any innovation in organizational, financial, research sphere and any improvement which provides economy of expenditure or creates conditions for such economy” [19, p. 144].

Author offers following definition: innovations are a complex process which consists of creation, working out, reduction to commercial use and distribution of the new organizational, technical, marketing, logistical or other innovative decision satisfying certain requirement and leading to qualitative changes in manufacture and advancement of production [9].

Now mainly researchers consider that innovations are qualitative changes in any field of activity. Grouping of innovations on different signs should not only concretize object structure, but also find out problem connections between different types of innovations in it. Problem character of such parities is the main reason of occurrence of new systematizations.

Novelty level is one of the most important criteria of classification of innovations because it defines their competitiveness and a consumer demand.

As for real novelty, it is possible to talk about only throughout the certain period of time when the involved novelty is not under technical and economic ageing yet. Therefore, it is necessary to consider concept of novelty in several aspects: scientific and technical novelty, industrial or consumer novelty, etc.

By criterion of introduction in production all innovations can be divided into technological and not technological. Thus, researchers always turned the greatest attention on technological innovations (changes in methods, means, and “know-how”). In turn, innovations in sphere of service of the basic operational processes are not technological. They, including, consist of

innovations of legal, social, administrative, organizational, marketing and ecological aspects.

The increase of attention to investment component of financial safety is predetermined by the fact that investments are basis of materialization of financial safety. Thus, there is a necessity of activation of investment processes for providing the extended recreation, creation of potential of positive changes in the conditions of intensifying the socio-economic contradictions, threats of self-development and independence of the state [13, p. 90].

Importance of support of investment component of financial safety at a due level is determined by the necessity of observance of national interests for given sphere. In particular, among such interests in the field of investment safety there are [13, p. 91-92]: long-term: forming the investment, and afterwards – innovative model of development, providing the structural alteration of economy; forming the favorable investment climate; medium-term: providing the dirigibility of process of capital crossflow (with taking into account of reasons and tendencies of its international motion) to the hi-tech sectors of economy, combination of investments with innovations, acceleration of modernization of industry on the basis of modern technologies, providing the quality structure of foreign investments, fund market, institutes of the general investing development; short-term: avoidance of destruction of the banking system, minimization of losses because of world financial crisis, providing the liquidity of enterprises and banks, avoidance of exceptional dependence on a foreign capital through the large volumes of external debt and bringing in of additional international loans, inhibition of norm of investing to GDP, maintenance of innovative orientation of investments.

Among directions of research of investment component of financial safety it follows to name: exposure of criteria, measures, instruments and procedures of its providing; determination of role of the state at the different levels of management in the process of support of investment constituent at a due level; an exposure of the system of intercommunications and interferences of investment constituent with other constituents of financial safety (in particular, innovative); determination of priorities of increase and prognostication of investment component strength of financial safety.

A reasonable interpretation of essence of investment component of financial safety is absent till now. In particular, Ohrimovych M. M. notices that most scientists examine the investment constituent of financial safety as an auxiliary instrument (structural element) of providing the financial safety, however, it is necessary to mark that such interpretation is superficially concentrated on possibilities of investment resources in the direction of realization of economic safety of the state and specifies on the improper estimation of investment component [10, p. 168].

Basic descriptions of innovative and investment components of state financial safety and main threats related to functioning the above-mentioned components are grouped in Table 5.1.

Table 5.1

Basic descriptions and threats of innovative and investment components of state financial safety  
[author's research on the basis of 18]

Component	Description	Threats
Innovative	<ul style="list-style-type: none"> <li>– a source of permanent process of creation, use and distribution of new knowledge and technologies of the state on the basis of combination of its scientifically-technological potential and innovative transformations;</li> <li>– possibilities of interregional (at separate terms international) co-operation that creates pre-conditions of the permanent functioning and development of the economic system;</li> <li>– condition of innovative activity of the state due to use of own intellectual and technological resources;</li> <li>– an instrument of generating of scientific ideas by introduction and perception of innovations subjects, providing the necessary amount of the quality converting in state economic development.</li> </ul>	<ul style="list-style-type: none"> <li>– a low level of innovative and investment activity of managing subjects;</li> <li>– technological lag of Ukrainian economy from the developed countries;</li> <li>– inefficiency of public policy in stimulation of innovative activity;</li> <li>– a low level of competitiveness of domestic products;</li> <li>– absence of market of high-tech;</li> <li>– improper defense of investors and intellectual property;</li> <li>– a low level of material encouragement of scientists and innovators;</li> <li>– an outflow of scientific staff to foreign countries.</li> </ul>
Investment	<ul style="list-style-type: none"> <li>– possibility to accumulate, to attract and effectively use investment resources for development of economy;</li> <li>– a resource factor of recreation of scientific and technical, innovative and intellectual potential of the state;</li> <li>– a factor of permanent increase of GDP and socio-economic development;</li> <li>– a factor of overcoming of depression and crisis phenomena in the state etc.</li> </ul>	<ul style="list-style-type: none"> <li>– chronic underfinancing of real sector of economy;</li> <li>– absence of the effective system of measures that stimulate transformation of additional profits of citizens and economic subjects in an investment;</li> <li>– absence of priority of budgetary charges on the investment measures of regions' development;</li> <li>– an unfavorable investment climate;</li> <li>– absence of the dedicated modes of investing with the simultaneous strengthening of control after their development.</li> </ul>

Innovative and investment politics and strategy of financial safety in Ukraine are in close intercommunications. Negative dynamics of indexes of innovative and investment components is



represented at general level of indexes of financial safety and creates the threat of disbalance of the financial system on the whole.

In the given context author considers expedient to trace interrelation and interference of variation of innovative and investment processes and level of balance of the state financial system, taking into account their irrefutable influence on financial safety.

One of variants of evident reflection of concept of balancing – correlation of relative volumes of positive and negative factors of influence on balancing condition – may be schematically presented on Fig. 5.2.

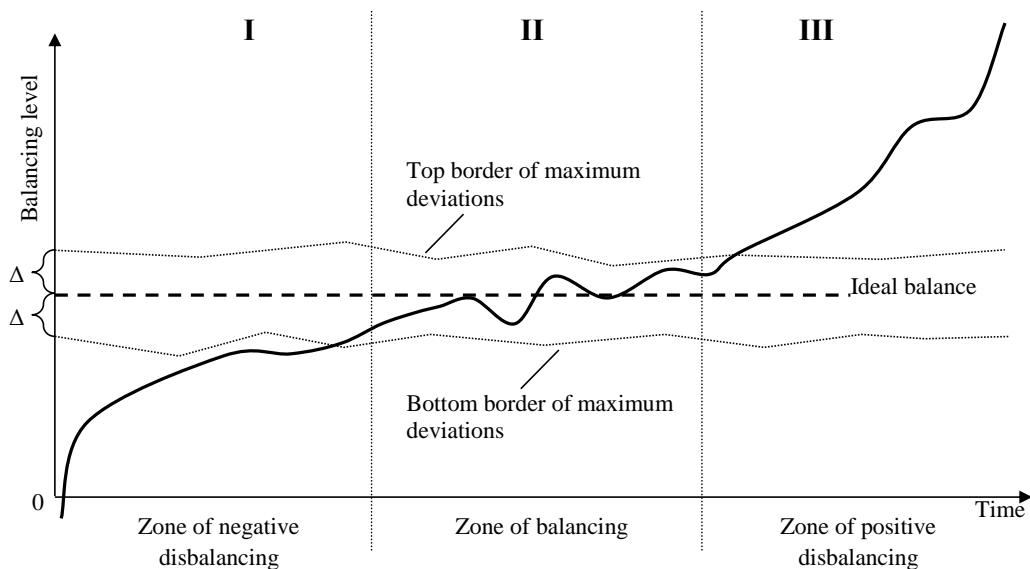


Figure 5.2. Dynamics of balancing level as result of positive and negative factors of influence [author's research]

It describes dynamics of balancing level with the course of time. For greater evidentness the investigated span of time is broken on three periods: negative disbalance, long-term balance and positive disbalance. There are lines of ideal balance and borders of maximum deviations on the picture. With the help of top and bottom borders of maximum deviations we can talk about balancing or disbalancing at the moment.

A line of chart in the zone of negative disbalancing (through predominance of negative factors of influence above positive) is below border of ideal balance. But in the zone of positive disbalancing a line of chart is higher than border of ideal balance through predominance of

positive factors of influence above negative. The zone of balancing is characterized by being of line of the presented chart in this period in the possible borders of disbalancing.

It is necessary to mark that the above-mentioned borders of disbalancing are the mathematical category of error of calculation of balancing level due to rounding, predictable unauthenticity of data through ignoring a certain row of factors that actually can have substantial influence on the eventual value of balancing level. Thus, the above-described borders can deviate from a certain middle level in time that helps to get more exact results of current and long-term levels of balancing, with greater probability to investigate the dynamics of balancing level, and also allows doing prognoses of future variation of balancing level.

Even size of ideal balancing in this case can't remain permanent and have the appearance of horizontal line. So, here balancing is not a certain size, ideal it is necessary to aim to, but middle value of indexes of size of positive and negative factors (although, in the short-term period of time mainly expedient is establishment of certain permanent size of ideal balancing, it follows to reach).

As a result (presence or absence of balancing) there is a predominance of those or other factors (positive or negative) influences. Only on condition of the simultaneous being of relative size of positive and negative factors in the possible borders of disbalancing it is possible to establish the fact of establishment of equilibrium. Insignificant deviation of size of positive or negative factors from possible borders at being of other index in these borders at certain terms (the presence of long duration tendency to balancing; temporality of the similar situation and so on) can also mean the presence of balancing of the state financial system, but such instances need the additional detailed consideration.

Also, it is necessary to consider that near to concept "balance" there is its direct antipode, or "unbalance", that confirms necessity of adequate measures for system reduction in a balance condition more visually.

Unbalance as something imperfect exists from the origin of society. Even at constant tracing of negative tendencies in ideally balanced financial system, any (at first sight insignificant) influence factor can essentially infringe a condition of balance and will lead to the unbalance. Certainly, it is possible to express thought that balancing of environment is superfluous, unnecessary – in long run influence of positive and negative factors will be counterbalanced, and time unbalance, from which we can not completely be protected, will prevent nobody, and will stimulate in addition development of concrete territory. But it is far not so. Self-balancing is possible only at minimum (or zero) state influence on the financial processes, and it basically is impossible because of existence of external influence and necessity

of fulfilment state functions. To some extent self-balancing occurs in the long-term period, but time necessary for a complete equilibration of system without additional actions is extremely difficultly to measure, it is almost impossible. And consequently it is possible to consider groundless such expectation of “best times” [5].

It is necessary to note that ideal balance (as well as the absolute unbalance) is practically impossible to reach. Therefore it is necessary to speak not about balance achievement as that, but faster about a maximum level of balance (or minimum unbalance) [3].

It is necessary to pay attention to relative inexpediency and low efficiency of balancing in the conditions of the considered country economic development formation. As balancing should be inherent in the countries with the certain development level, settled economic, political and social relations in society and to be used for the purpose of minimisation of their possible fluctuations, and also fast returning to an equilibrium condition [6].

A phrase: “the country is in an equilibrium condition”, unfortunately, speaks nothing about development level of the given country (or about “balancing level” – a comparative indicator with which help degree of investigated territory balancing at present or during time is measured). It is clear, what even in the far from civilization settlement there can be accurately settled all existing relations of the given company, thus system it is considered to be balanced (or close to balance) though it is natural, that the level of development of similar territory leaves much to be better.

The similar situation also can be in highly developed modern state which skilfully using all existing regulation levers gradually leaves on the maximum step of development, considerably not infringing an equilibrium condition. Thus, in this case “from the outside” (that is, having only statistical data and nothing knowing about the concrete country) the investigated state was in long-term balance, and is impossible to tell about increase (or decrease) level of its economic development by means of the given method.

Speaking particularly about Ukraine, it is necessary to notice, that it at the given stage sensitively enough reacts to any influence factors (especially external). Therefore, it is extremely difficultly to predict any processes with high accuracy and on long prospect under these conditions. Realisation of forecasting only for a short time seems possible. For the purpose of evident submission of the last assertions Fig. 5.3 is resulted. It displays dependence between indicators of Ukraine financial system balancing and volumes of innovative and investment incomes in it.

So, with the help of Fig. 5.3 we trace dependence of such character: at increase in volume of direct foreign investments receipts increases negative unbalance of state financial system that

constantly deepens beginning from 2003. But during last years there is stabilization of balance level. However, it can be the consequence of reduction of receivables of direct foreign investments and reduction of financing of innovative activity, what the results of previous researches of authors testify to [4; 5; 7]. Thus, the similar stabilization is expedient to study in more details and not perceive only positively.

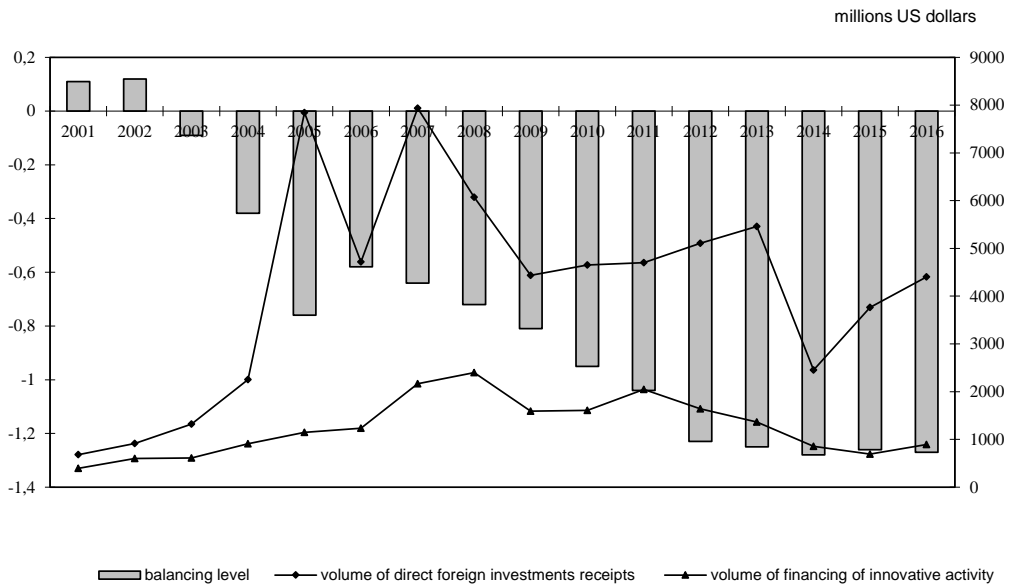


Figure 5.3. Comparative dynamics of balance value of Ukrainian financial system and volumes of innovative and investment incomes (author’s research on the basis of [16])

The author considers the similar tendency as result of irrational use of investments, therefore, the financial system feels increasing requirement of search of effective methods of rebalance. With the help of reasonable influence on volumes and directions of use of direct foreign investments, it will be possible to receive desirable result for a short time interval in the form of updating of Ukraine financial system equilibrium condition. In the future it will be possible to talk about possibility to involve corresponding maintenance mechanisms of state economic firmness in a point of the reached equilibrium condition.

Also it does not follow to ignore different opinions of scientists about the role of foreign investing. In particular, Podvysotskyj U.A. marks that the receipt of direct foreign investments, at least at certain terms, has substantial positive influence on economic development – additional capital investments, receivables of the newest technologies, foreign currency, that is especially

actual in the conditions of crisis [12, p. 74]. And Berezhna I.U. accents attention on a role and value of foreign investments in the conditions of global world integration [2, p. 50].

The important constituent of investment activity is providing of favorable investment climate. A socio-economic dynamics, efficiency of bringing in the world division of labor, and upgradability of national economy on this basis depend on realization of investment climate.

Financial safety of state depends on favorableness of investment climate, or totalities of political, legal, economic and social terms that provide investment activity of domestic and foreign investors [1, p. 712]. An investment climate is an internal atmosphere that is formed on concrete territory, taking into account priority of bringing in of additional financial resources. It objectively influences on position of investor in relation to a decision-making about investing of objects of that or other territory.

For today an investment climate is in negative position that is confirmed by basic international indexes on that investors are oriented. A part of direct foreign investments in a general volume diminishes constantly, threat of outflow of capital abroad and difficulties in bringing in of additional foreign investments to Ukraine can result in the disbalance of the financial system and creation of additional threats to financial safety of country. For this reason efforts of the state must be directed to an exposure and effective warning of internal and external threats to financial safety in an investment sphere.

Process of forming the investment projects that need state support is not integrated in a general budgetary process. A crisis considerably narrowed internal sources for investments, and international financial resources became almost inaccessible. In turn, international investors force to behave more careful to the risks of country. Thus, low investment image of Ukraine makes the state less attractive for an international capital [8].

To provide the increase of foreign capital inflow in the real sector of economy, it is necessary to create a favorable investment climate. However, yet the corresponding program of bringing in of foreign investments is not worked out until now by public authorities, that would contain methodology of determination of priority of investments in those or other industries of economy.

So, there is a sharp necessity of modification of state influence on innovative and investment activity with the aim of strengthening of financial safety in Ukraine. Simplification and organization of state administration, forming the terms for market self-regulation of innovative and investment components of financial safety are extremely necessary in the decision of problems of creation of favorable investment climate of Ukraine, achievement of balance of its financial system, and support of financial safety in Ukraine on a due level.

With the aim of support of innovative and investment components of financial safety in Ukraine on a due level it is necessary: to create corresponding financial terms for providing of the regular investing of innovative projects; to provide functioning of legislative mechanisms of protection of rights for domestic and foreign investors; to form the system of investment activity insurance; to modify the structure of Ukrainian economy for passing to producing of high technology innovative products; to create economic terms for investing of modernization and innovative piling up of basic capital.

Providing proper level of safety of finance in Ukraine is possible on condition of complex approach in relation to determination of reasons of the negative phenomena of its basic components. And by means of correction of negative influences it is possible to define positive processes in the financial system of the state and its financial safety. Without neutralization of the educed threats it will be enough difficult to provide balanced development of the state.

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## **5.2 RISKS AND ADVANTAGES OF THE CRYPTOCURRENCY MARKET**

The development of the Internet and consumer-friendly electronic technologies, as well as the provision by the banks new types of services on a competitive basis, is associated not only with benefits, but also with risks. Risks must be consider in conjunction with the factors, since only knowing the information on these factors an advanced risk management system can be created. The division into financial factors and factors of non-financial risks makes it possible to assess the state of the system from two sides: internal – it depends entirely on the activities of participants in the payment system, and external, which does not depend on the behavior of counterparties of the payment system. This is extremely important for developing methods and mechanisms for risk management.

Payment systems on the Internet are subject to both financial and non-financial risks. These risks concern both users of payment systems and operators of the system. Analysis of the risks of payment systems is also advisable to proceed based on the classification of risks in their areas of origin, the mechanisms of calculation, their distribution over time. This makes it possible to assess the degree of each type of financial risk and to choose the methods of managing them.

The types of payment systems risks, their degree, and management measures should also be considered taking into account the issues: who manages the system and who is the guarantor (central bank or private organization); if provides a daily loan; how made settlements – by gross or net settlement system.

There are some general principles for to be guided and used in payment systems to developing and implementing risk management measures:

- mandatory identification of system users;
- transparency of mutual settlements;

- control access to the system;
- risk must be managed with minimal costs;
- need to be flexible in determining ways to achieve the goal;
- to stimulate the most economical solutions to risk management;
- the publication of errors in the payment system, fraud, as well as centralized analysis of the parameters and causes of errors;
- periodic verification of measures to counter fraud with the introduction of the necessary changes in the payment process.

Risks of payment systems and banking risks are similar to each other and have both financial and non-financial nature. Financial risks should be associated with the purchasing power of money and with the investment of capital. This approach leads to the appropriateness of classifying the liquidity risk and inflation risk as a financial category. Therefore, credit risk, risk of liquidity, and systemic risk have financial nature. The legal risk and operational risk are non-financial.

For now, very often donation is made in cryptocurrency, for example Bitcoin. However, there is also no mechanism to guarantee a refund in the event that payment is made, but the service or the goods are not received. However, scammers use this. The means of cryptographic protection, which protect cryptocurrency systems, have not been tested by time, wide circulation and a hassle-free history yet. Therefore, safety is not confirmed.

Many countries have not decided on their unambiguous attitude to electronic money yet. Central banks of most countries are very wary of the development of electronic money, fearing uncontrolled emissions, the use of electronic payment systems for money laundering and other possible abuses. If talk about how countries are looking at the cryptocurrency, then can say that, the countries were divided into three camps:

1. Those who do not approve the use of the cryptocurrency, as China and Russia did;
2. Those who created a legal framework that allows the use of the cryptocurrency, along with conventional (US, Israel and UAE);
3. Those who wait.

The use of bitcoin by criminals has attracted the attention of financial regulators, legislative bodies, law enforcement, and the media [13]. The FBI prepared an intelligence assessment [14], the SEC has issued a pointed warning about investment schemes using virtual currencies [13], and the U.S. Senate held a hearing on virtual currencies in November 2013 [15].

Various potential attacks on the bitcoin network and its use as a payment system either real or theoretical have been considered. The bitcoin protocol includes several features that



protect it against some of those attacks, such as unauthorized spending, double spending, forging bitcoins, and tampering with the blockchain.

Cryptocurrency is a special electronic means of payment, the rate of which is supported only by supply and demand. Such electronic money is not regulated by any of the state systems, including the Central Bank. The function of observers and supervisors is realized by users of Network and owners of cryptocurrency.

Many believe that the crypto currency is the money of the future. This is confirmed by the fact that some large stores in the US and Europe can already make settlements using cryptocurrency. Money transfer systems, such as eBay and PayPal, already have functionality to work with this electronic mean of payment.

The main distinguishing feature of the digital currency is decentralization. The cryptocurrency is distributed between different nodes a.k.a. peers and does not have centralized management. The advantage of electronic money is also their anonymity and the confidentiality of conducted transactions. The cryptocurrency wallet address that is used for coin transfers is just a set of symbols that is not tied to personal data and cannot be the owner's identifier. Moving the crypto currency between users is much faster than a similar banking transaction. At the same time, the low amount of a commission is very encouraging.

The course of the cryptocurrency cannot be affected by the work of any financial institution or political instability. However, the specificity of digital money lies also in the fact that their value is unstable and can change every minute. The converter of crypto currency must be updated every minute, only then it allows you to find out the current value of electronic coins.

Some advantages of cryptocurrencies are their shortcomings. For example, anonymity is a good basis for Internet speculation with large amounts of electronic money. The disadvantage of such system based on mutual settlements is its vulnerability to computer viruses and damage to physical media.

First, the crypto currency was conceived as a simple way of Internet shopping or transferring ordinary money between network users.

Later, the crypto currency was divided into two types:

- electronic money tied to real, ordinary money;
- electronic money, the issue of which is carried out by means of electronic calculations on the Internet.

The major difference between E-money and digital currencies is that E-money does not change the value of the fiat currency (USD, EUR) it represents. However, digital currency is not

equivalent to any fiat currency. In other words, all digital currency is Electronic money, but Electronic money is not necessarily digital currency.

Many centralized systems – such as PayPal, eCash, WebMoney, Payoneer, cashU, will sell their electronic currency directly to the end user (Table 5.2). Other systems only sell through third party digital currency exchangers.

Table 5.2

Systems of fiat and digital currency [author's research]

Centralized systems of fiat currency		Systems of digital currency	
Based on networks	Based on smart cards	Centralized	Decentralized
PayPal	Visa Cash	EasyPay	Bitcoin, BTC
M-Pesa	Mondex	WebMoney	Litecoin, LTC
Yandex.Money	Octopus	QIWI	Ripple, XRP
Globalmoney	Chipknip	RBK Money	Peercoin, PPC
eCash	Payoneer		QuarkCoin, QRK
	cashU		Dogecoin, DGC
			BitShares, BTS
			Nxt, NXT
			Monero, XMR

Cryptocurrencies allow electronic money systems to be decentralized.

The most popular cryptocurrencies in the world are:

1. Bitcoin, BTC
2. Ethereum, ETH
3. Ripple, XRP
4. Litecoin, LTC
5. Dogecoin, DOGE
6. Stellar, STR
7. DigiByte, DGB
8. Siacoin, SIA
9. Dash, DASH
10. Ethereum Classic, ETC.

This is only a small part of all existing cryptocurrency. There are about 700 active and already outdated digital money in the period from 2008 to 2015.

The list of cryptocurrency may conditionally be divided into five parts:

1. Commonly recognized cryptocurrencies
2. Cryptocurrency with a large market share carry original ideas, but do not have universal recognition
3. Alternative Cryptocurrency (mainly Fork) with a large community and good growth prospects
4. Fork (with minimal modifications) have a live community and some chances of getting into the third category
5. Clones without any prospects. They differ from fork by the absence of innovations.

Commonly recognized cryptocurrencies are:

- Bitcoin, a peer-to-peer electronic monetary system based on cryptography.
- LiteCoin, originally based on the bitcoin protocol, intended to improve upon its alleged inefficiencies.

**BTC Bitcoin** is the first successful cryptocurrency that has a high popularity in the world. However, more than 95% of the bitcoins are concentrated in the hands of a very narrow circle of persons. In addition, due to increased popularity and complexity accordingly, generation of bitcoins is possible only on special equipment (ASIC), which leads to extremely uneven distribution of coins. This not only increases the risk of speculation, but also reduces the reliability of the network.

A decentralized peer-to-peer network regulates transactions and Bitcoin emissions. Bitcoin uses a single database distributed across the network, included in a decentralized peer-to-peer network that uses an electronic digital signature and is supported by a proof-of-work protocol to ensure the security and legitimacy of the funds put into circulation. Despite the fact that formally for the use of Bitcoin the user identification is not required, the currency is not completely anonymous [1].

The stability of the system is based on the number of users who have a full client running. Until the honest nodes are the majority, nothing threatens to the Bitcoin network. Smallest amounts of bitcoin is a satoshi, named after Satoshi Nakamoto, bitcoin's creator. Satoshi is representing 0.00000001 bitcoin, one hundred millionth of a bitcoin [2, 3]. If necessary, the protocol and the corresponding software can be changed to work with smaller quantities.

Mining is one of the ways to get electronic coins. Mining is the process of finding solution to some complex mathematical problem, which is conducted by the brute force method.

Every 10 minutes, the algorithm for getting bitcoins becomes more complicated in order to limit the annual emission of crypto currency and prevent inflation.

The system was designed so that the maximum number of new bitcoin should be mined at the beginning with gradual reduce the award for mining along the time. It is assumed that the production process will end in 2140 with 21 million bitcoins. Now, about 15 million BTC have been produced or about 70% of all coins.

It can be concluded that investing in bitcoins for profit is associated with greater risks of losing money along with the possibility to hit the jackpot (as it was in 2013 when the price of Bitcoin has gained 1000% less than for a month). However, there is one assumption they will someday become a scarce commodity because of a limited emission. This means that prices will be higher than current ones.

Bitcoins can also be obtained in the following ways:

- by receiving a payment for services and goods;
- by purchasing of cryptocurrency on exchanges;
- by exchanging Bitcoin between individuals on the Local bitcoins service – localbitcoins.com;
- by exchanging Bitcoin through Web Money, Yandex Money, Qiwi, banks, Visa or MasterCard using the service like bestchange.com.

One alternative way to get Bitcoin is to buy them on the cryptocurrency exchange. Such resources allows trading of different coins and even fiat money. There are three options for storing Bitcoin:

1. Regular wallet – installed and created on the computer software that is connected to other peers of the network and encrypted to avoid hacking.
2. Online wallet – all data is stored on the server. If the server is hacked, then all private information will be compromised.
3. Cold wallet – funds are located on physical media (for example on DVD) or device without internet access.

**LTC Litecoin** is a successful fork of Bitcoin. It is being treated as the “silver” in cryptocurrency world. It has a good chance to becoming the currency number 1. However, Litecoin has an algorithm for coin generation different from Bitcoin. This makes the currency resistant to generation on ASIC, and more popular among the population. Litecoin is more convenient than bitcoin for payment transactions, because it requires less confirmation from the network (2.5 minutes against 10 minutes in bitcoin). Cryptocurrency with a large market share carry original ideas, but do not have universal recognition.

Crypto-currency with a large market share carry original ideas, but do not have universal recognition. They are:

- Dogecoin is a clone of Litecoin system created to reach broader demographics. Dogecoin is just actually slightly renamed. Nothing fundamentally new, but it is one of the five largest crypto-currencies. Currency is a meme that has appeared exclusively for fun and in the future, the next two years can completely be replaced by something more interesting.

- Ripple is monetary system based on trust networks developed primarily for banks and financial organizations.

- Nxt is conceived as flexible platform to build applications and financial services around.

- Monero is an open source cryptocurrency created in April 2014 that focuses on privacy, decentralization and scalability.

- PeerCoin concept has been written on an August 2012 white paper by the authors Scott Nadal and Sunny King. It has a huge number of coins, but it has a built-in inflation mechanism.

- NovaCoin – fork of PeerCoin. It has a significant improvement in the concept of Dola and it uses the Scrypt algorithm as well as Litecoin uses the Scrypt algorithm. Like PeerCoin has an unlimited number of coins and a built-in inflation mechanism.

There are many different cryptocurrencies, but this list is constantly increasing. Some currencies appear and disappear, but there are also those that work for a long time and have a great community.

### **Cryptocurrency advantages**

Electronic money can be correctly compared with cash, as the circulation of non-cash money necessarily personified, and the details of both parties are known. It is sufficient to know the requisites of the recipient of funds in the case of payments using digital cash.

Electronic money has the following advantages over traditional ones:

1. Your crypto coins can be only on your computer in the electronic wallet (i.e. cold wallet) and no one, and under no circumstances will be able to do anything with them.

2. No control by the banks or the state. As a consequence, the inability to control cryptocurrency by various state structures.

3. Open cryptocurrency code – Bitcoin uses the same algorithms that are used in Internet banking.

4. Absence of inflation is the total quantity of coins in this system that limited by an algorithm.

5. There is no main server responsible for all transactions in the peer-to-peer cryptocurrency network. Information is exchanged between autonomous and independent nodes.

6. Unlimited possibilities of transactions – each of the wallet owners can pay to anyone, anywhere and for anything. The moment of payment is fixed by electronic system, the human factor impact is reduced.

7. Commission is lower in this system than in any other one. They constitute 0.1% of the transaction amount. Interest is in the purse of the "earners" Bitcoin.

8. Security is provided by cryptographic and electronic means.

### **Risks of the cryptocurrency market**

In the Bitcoin system it is impossible to appeal and / or cancel transactions, even if it is proved that the owner did not know about them and did not want to conduct them. If the attacker has stolen the wallet's private key and the bitcoins have been transferred to another address, the victim will not be able to find out who did this, since the recipient's address does not contain identification information [4]. There is also no mechanism to guarantee a refund in the event that payment is made, but the service or the goods are not received. Scammers use this. The means of cryptographic protection, which protect cryptocurrency systems, have not been tested by time, wide circulation and a hassle-free history yet. Therefore, safety not confirmed.

The main Bitcoin exchange, Bitfinex, was hacked and almost 120,000 BTC (about \$ 60 million) was stolen in 2016.

In 2011, an error was detected in the processing of unconfirmed transactions in the accounting systems of many exchange services, which allowed the crediting of funds without transmission of bitcoins [5]. Ignoring this problem led to the bankruptcy of Mt.Gox. Other burglaries of exchange sites and pools of joint mining were also recorded [6, 7, 8, 9]. At the end of 2013, 96,000 bitcoins belonging to users were stolen from the transit accounts of the Sheep Marketplace [10, 11].

In April 2014, Kaspersky Lab reported the growth of virus attacks aimed at stealing bitcoins, including through theft of files with keys (wallet.dat) [12].

**Unauthorized spending** mitigated by bitcoin's implementation of public-private key cryptography. For example; when Alice sends a bitcoin to Bob, Bob becomes the new owner of the bitcoin. Eve observing the transaction might want to spend the bitcoin Bob just received, but she cannot sign the transaction without the knowledge of Bob's private key.

A specific problem that an internet payment system must solve is **double-spending**, whereby a user pays the same coin to two or more different recipients. An example of such a problem would be if Eve sent a bitcoin to Alice and later sent the same bitcoin to Bob. The

bitcoin network guards against double-spending by recording all bitcoin transfers in a ledger (the blockchain) that is visible to all users, and ensuring for all transferred bitcoins that they haven't been previously spent.

Other attacks, such as theft of private keys, require due care by users.

**Race attack.** By the rules, the network accepts only one of the transactions. If Alice offers to pay Bob a bitcoin in exchange for goods and signs a corresponding transaction, it is still possible that she also creates a different transaction at the same time sending the same bitcoin to Eve. This called a race attack, since there is a race which transaction will be accepted first. Bob can reduce the risk of race attack stipulating that she will not deliver the goods until Alice's payment to Bob appears in the Blockchain [16].

Another variant race attack (Finney attack) requires the participation of a miner. Instead of sending both payment requests (to pay Bob and Eve with the same coins) to the network, Alice issues only Eve's payment request to the network, while the miner tries to mine a block that includes the payment to Bob instead of Eve. There is a positive probability that the rogue miner will succeed before the network, and the payment to Bob will be rejected. As with the plain race attack, Bob can reduce the risk of a Finney attack by waiting for the payment to be included in the Blockchain [17].

### **History modification**

Ideally, merchants and services that receive payment in bitcoin should wait for at least one confirmation of that transaction to be distributed over the network, before assuming that the payment was done. The more confirmations, the more difficult it is for an attacker to successfully reverse the transaction in a blockchain. If the attacker controls more than half the total network power, in which case it is called a 51% attack [18, 19].

### **Deanonymisation of clients**

Deanonymisation is a strategy in data mining in which anonymous data is cross-referenced with other sources of data to re-identify the anonymous data source [20].

### **Data in the blockchain**

While it is possible to store any digital file in the blockchain, the larger the transaction size, the larger any associated fees become [21].

Thus, it is possible to sum up all the risks of cryptocurrency:

- lack of legal regulation;
- priority orientation of legislation to the banking sector in field of payment systems;
- there is a possibility of irrevocable loss of electronic money in the event of physical destruction of the computer or data carrier on which they were stored;

- impossibility to identify the amount and type of money without special software;
- theft of electronic money is possible through innovative methods;
- a large number of competing and poorly oriented to their customers technologies and lack of standards.
- significant fluctuations in the rate of the cryptocurrency.
- investment in the cryptocurrency is associated with greater risks and should be considered in the medium and long term.

It's hard to say which way is true. Free circulation of digital money in the country can easily kill the local currency, but they are also capable of increasing the competitiveness of the country's economy. Thus, they allow to make direct investments without the need for their double conversion into local currency at the entrance and exit. If the banks of developed countries start issuing cheap loans in the cryptocurrency to companies from other countries, it will be both the death of local currency and the development of the local economy.

Cryptocurrency is interesting because it does not belong to a specific person or regulator, and there is no single center for emissions and supervision. Everything that happens inside the system is the actions of the users themselves and the direct owners of digital money. That is, the cryptocurrency is an alternative to classical money, with some financial imbalances in the world.

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### **5.3 INFORMATION ASYMMETRY REDUCTION AS A BASIS FOR THE FINANCIAL SECURITY OF THE STATE**

Classical economic theory involves the rational actions of economic subjects, based on equally distributed information. But real life shows that this is only an ideal model and in practice it does not work. Its main provisions – the rational actions of the subjects and equal information distribution – are essentially abstractions and in practice are implemented only partially.

Failure to complete the rationalization of actions and behavior of economic subjects is related to human psychology and connected with the presence of different kinds of expectations, mostly with the individual, not common nature.

Equal distribution of information between economic agents is impossible – someone always knows more than the others. Some economic agents do not want others to know about their real state or do not want to harm themselves with their own information actions (e.g., sale of shares by the owner of the company can generate a negative signal about the company's prospects, so the owner will try to hide information about such actions to avoid harm to the

company). Other economic agents due to certain circumstances cannot share information with the others, because transfer of information can be associated with additional costs and requires additional time losses. Quite often obtaining of information is accompanied by significant costs that is why economic subjects limit their own knowledge. Despite the significant development of information technologies and faster access to information, growth in size of available information, this problem does not become less, and even increases in scale.

The situation where part of economic subjects is more informed in contrast with other participants of economic relations is called information asymmetry. Information asymmetry leads to market failure, which in turn can lead to crisis in the economy. With growing globalization and internationalization of economic and especially financial processes, the problem of information asymmetry from a secondary becomes one of the key economic issues.

Financial security of the state can be harmed by the information asymmetry in a variety of ways. For example, in banking using a credit card customer borrows money without any collateral. Obviously, the debtors better than a bank know whether they would return the debt or not. In addition, debtor can stop acting to return the debt. For example, if the customer does not care about the return of debt, he can safely accept the loss of job. This, of course, eliminates his ability to repay debt to the bank. In case of financial markets information asymmetry leads to the appearance and to collapse of price bubbles and, as the result, can cause economic crisis. Similar examples can be provided from other spheres and aspects of economic activity (labor and health market, investing and insurance, consumer sector, etc.). As can be seen, financial security of the state can be harmed significantly with the information asymmetry and its consequences.

At the same time effective mechanism of information asymmetry counteraction still does not exist. Thus, it is very important to research the nature, causes and consequences of information asymmetry and to search methods of its minimization.

Basic theory of information asymmetry in the economy was developed by Arrow (1963) and Akerlof (1970) [1; 2]. Latter Akerlof constructed mathematical model of the market with imperfect information (for this he had received the Nobel Prize in 2001. By the way in 1996, Nobel Prize was awarded to William Vickrey and James Mirrlees "for their fundamental contributions to the economic theory of incentives under asymmetric information" – it underscores the importance and urgency of this problem) [10**Błąd! Nie można odnaleźć źródła odwołania.**]. Akerlof (1970) showed that due to imperfect information dishonest retailers may offer less quality products. The result is fall in demand for goods and low prices for them. As a result sellers of better goods disappear from the market or try to separate themselves from the average producer which leads to additional costs [1].

The problem of information asymmetry is one of the most important in modern economy because it is typical for all levels and all areas of economic activity: at the macro level and micro level, at the national and international levels in all areas of industry and services.

Relationships between elements at the macro level are always accompanied by some level of information asymmetry. For example, existence of shadow economy is one of the results of information asymmetry (economic subjects have information about the actual amounts of their financial and economic activity while the state is able to monitor only a part of them – as the result part of economy is not controlled by the government).

The problem of information asymmetry does not apply to a particular type of industry or sector of the economy – it is a general defect of economic system and, as the result, it is quite important for the financial security of the state, because it leads not only to additional losses of economic activity, but also acts as a basic factor in failure of market mechanism in general.

The main reasons for the existence of information asymmetry are:

- 1) limited access to information;
- 2) variability and the rapid aging of information;
- 3) partial assimilation of information;
- 4) confidentiality;
- 5) costs on obtaining information;
- 6) opportunistic behavior of the parties.

The main consequences of information asymmetry are:

- it prevents the adoption of optimal economic decisions;
- it contributes to distortion of markets and their failure;
- it causes additional transaction costs;
- economic agents find themselves in rough conditions while making decisions that can lead to opportunistic behavior and loss for one of the parties;
- it stimulates the cooperative behavior of firms.

As information asymmetry consequences are important in modern economy, it is necessary to know how to counter it.

According to Akerlof (1970), there are only 2 ways to solve the problem of information asymmetry: guarantees and reputation [1]. Guarantees can only be realized in court, and appropriate reputation realization is possible only in an open society (in this society every citizen has free access to information on all companies and sellers).

The main methods and approaches to reduce the information asymmetry are presented in Fig. 5.4.

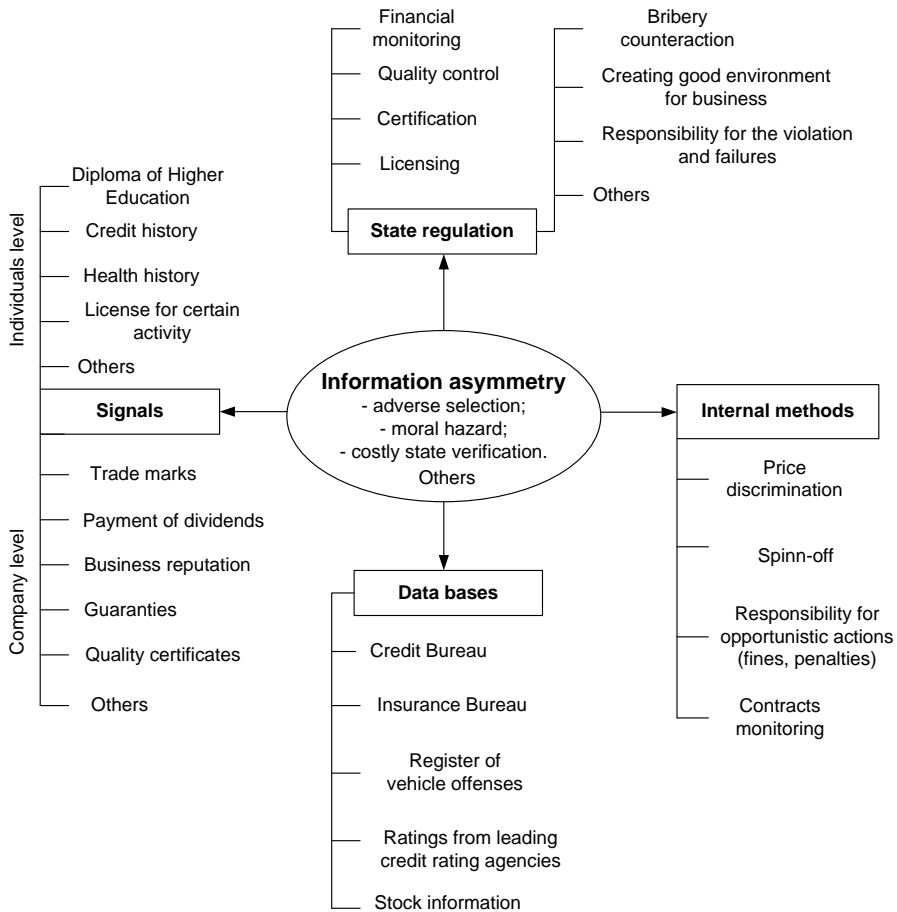


Figure 5.4. Methods of information asymmetry reduction [author's research]

We offer a group of four methods that help to reduce information asymmetry in the economy which can act as a basis for the financial security of the state.

The basis of information asymmetry reduction was developed by Spence (1974) with his "theory of market signals". According to this theory sellers have to provide additional information about the quality of their products. This will counteract against adverse selection and save market efficiency. Logos, trademarks, guarantees, reputation of company, quality certificates, diplomas from various competitions and prestigious nominations, recommendations, qualifications and payment of dividends as a signal of prosperity and good prospects may act as additional information about the company [11].

In general, all signals from the company can be divided into three groups:

1. Signals about quality – designed to show the quality of the products and to form the positive image of the company (expensive advertising, very attractive guarantees from the manufacturer etc.);

2. Strong competitive position signals – designed to show the benefits of the company over its competitors and its self-confidence and abilities (aggressive price cuts, sales);

3. Signals of financial success – aimed at forming an opinion of stable financial state of the company and its ability to generate significant amount of income and profit (financing the company not by issuing shares, but by issuing bonds, which are more costly, dividends payout).

Spence (1974) mentioned signals not only at the company level, but also at the level of individuals (e.g., employees) and the state. For example, when government is trying to show its commitment to deal with high inflation, the central bank held its restrictive monetary policy [11].

One more example of the generation of signals at the state level is the existence of special institutions that perform guarantee and insurance functions. For example, the presence of the Guarantee Fund for the deposits signals to investors about the reliability of the banking system, thereby reducing the level of information asymmetry between economic subjects and banking system.

During the global financial crisis level of confidence of the banking system has dropped significantly. One of the reasons was sharp increase in information asymmetry.

For individuals the graduate degree and license for certain activities may act as signals. As for the financial activities of individuals, credit history can act as the element of information asymmetry reduction. So maintenance of credit bureaus by banks and credit unions or at least presence of clients' databases can prevent the emergence and implementation of moral hazard.

Stiglitz and Rothschild (1973) developed the mechanism of "reverse market adaptation". Uninformed market participants receive information from more informed. For example, insurance company (uninformed participant) should encourage their customers (well-informed participant) in order to "force" them to discover information about their real insurance risk [12].

Also there is a group of methods which can be called "internal". They are used by companies to reduce the information asymmetry. For example, price discrimination. Price discrimination in various forms can be very effective counteraction to the information asymmetry and its effects. Setting different prices for different consumers allows reducing moral hazard and adverse selection. For example, a healthy person, for which the probability of the insured event (for health insurance) will be quite low, should have lower premiums than the person with a health problems, who respectively, will be paid higher premiums, because the probability of occurrence of insured accident is much higher.

Creation of subsidiaries makes the activities of the company more transparent, as investors become more transparent about the strategy in whole and its activities that are presented by subsidiaries and their results. Plus spin-offs reduce the negative synergy that can exist when all activities are conducted "under one roof."

Penalties and responsibility for breach of contract can significantly reduce moral hazard and the size of opportunistic behavior.

Monitoring of partners and their economic activity despite costs can significantly reduce the possibility of financial losses from information asymmetry.

In case of information asymmetry in banking widely used method of information asymmetry counteraction is collateral. Collateral, property promised to the lender if the borrower defaults, reduces the consequences of opportunistic behavior because it reduces the lender's losses in the event of a default. If a borrower defaults on a loan, the lender can sell the collateral and use the proceeds to make up for the losses on the loan. For example, in case of fail to make mortgage payments, the lender can take title to house, auction it off, and use the receipts to pay off the loan. Lenders are thus more willing to make loans secured by collateral, and borrowers are willing to supply collateral because the reduced risk for the lender makes it more likely they will get the loan in the first place and perhaps at a better loan rate.

At the same time, the debtor, who gave his property for collateral, will not be prone to opportunistic behavior because economic benefit for him in this case is questionable. This leads to a reduction in adverse selection and moral hazard, which in turn increases the efficiency of credit activity, resulting in reduced credit risk and, consequently, in reduced rates on credit.

At the company level net worth can act as another element of the information asymmetry reduction. When borrowers have more at stake because their net worth (the difference between their assets and their liabilities) is high, the risk of moral hazard and other types of opportunistic behavior will be greatly reduced because the borrowers themselves have a lot to lose. The greater the borrower's net worth is, the greater the borrower's incentive to behave in the way that the lender expects and desires is, and the smaller the moral hazard problem in the debt contract is, and the easier it is for the firm to borrow. Vice versa, when the borrower's net worth is low, the moral hazard problem is bigger, and it is harder for the firm to borrow.

In case of investments, potential method of opportunistic behavior reduction is the use of so-called debt contracts. Debt contract is a contractual agreement by the borrower to pay the lender (investor) fixed sums of money at periodic intervals. This approach, unlike investors' participation in the profits, reduces the likelihood of moral hazard and opportunistic behavior by managers.

When the firm has high profits, investor receives the contractual payments and does not need to know the exact profits of the firm. If the managers hide profits or pursue activities that are personally beneficial, but don't increase profitability, the investor is indifferent as long as these activities do not interfere with the ability of the firm to make its debt payments on time. Only when the firm cannot meet its debt payments, thereby being in a state of default, there is a need for the lender to verify the state of the firm's profits. In case of debt contracts, when company has to pay fixed payments, it is inefficient for management to hide profits. They will prefer to operate at maximum efficiency, because the more profit the company gets, the more money will remain in their possession after payments to investor under debt contracts, the more managers will get as bonuses. Investor in this case does not care how management behaves, because he will get his money in any case.

It has to be mentioned that debt contracts are still subject to moral hazard. The borrowers have an incentive to take on investment projects that are riskier than the lenders would like, because a debt contract requires the borrowers to pay out a fixed amount and lets them keep any profits above this amount.

But not only debt contracts can reduce opportunistic behavior of the management and moral hazards arising from this. A possible alternative is so-called “restrictive covenants” – clearly stated in the contract permissible actions and responsibilities of the management. Hubbard (2002) mentions four types of restrictive covenants:

1. Covenants designed to keep the borrower from engaging in the undesirable behavior of undertaking risky investment projects.
2. Restrictive covenants that encourage the borrower to engage in desirable activities that make it more likely that the loan will be paid off.
3. Restrictive covenants that encourage the borrower to keep the collateral in good condition and make sure that it stays in the possession of the borrower.
4. Restrictive covenants that require a borrowing firm to provide information about its activities [7].

An important group of methods associated with information asymmetry and the behavior of executives is their insider activity (for example, deals with shares of their company). Executives have unique information on the current and future state of the company. It gives them opportunity for speculative trading. That is only one of the examples how they could materialize information asymmetry. To prevent such behavior the next methods can be used:

- 1) disclosure by key insiders information on the number of shares they own;
- 2) restrictions on transactions with securities by insiders.

Key insiders are required to submit certain information to the state agencies that publish this information in special issues. In addition executives can be limited in personal transactions with shares of their company. Typically, these restrictions are applied to "short" operations (sells).

Thus, insider activity is state regulated. This leads to information asymmetry reduction and reduces the opportunities of its use to obtain economic benefits.

Effective information asymmetry counteraction is impossible (or at least is much more complicated) without government regulation. Thus, another element of information asymmetry counteraction is an active participation of government (state) in certain aspects of economic activity. In particular, state control over the quality of goods and services, creation of special public services, inspections, and bureaus of quality control in various areas of socio-economic activity provides conditions for information asymmetry reduction.

Akerlof (1970) notes that information asymmetry in developed countries is somewhat less than in the developing countries, due to the fact that in developed countries effective state and public control over the quality are adjusted [1]. So in Ukraine the problem of information asymmetry is much bigger than in case of developed countries.

An important element of government regulation of information asymmetry is licensing and certification. Additionally government could, for instance, produce information to help investors distinguish "good" firms from "bad" ones and provide it free of charge.

Another possibility for the government is regulation that encourages firms to reveal honest information about them so investors can determine how good or bad the firms are.

The U.S. experience in the sphere of government control of financial activity is quite important. The U.S. financial market has a large number of investors (large and small) that operate on it. At the same time, dishonest behavior of firms on the basis of information asymmetry often leads to losses. In order to reduce information asymmetry and to prevent opportunistic behavior in relation to investors, Securities and Exchange Commission (SEC) was founded. This government agency makes firms that sell their securities in the stock markets follow standards of accounting and disclosure of income, assets and size of activity. Accounting standards are designed to ensure that investors can assess the financial state of companies they invested to, thus reducing the level of information asymmetry.

Healy et al. (1999), Leuz and Verrecchia (2000) evidence in favor of inverse relationship between the level of information asymmetry and the level of disclosure which is achieved by financial reporting standards [6; 9].

In addition, laws interpret misreporting or stealing profits belonging to shareholders as an offense, which is punished by large fines or prison terms, or both.



Although government regulation lessens the adverse selection problem, it does not eliminate it. Even when firms provide information to the public about their sales, assets, or earnings, they still have more information than investors. Statistics can't provide enough information about the quality of a firm. Furthermore, bad firms have an incentive to make themselves look like good firms because this would enable them to fetch a higher price for their securities. Bad firms will slant the information they are required to transmit to the public, thus making it harder for investors to sort out the good firms from the bad.

The asymmetric information problem of adverse selection in financial markets explains why financial markets are one of the most heavily regulated sectors in the economy.

Another example of state regulation of economic activity aimed at information asymmetry counteraction is a system of measures for prevention of manipulation of stock exchange prices. For example in the U.S. imitation of market activity, dissemination of false information, sales of insider information, etc. are forbidden.

Important group of methods of information asymmetry reduction are those one which have purely informational nature. We called them databases. For example, creation of specialized databases (credit and insurance history, motor offenses registries and other data sets).

The most common approach, which reduces information asymmetry on different types of markets, is the use of intermediaries. Intermediaries can be divided into two groups depending on role in information asymmetry reduction:

- financial and economic intermediaries;
- information intermediaries.

Capital can be moved from households to companies directly (by buying shares of the companies, direct investment) or through financial intermediaries (banks, investment companies, venture capital funds). According to Healy and Palepu (2000) information flows companies may contact investors directly (financial statements, press releases) or through information intermediaries (financial analysts, credit rating agencies, audit firms, consulting companies, etc.) [5].

In financial markets, the main financial intermediaries are banks. Banks become evaluators of creditworthiness by providing loans to borrowers and have a possibility to distinguish "good" borrowers from "bad." Banks act as intermediaries between those ones who want to borrow money (take a bank loan) and those who want to get income from savings (put money on deposit at the bank). Since the interests on loans are bigger than the interests on deposits – banks obtain profit, which actually is a price to pay for information asymmetry reduction. Free-rider problem in case of banks is solved itself, because information generated by the bank is used by the bank. Private loans are not traded, so no one else can free-ride on the intermediary's monitoring.

Audit reports reduce information asymmetry and form positive image of the firm. This helps potential investors to take right investment decisions. Kothari (2000) notes that reaction of stock prices on companies' announcements of financial reports confirms that investors generally believe that accounting information of the companies is reliable. In turn, this trust was formed largely by confirmation of financial reports by independent auditors and their reputation. It should be mentioned that auditors do not provide markets with new information about the company or its condition, they just confirm existing information [8].

Credit rating agencies play an important role among information intermediaries in the financial sphere. Credit rating agencies are companies that assign credit ratings to issuers and their securities. Credit rating agencies indirectly through ratings exposure (rating is a credit rating agency opinion about the creditworthiness of rating object and /or about its individual debt or other financial instrument, which is expressed as a score on a scale of credit ratings) signal economic subjects about the status of other economic subjects. Availability of rating can open or, conversely, close access of a company to financial resources, improve its reliability in the eyes of investors, or reduce it. In any case, the ratings significantly reduce the level of information asymmetry and today it is one of the most effective and efficient instruments of information asymmetry reduction in financial markets, especially international.

Financial analysts play important role of information intermediaries in the financial markets. They collect information from public and private sources, assess the current state of companies and make predictions about their future perspectives and give certain recommendation (for example, to buy/sell shares of the company).

Some researchers add so-called reputational intermediaries as an additional class of intermediaries. They are economic subjects whose participation in certain transaction (agreement) guarantees its transparency and honesty. This guarantee is achieved by the reputation of these economic subjects. Participation of such firms in agreement reduces the level of information asymmetry around it. As reputational intermediaries may act investment banks and their role of underwriters during the initial public offering. In this case, investors may not have sufficient information on IPO subject, however reputation of the bank, is reducing the level of information asymmetry (Black 1998) [3]. Also audit companies can act as reputational intermediaries, because their main asset is the reputation that was created by decades of their activity in the market. An illustrative example is the fate of the audit firm "Arthur Andersen" (was one of the five largest audit firms in the world) that after the scandal with "Enron" was forced to cease its existence because of reputation loss.

Stiglitz and Grossman also proved that the existence of information asymmetry leads to the use of non-market mechanisms by banks, such as credit rationing (limitation of the credit size to one borrower). Formally, if demand for loans exceeds supply banks would raise interest rates and increase profitability of operations. This is how the market mechanism works. However, when the information asymmetry is high and its consequences (adverse selection and moral hazard) are present on the market, interest rates increase could lead to the disappearance of “good” borrowers and to the appearance of “bad” lenders on the market. This will lead to the losses of the bank, when it cannot get back money from “bad” lenders. Thus, rationing serves as an instrument of bank's losses reduction by avoiding loans with high level of information asymmetry [4].

Important instrument of information asymmetry reduction is stock markets and information from them. Usually signals that economic system sends to its members have considerable big time lags. As the result, economic subjects act in conditions of uncertainty. At the same time sphere of economic activity, where information is absorbed quickly and signals are generated in real time is a stock exchange activity. Asset prices in this case are some sort of a practical result of processing the entire set of information about certain part of economic activity or economic subject.

Stock exchange is a place where information is aligned, and market prices are kind of tool for alignment, or indicator.

In an efficient capital market, the price of a company's stock provides the best signal to managers about the profitability of new investments. Stock prices increase in response to good news, suggesting that more capital should be allocated to the firm's lines of business. Similarly, a decline in stock prices reflects news about market pessimism regarding the firm's prospects.

Thus, analysis of stock markets, dynamics of prices and their reaction to certain events provides more objective and adequate picture of economic reality, i.e. helps to reduce information asymmetry. Information from stock markets is important not only because of its speed, but also because it is formed as a result of analysis by a large number of professionals – stock analysts, traders, investors and other participants. Thus, exchange information is unique both in its speed and quality.

Information asymmetry is important and even crucial element of financial security of the state, because it generates inefficiency of the various aspects of economic activity and economic system in general. That is why information asymmetry reduction can increase the financial security of the state. Proposed methods of information asymmetry reduction and their classification can act as a basis for the appropriate actions from the government to ensure the financial security of the state.

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#### **5.4 FINANCIAL CONSUMER PROTECTION THROUGH THE DEPOSIT GUARANTEE SYSTEM: ON THE WAY TO NATIONAL ECONOMIC SECURITY**

The current financial crisis has sharply aggravated the issue of protection of the depositors interests of domestic banks. This issue is particularly actualized in the context of the implementation of national economic security. The existing structure of the deposit insurance system of Ukraine, which still functions properly, is currently almost exhausted and needs serious reform. The main components of such reform should be the creation of more flexible financing system of the Deposit Guarantee Fund for individuals and strengthening of its powers for work with banks that are in the stage of liquidation.

The deposit insurance system is an important component of the financial infrastructure and national economic security of any state. It is necessary to prevent a massive "escape" of depositors from banks. For the first time such system was created by the United States in 1933, during the Great Depression. According to the International Association of Deposit Insurers (IADI) [5], as of June 2008, 119 countries had a deposit guarantee system or planned to introduce it. Such system functioned fully in 99 countries.

Currently, 113 countries operate in the deposit guarantee system (in 1974 they were 12, from 1980 – 20), 66 insurers belong to the International Association of Deposit Insurers (IADI), another 40 have applied for membership. IADI was founded on May 6, 2002 at the Bank for International Settlements in Basel.

It should be noted that in 2009 the "Basic Principles of Efficient Deposit Insurance Systems" was updated by the IADI [4] in November 2014. Principles of Deposit Guarantee Scheme:

- mandatory participation in the deposit insurance system;
- reducing of the risks of adverse consequences for depositors if banks fail in realisation of their obligations;
- transparency of the activity of the deposit insurance system;
- the accumulative nature of the formation of the mandatory contribution insurance fund at the expense of regular contributions from banks of participants in deposit guarantee systems.

It should be noted that the first deposit insurance system appeared in the United States: in 1933 Congress passed the Federal Deposit Insurance Corporation (FDIC) Act. The insurance indemnity amounted to \$ 100,000, but in 2000 it was temporarily increased to \$ 250,000 by 31.12.2013. USA [11].

The main difference between the USGS of the USA from Ukraine is that it includes not only commercial banks, but also other institutions that have licenses for work with deposits of the population. If necessary, FDIC can count on borrowings from the state budget up to \$ 500 billion. FDIC supports the amount of funds in the range of 1.35-1.5% of the amount of insured deposits, which is about 100 billion dollars. The rates of contributions are differentiated depending on the stability of the bank.

In 1962, a Deposit Insurance Corporation (DIC) was created in India after the bankruptcy of two largest banks: Laxmi Bank's and PalaiCentral Bank. The state has provided the DICGC (since 1978) with all its initial capital, now it is about \$ 700 million. The maximum amount of payments is 100 thousand rupees (about 100 USD 1.2 minimum annual salary).

In the UK, not only banks, but also other institutions that have licenses for work with deposits of the population are included in the GVA. The Bank of England can provide up to 175 million pounds of the State Insurance Fund to the Deposit Insurance Fund, then the banks will return it within 5-10 years. The insurance fund is formed from an entry fee that depends on the class. The minimum contribution is 10 thousand pounds, max.is 300 thousand, but no more than 0,3% of deposits.

The total size of the insurance fund is about 4 billion pounds. In addition to contributions insured investments, pension accumulation and insurance policies. In most European Union countries, the amount of insurance payments is 100 thousand euros, in the UK 5 thousand pounds. (134 thousand dollars, 7 minimum annual salaries), 50 thousand pounds from investments and housing loans and 90% of insurance policies (no upper limit). The maximum insurance indemnity for a single depositor is defined in 100% up to 2 000 pounds and 90% from 2,000 to 33,000.

In Switzerland, all deposits in banks and security dollars are insured for up to 100,000 Swiss francs. The total insurance fund of the Swiss Association of Bankers is CHF 6 billion.

In the Czech Republic, the Deposit Insurance Fund (DIF) was established in 1994 to protect deposits in banks, construction companies, cooperative and savings banks. Since its inception, DIF has paid compensation for insured deposits to 300,000 clients for an amount of more than 41.9 billion kronor (from 1995 to 2014, 12 banks and 5 credit unions were banned).

In Bulgaria, the Deposit Insurance Fund (BDIF) was established in 1999 by BDIF, with 23 participating banks, guaranteeing BGN 196,000 (100,000 euros).

In Hungary, in 1993, the National Deposit Insurance Fund (NDIF) was established. NDIF pays compensation to depositors not more than 100 thousand euros in Hungarian forint at the rate of the day preceding the date of commencement of payments. Insurance is also distributed to deposits of legal entities.

In Norway, in 2004, the Savings Bank Guarantee Fund (1923) and the Deposit Guarantee Fund (1961) merged into the Bankenes Sikrings Fund Guarantee Fund of Norwegian Banks. The contribution is 0.1% from the deposits placed in the bank and depends on the size of the bank's capital: if the equity capital exceeds 8%, it is set a proportional discount of up to 35%, if the equity capital is less than 8%, it should be paid in the increased amount. It should be noted that since 1961 in Norway there was no bankruptcy of a credit institution.

In France, the Deposit Insurance Fund is called the "Solidarity Mechanism" and it is managed by the French Association of Banks; funds are formed from bank contributions in accordance to the scale, it is taking into account the volume of deposits of each bank, but can not exceed 30 billion francs. The amount of insurance indemnity per one depositor is up to 70 000 euros.

In Japan, in 1971, a deposit insurance corporation was established, participation was mandatory for all city banks, currency and savings banks, credit cooperatives. The fund is formed from annual contributions in the amount of 0.00% of the insured deposits of the bank. Compensation to depositors is paid only if their deposits were in yen.

In China, from May 2015, deposits from companies and individuals are insured up to 500,000 yuan (\$ 80,550). Payments are made from the fund under the control of the central bank.

In Germany, the insurance system involves both compulsory and voluntary insurance, regulated by the law on deposit protection. If the credit institution goes bankrupt, then the insurance companies and private investors will receive insurance payments. State insurance is subject to an amount of up to 18,000 euros. Savings and other public banks are not included in the state protection of deposits.

In Canada, under the deposit insurance system, it receives up to \$ 100,000 Canadian dollars.

In Austria, from 2019, payments to depositors up to 100 thousand euros will be made from a fund funded by banks. Now 50% of the losses of depositors are offset by banks and 50% of the state. From 2015, banks will transfer 150 million euros annually to the deposit insurance fund to reach 1.5 billion euros by 2024 [5].

By studying the deposit insurance systems of different countries, we can note that now there is no single and universal model for their development and further functioning. Features of the construction of a deposit insurance system largely depend on the skeleton of the banking system, on the banking supervision in the country, on the degree of state regulation of financial and credit organizations.

The process of unifying of all banking legislation and globalization of the entire world economy reveals the main points in building such systems. Any system of deposit insurance in banks consists of different characteristics, the most important are:

- principles of coverage of financial and credit organizations and types of bank deposits;
- principles for determination of the amount of guaranteed reimbursement;
- the role of the state, central (national) bank and commercial banks in establishing and operating an agency or deposit protection fund (FZD);
- distribution of expenses related to the protection of bank deposits (sources of formation of a deposit insurance fund);
- role (function) of the deposit insurance fund in dealing with problem banks.

An overview of foreign deposit insurance systems makes it possible to distinguish the following features and development trends:

1) practically in all countries where deposit insurance systems operate, commercial banks are included, but such participation of banks may be voluntary or mandatory;

2) there was a tendency to expand the range of financial institutions that are included in the insurance systems;

3) recently, in developed countries, the importance of private banks is increasing, as a result – practically in none of developed countries, the insurance fund is not organizationally linked to the central bank. Instead, in developing countries, the state plays a leading role in this process. For example, guarantee funds created in Argentina, Chile and Kenya are subdivisions of central banks or subordinated to them;

4) in some countries – Great Britain, Canada, France, Japan – foreign currency deposits are not covered by insurance protection. This is explained primarily by the fact that foreign currency deposits are not a part of the country's own money supply. In virtually all European countries, the deposit insurance system extends both to deposits in the national currency and to deposits in foreign currency (Austria, Poland, Bulgaria, the Netherlands, Finland). In these countries, the law or treaty provides for the conversion into national currency in the event of payment of compensation. Some banking systems exclude from insurance coverage deposits in foreign currency by local banks – France, Colombia, El Salvador [11, p. 123];

5) in the majority of developed countries and individual developing countries, participants of the deposit insurance system are foreign banks operating in the country (USA, UK, Spain). Only in Japan for foreign banks it is closed access to the guarantee system;

6) practically all countries have limits on the liability of insurance funds for deposits. Such limits are expressed, firstly, by the maximum amount of the deposit insured, and, secondly, by the percentage of coverage of the deposit by insurance. The maximum amount of insurance indemnity, as a rule, varies from 25 thousand to 100 thousand dollars, although in some countries it is much higher. It is worth noting that the size of the guaranteed payments is constantly increasing.

In Ukraine, the functions of the guarantee system, or deposit insurance, are performed by the Deposit Guarantee Fund of Individuals (FGVFO). This specialized state organization was created during the Russian financial crisis of 1998 by the Decree of the President of Ukraine "On measures to protect the rights of individuals – depositors of commercial banks". The institution started its work in 1999. The Foundation has proved its effectiveness for many years. According to the Accounting Chamber, during the period of 1999-2007, 10 banks were liquidated in Ukraine, resulting in compensation of 247 thousand depositors of these banks totaling UAH 319 million.

In accordance with the Law "On the System of Guaranteeing Individuals' Deposits" [6], in case of exhaustion of the funds, the PPFU has the right to apply to the Cabinet of Ministers of



Ukraine or the National Bank of Ukraine for loans. But the government's capabilities are now limited due to the failure of the state budget. And lending to the central bank will lead to an unnecessary increase of the money supply in the economy, which can accelerate inflationary processes. Finally, under the loans, liquidity is needed, and they will have to be serviced. All this means that the reform of the mechanism of regular funding of the fund must be such that it is able to perform its functions without third-party assistance. In addition, the current system of deductions (banks pay twice a year for 0.25% of the total deposits) does not contribute to reducing the problem of so-called moral hazard. This problem is inherent in any insurance system and is that if there is protection, entities may behave too risky. For example, depositors do not worry about placing their funds in a reliable bank. In particular, they may be seduced by high deposit rates, although it is clear that such a return can be provided only by a risky loan and investment portfolio. Ideally, the mechanisms of the deposit guarantee system should provide for the reduction of such risks. Efficiency of compensation is also needed. Under the current fund law, only administrative procedures may last up to two months. Immediate payment of compensation is given for another three months, and this period may be increased up to six months in the event of the elimination of a large systemic bank. Given the social function of the deposit guarantee system, five to eight months, which depositors can wait for their funds, is too long. After all, some citizens do not put enough money in the bank to increase their wealth, but simply temporarily free funds to safely save them – with the intention of using them in case of need.

Thus, the system has certain shortcomings that need to be corrected in the near future. Currently, from 18 principles of the deposit insurance system developed by the International Deposit Insurance Association, Ukraine fully enforces only 11, 5 more – partially and 2 are not implemented at all (Table 5.3).

The Deposit Guarantee Fund in 2016 clearly fulfilled its tasks and laid the foundation for the development of the guarantee system in accordance with international standards. During 2016, depositors of insolvent banks received almost UAH 15 billion. guaranteed reimbursement. These funds have been paid to the Fund without attracting of new loans from the Ministry of Finance and the National Bank of Ukraine. At the same time, a significant item of expenditures of the Fund was the maintenance of debt to these institutions, which by the end of 2016 exceeded 60 billion UAH. The amount of interest paid on loans amounting to 12% per year and more amounted to UAH 2.4 billion.

Table 5.3

Compliance of the Ukrainian Deposit Guarantee System with the International Association of Deposit Insurance Standards (created by the author on the basis of [7, 2, 3])

<b>№ п/п</b>	<b>Principle</b>	<b>Essence</b>	<b>Compliance of FGVFO</b>
1	2	3	4
1	Tasks	The tasks of the deposit insurance system should be clearly established and supported by the mechanisms of the system operation	Yes
2	Avoiding of Moral Risk	The mechanism of work of the system should minimize the problem of moral hazard (when protection leads to very risky behavior of banks and their depositors)	Partly. The amount is limited, there are exceptions regarding the categories of depositors, but there is no binding of bank deductions to risks
3	Mandate	The mandate of the system should be clear and formalized	Yes
4	Powers	The system should have sufficient powers to enable it to perform its functions	Partly. The Fund has all the necessary tools, except for participating in the liquidation of the bank
5	Management	The system should work transparently and independently, it should be protected from the influence of political or business interests	Yes. The administrative board of the fund consists of two representatives of the government and the NBU, as well as one from the Association of Ukrainian Banks
6	Relations with other bodies	The efforts of the guarantee system and other stakeholders should be coordinated, regular exchanges of information between them should be established.	Yes
7	international cooperation	If necessary, the system should exchange information with other similar systems in the world	Yes. The Fund is a member of the International Association of Deposit Insurance
8	Compulsory membership	Each organization that accepts contributions from the subjects of insecure (citizens and small business) must be a member of the guarantee system	Partly. The system guarantees only deposits of individuals and only in banks. Work is ongoing on the creation of a similar system for credit unions

Table 5.3 (contd)

1	2	3	4
9	Covering	It should be clearly stated what and in what volumes is guaranteed. The guaranteed amount should be limited, but significant (to cover most depositors)	Yes
10	The transition from the blank system	If a state moves from blank to limited warranty, it should be as fast as possible	Yes. No restrictions are currently planned
11	Financing	The system must have all the tools to be able to pay compensation to depositors in a timely manner. Most of the costs should be bear by banks	Partly. The Fund has various financing instruments, but the volume of its assets is currently insufficient
12	Publicity	It is important to inform regularly the public about the benefits and limitations of the guarantee system	Yes
13	Legal protection	The deposit guarantee system and its employees must be protected from claims connected with their decisions	Yes. Currently, the fund does not make decisions that have legal risks
14	Cooperation during liquidation	The Fund has the right to file lawsuits against bankruptcy guilty of the bank	No. The fund only becomes a creditor of the liquidated bank
15	Preventing problems	The guarantee system should be part of the system of financial security of the state, which prevents and early addresses the problems of banks	No. The Fund performs only technical functions – accepts contributions and makes payments
16	Effective Elimination	The scheme of liquidation of the bank should facilitate the implementation of the system guaranteeing its functions	Partly. Look paragraph 14
17	Payment of compensation	Contributors should have timely access to their bank deposits (within the guaranteed amount). They need to be informed about how they will receive compensation	Yes
18	Return of assets	The guarantee system should be entitled to a share of the funds received during the liquidation of the bank	Yes. Look paragraph 14

On January 1, 2017, the participants of the Guarantee Fund for Individuals Deposits were 99 banks licensed by the National Bank of Ukraine for banking operations.

Analyzing the results of the banks' activities in 2016, one should pay attention to both positive and negative trends of the reporting year. In 2016, there was a significant capitalization of the banking system, the authorized capital of the Fund's participants more than doubled; the

pace of devaluation of the national currency slowed down; the rate of outflow of foreign currency deposits in comparison with the previous two years has significantly decreased; there is an increase in deposits in the national currency; gradually decreasing both the cost of resources and the cost of loans. At the same time, the deterioration of important indicators of the state of the banking system shows: a reduction in lending volumes, insufficient level of trust in the banking system by depositors, an increase in the share of the problem debt, the highest level of loss of the banking system in the history of its existence [10].

The credit activity of the Fund's participants continues to remain low due to a limited number of reliable borrowers, a high level of uncertainty about further economic development and high cost of credit resources. According to the NBU, at the beginning of 2017, the average interest rate on loans in national currency was 17.7% (21.5% as of 01.01.2016). For loans in foreign currency the indicator corresponded to 8.2% (6.9% as of 01.01.2016). The reduction of the NBU discount rate is also accompanied by a gradual decrease in the cost of credit resources in the domestic market.

During 2016, the volume of the client's loan portfolio of the Fund's participants decreased by 0.05% (by UAH 403.7 million) and on January 1, 2017 amounted to UAH 857 507.9 million. Positive dynamics of client's loan portfolio was observed in 3 quarters, except for the second. The main factor in the volatility of the total volume of the loan portfolio during the year are also exchange differences because about half of the loans issued are denominated in foreign currency.

The total volume of obligations of the participants of the Fund for 2016 decreased by 5.96% to UAH 954 360.5 million. due to the reduction of interbank loans and the amount of subordinated debt. At the same time, along with the rate of the national currency, the liquidation of 19 participants of the Fund significantly affected the reduction of this indicator.

There is an increase in client funds, which grew by 11.7% and reached UAH 690,401.3 million.

Given the significant amount of capital accumulation of a number of participants of the Fund and the exclusion from the calculation of statistical indicators of loss-making banks sent to liquidation (19 banks), the equity capital of the Fund's participants for the reporting year increased to 18 256.9 million UAH. or to 20.6% and on 01.01.2017. and it is 106 719,3 million UAH.

During the year, 50 participants of the Fund increased the authorized capital for the total amount of UAH 199 479.8 million. Taking into account that not all banking institutions will be able to execute the schedule of increase of the authorized capital, it is expected that some institutions will decide on mergers with other banks, or about termination and liquidation.

The equity of the Fund's participants during the reporting year increased by UAH 18 256.9 mln. or to 20.6% and reached 106,719.3 million UAH. For comparison, during the previous year, the volume of equity decreased almost in third. The main reason for the increase in 2017 is the significant amount of capitalization of banking institutions (the increase in authorized capital was doubled) and the exclusion from the calculations of statistical data of banks that were excluded from the register of participants of the Fund during 2016. The reduction of equity capital is observed in 35 banks, 1 participant has a negative capital.

The amount of possible compensation in the participants of the Fund for 2016 increased to 11.3 billion UAH. or 5.9% and amounted to 203.3 billion UAH. or 53.2% to the total contributions of participants of the Fund. For comparison, in 2015, the amount of possible compensation decreased by UAH 17.9 billion. or by 8.6% from UAH 209.9 million to UAH 191.9 billion.

The amount of possible reimbursement in 95 banks (without insolvency on 01.01.2017) amounted to UAH 202.1 billion. In 4 insolvent banks, the amount of compensation is 1.1 billion UAH, the number of persons guaranteed deposits – 80.5 thousand people.

The main indicators that make it possible to assess the effectiveness of the Fund are financial sustainability (1) and the predictive value of this indicator (2) [6].

$$FSF_i = \frac{FF_i}{FGF_i} \cdot 100\%, \quad (1)$$

where  $FSF_i$  – financial stability of the Fund as of the beginning of the 1st month;  $FGF_i$  (funds guaranteed by the Fund) – the amount of the possible indemnity for deposits of individuals, determined by the beginning of the 1st month;  $FF_i$  (funds of the Fund) – amount of financial resources of the Fund at the beginning of 1st month and fees from participants of the Fund, which should arrive during the 1st month.

Forecast financial stability of the Fund is calculated on the 01th day of each month for the following 12 months, using the following formula:

$$FSF_{i+1} = \frac{FF_{i+1}}{FGF_{i+1}} \cdot 100\%, \quad (2)$$

where  $FSF_{i+1}$  – Projected financial stability of the Fund as at the beginning of 1 + 1 month;  $FF_{i+1}$  (Fund's funds) – Fund's financial resources at the beginning of 1 + 1 month;  $FGF_{i+1}$  (guaranteed by the Fund) – the mind of the possible indemnity for deposits of individuals, determined at the beginning of 1 + 1 month.

Thus, from the foregoing we can say that the deposit guarantee system in Ukraine has both individual advantages and disadvantages. It should be noted that analyzing the practices of foreign deposit guarantee systems, the Ukrainian system should borrow some functional aspects of foreign countries:

- guarantee only deposits in hryvnia, which will further strengthen the hryvnia position above the US dollar.

- to allow membership in the guarantee fund not only to banks, but also to insurance companies and credit unions.

- expand the range of participants of payments: individuals and legal entities.

- increase the guaranteed amount of deposits, remind that at the moment it is 200000 UAH.

In addition, the mechanism of realization of the right to contribute in the event of insolvency of the bank, its liquidation, and the interaction of authorized bodies and individuals to ensure the protection of depositors' rights is needed. The deposit guarantee system in Ukraine, of course, needs a critical review, despite the fact that systemic changes to the legislation in this area have been introduced.

The provision of guarantees to depositors of banks will be facilitated by the introduction of foreign experience in national legislation. In the Federal Depositary Insurance Corporation (Federal Deposit Insurance Corporation), an independent agency created by the Congress in 1933 to provide stability and public confidence in the financial system through the deposit insurance, study and control of the financial institutions of the country, operates in the USA. This corporation does not receive government funding, but is financed by insurance contributions paid by banks for deposit insurance. It carries out not only insurance of deposits and protection of interests of depositors, but is "trusted" in case of a bank bankruptcy with the right of attraction of specialists for carrying out functions connected with bankruptcy procedure.

At the present stage of the development of the banking system, the FSFM plays one of the decisive roles, since it guarantees the return of funds to individual depositors and their confidence in the preservation of their funds. In most economically developed countries, individuals are the most important source of investment. Expansion of their use is one of the effective ways of attracting additional funds to the real sector of the country's economy. The introduction of a deposit insurance system is intended to help increase the attractiveness for individuals to maintain their own savings in banks and financial and credit institutions. In the vast majority of countries of the world (in countries such as Canada, the United States, Great Britain, Japan and Bulgaria), the CERs are created by the state, and participation in it, is mandatory for banks.

Consequently, in each country, the deposit guarantee system has its own problems and pay-back results. Ukraine also has a number of problematic aspects in the work of the deposit guarantee system, but at the same time, insurance of bank deposits in Ukraine has all the prospects for further development. This requires:

- expand the powers of the FGVFO;
- the deposit guarantee system should be oriented towards protecting the interests of both individuals and legal entities;
- increase the size of the reimbursement of bank deposits to tune into GDP per capita;
- to establish a differentiated amount of regular contributions of banks to the fund depending on the riskiness of their activities;
- to establish participation of the NBU in the formation of the fund's income in the amount of 20% of the amount exceeding the estimated revenue over the estimated expenditures approved for the current budget year;
- to establish a fee for the use of temporarily free funds of the fund at the level of payment for the use of budget funds by commercial banks.

Thus, Ukraine has prospects for the development of deposit insurance, taking into account previous mistakes and using the experience of more developed countries in the field of insurance, and thereby strengthening the level of national economic security of the country.

An analysis of foreign practice makes it possible to draw the following conclusion: if CERs were to be effective, it should be part of an effective system of ensuring the financial security of the state, supported by strong prudential regulation and supervision, an adequate legislative framework and mechanism for its implementation, as well as an appropriate level of accounting and established disclosure procedures information. The fulfillment of the above conditions becomes possible at the time when the body managing the CERs has the appropriate public-law powers. This approach is also contained in the "Recommendations on the establishment of effective deposit insurance systems" adopted by the Working Group on the Forum on Financial Stability. The result of applying an integrated and well-balanced approach to creating a deposit guarantee system is to reduce its risks and maintain its financial viability in the future.

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## **5.5 INFLUENCE OF SHADOW CAPITAL WITHDRAWAL ABROAD ON THE INVESTMENT ATTRACTIVENESS OF UKRAINE: PREVENTION AND WARNING MECHANISMS\***

The formation of the favorable investment environment, being under the influence of external and internal factors is considered to be the basis for sustainable economic development of any country. Development and implementation of a rational model that will revive the national investment climate and at the same time will fully take into account the influence of shadow capital on the main indicators of economy development is highly important for Ukraine.

Leading role in stimulation of these processes must play specialized public administration bodies – the National Bank of Ukraine, State Commission on Securities and Stock Market, State Commission for Regulation of Financial Services, etc., as well as the corporate self-regulatory organizations – the Association of Ukrainian Banks, Ukrainian Association of Investment Business and many others. The primary mechanism of such stimulation is the improvement of the

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legislation regulating investment processes. It should be emphasized that both banking and non-banking financial intermediaries should understand the importance of maintaining investor confidence not only to their own institutions and associations, but also to the financial system in general, which ultimately makes a crucial influence on the economic situation of the state.

Particularly critical issue of optimization of the investment process arose in conditions of active deployment of crisis in real economics of Ukraine, which caused a dire shortage of liquidity of leading financial institutions, in the end – a significant growth of the level of shadow capital withdrawal abroad.

In today's context one of the priorities of state economic regulation is to improve the investment climate and promote investment activities of economic entities, creating conditions for provision by banks and other participants in the investment market of various investment services for the purpose of concentration of capital resources and their transfer to the real economy.

Nowadays, our economy is required a large volume of extra money. One of the most widespread way of obtaining it – attracting domestic or foreign investment. But, unfortunately, according to calculations of the Ministry of Economic Development and Trade of Ukraine, majorities of European companies do not invest money in Ukraine because of high risks and level of corruption. As shown in Fig. 5.5 the investment attractiveness of Ukraine in the first quarter of 2015 remained virtually unchanged in comparison with 2012-2014 – 2.51 points out of five. The highest index of investment attractiveness of Ukraine was in 2011 –3.4 points, then it has gradually decreased. The lowest value was recorded in 2013.

The internationalization of the global financial system and the liberalization of capital movements led to increase in illegal outflow of funds abroad, reduction of information transparency of financial flows, enhancing global financial intermediation of a parallel activation of money laundering operations and in turn – reduction of tax competitiveness and investment attractiveness of the country. Due to the clandestine nature of the money laundering, it is increasingly difficult to estimate the scale of money laundering both in the particular country and in the world in whole. Some estimates suggest that the amount of money laundered each year is approximately USD 2.8 trillion, but in fact the amount is more than four times greater than the figure generally accepted. The United Nations Office on Drugs and Crime estimates that between 2 and 5% of global GDP is laundered each year. That's between EUR 715 billion and 1.87 trillion each year. With that in mind, the money laundering cannot be considered as an isolated threat of the economic security of each country.

Money Laundering is the multi-stage process of hiding the source and destination of illicitly-obtained money in order to legitimize it. In the context of globalization, money

laundering is becoming increasingly widespread. Each year, the diversity of schemes and participants in this process will increase. Banks, insurance companies, international organizations with a branched structure are commonly used as channels to launder money.

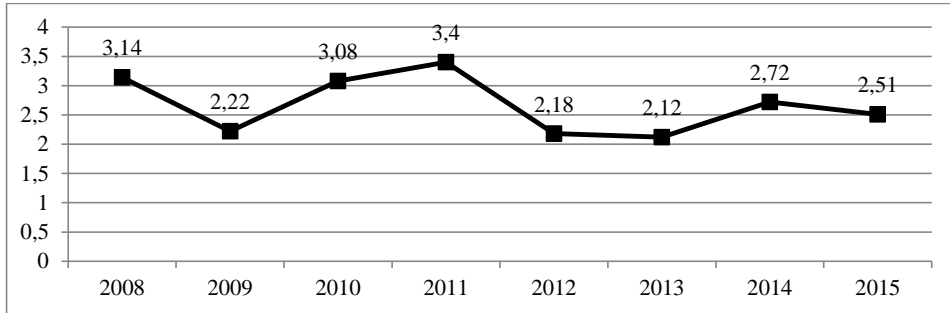


Figure 5.5. Investment attractiveness of Ukraine [12]

According to the World Bank, Ukraine has the largest informal sector in the world – about 40% of official GDP (Fig. 5.6). In addition, a two-sectoral economy model emerged in Ukraine, when one sector (less technologically and capital intensive) works in the shadow, and the second (more developed and capital intensive) – in the legal environment.

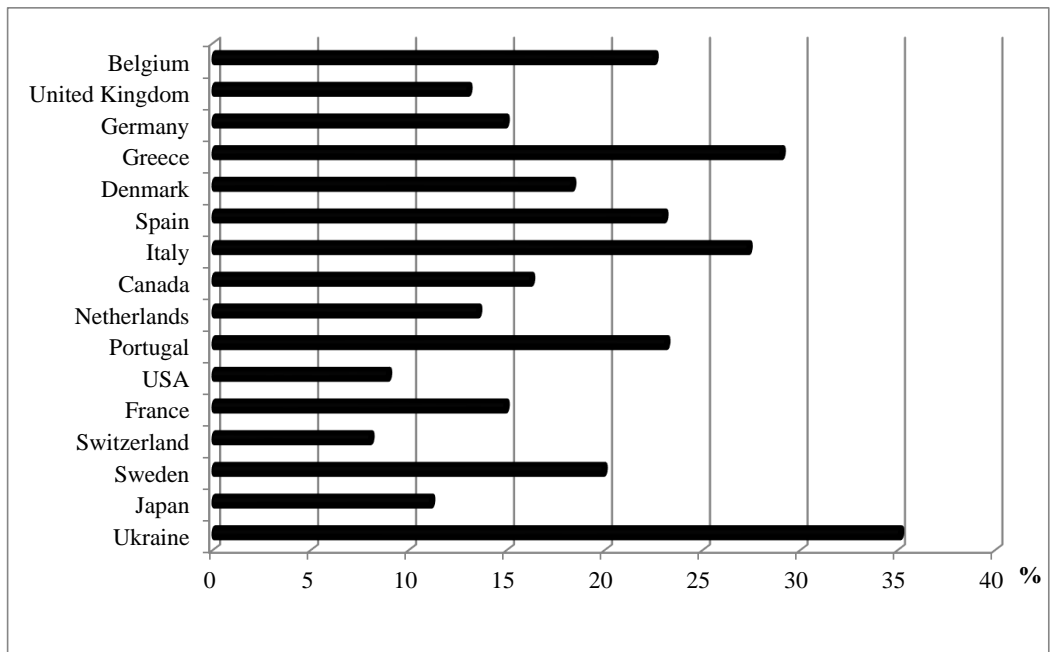


Figure 5.6. Level of shadow capital

Money laundering has both macro and micro levels. There are three main stages money laundering on macro level: placement, layering and integration (Fig. 5.7).

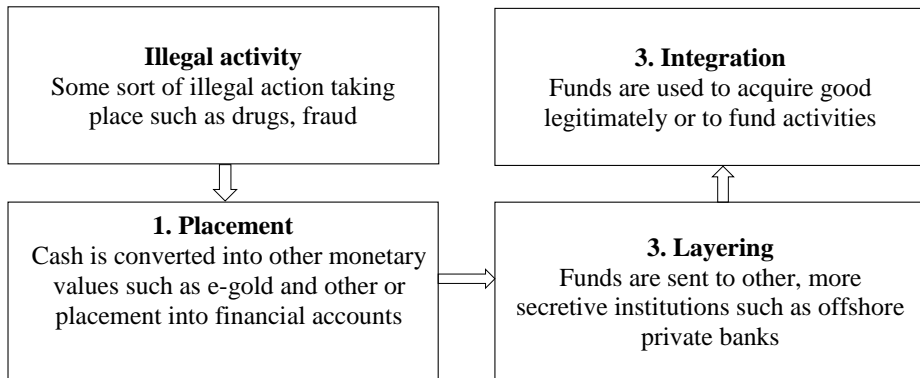


Figure 5.7. The stages of money laundering [10]

*Placement:* Financial resources are deposited into financial institutions or converted into negotiable instruments for example money orders or traveler’s checks. The main aim of placement is to remove the cash from the location of acquisition in order to its concealment from the authorities and transform into other asset forms.

*Layering:* includes the separation of proceeds from the illegal source through the use of complex transactions designed to obscure the audit trail and hide the proceeds. This stage can include the transfer of money from one bank account to another, from one bank to another, from one country to another, or any combination thereof. For example, money can be moved into and out of various offshore bank accounts through Electronic Funds Transfers.

Layering is the most international and complex step of the money laundering cycle because funds are typically moved from one foreign account to another. Considering the difficulty in obtaining account information to identify owner, using shell corporations and offshore banks is the most frequently way of lander money on this stage.

*Integration:* represents the conversion of illegal proceeds through financial or commercial operations. Integration creates the illusion of a legitimate source for criminally derived funds and involves techniques by legitimate businesses to increase profit and reduce tax liability. Integration includes producing false invoices for goods purportedly sold by a firm in one country to a firm in another country, using funds held in a foreign bank as security for a domestic loan, commingling money in a bank accounts of companies earnings legitimate income, and purchasing property to create the illusion of legal proceeds upon disposal.

In recent years, a tendency of reducing the level of shadow economy has been observed. According to official data of the Ministry of Economic Development and Trade of Ukraine, the level of shadow economy is 34% of the official GDP [12]. Despite the positive trend of reducing the shadow economy, there are a number of potential risks that may contribute to growing of the shadow economy. First of all, they are associated with a possible recession in the EU and significant financial commitments of Ukraine on foreign markets, leading to a sharp slowdown in economic growth of Ukraine.

A number of issues play factor to the occurrences of money laundering both directly and indirectly around the world. In general, factors of money laundering can be classified into 6 groups:

- 1) political;
- 2) social;
- 3) technological;
- 4) environmental;
- 5) legislative;
- 6) economic.

In more detail, their structure is shown in Fig. 5.8.

Money laundering and the financing of terrorism are global problems that not only threaten security, but also compromise the stability, transparency and efficiency of financial systems, thus undermining economic prosperity. It was considered as a threat to the integrity of financial and commodities markets, undermines fair inside and outside competition, distorts financial, material and nature resource allocation, destroys public trust and undermines the rule of law.

If growth rates of shadow revenues outpaced the official GDP growth rate, this could lead to an underestimation of the real need of the economy in money, an increase in investment risks, a decrease in investment activity and, as a result, a reduction in the supply of investment resources. Shadow activity limits the ability of entrepreneurs to attract investment resources, especially foreign ones. Expansion of the shadow sector stimulates the growth of speculative financial, trade and intermediary transactions to the detriment of the development of real production. The growth of the shadow sector is characterized by concealing the sources of investment. Thus, Ukrainian investors during the crisis insure investment risks. It should also be noted that the "shadow" accelerates the process of concentration of capital, which is extremely important for countries with market economies.

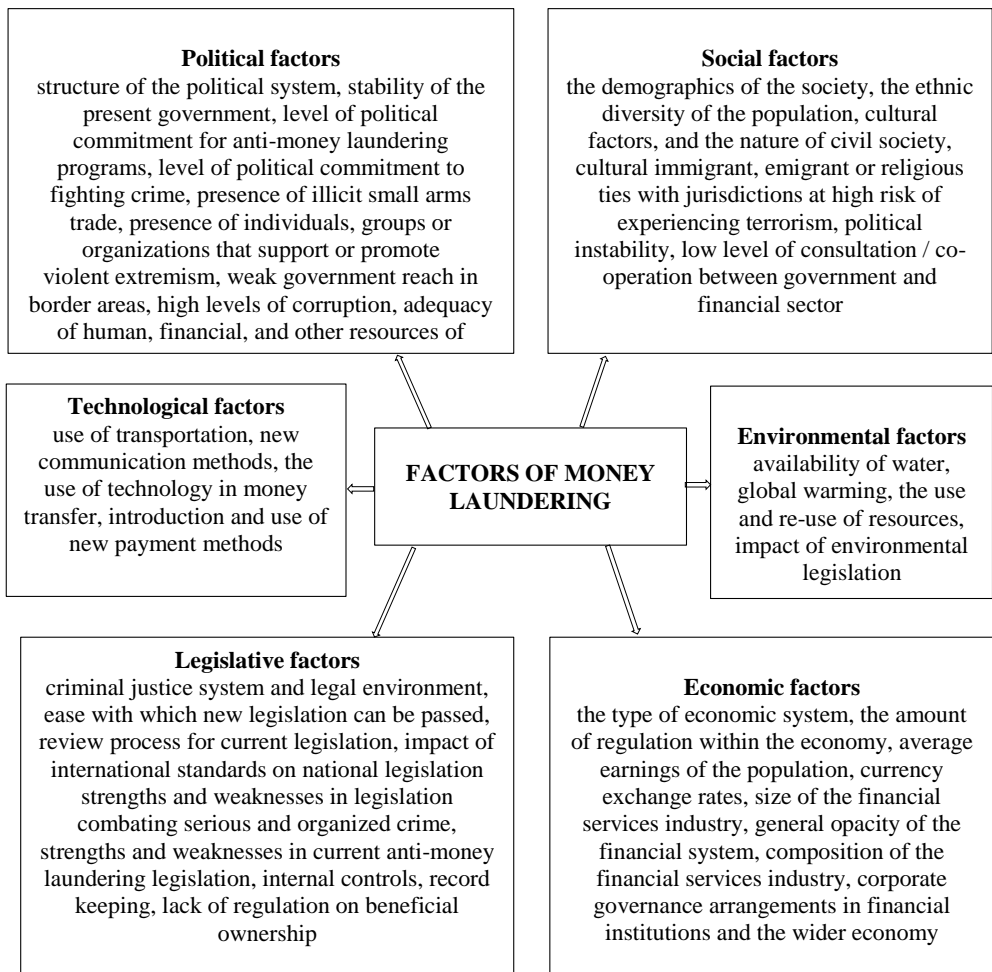


Figure 5.8. The factors of money laundering [1, p. 34]

In analyzing the impact of money laundering on developing economies [2] specified five directions of money laundering flows in such economies. First, domestic flow, in which illicit domestic funds are laundered within the country. Second, returned flow means of criminal activities occurred in the developing country, fund placed outside the country and later on integration occurred in the developing country. Third, inbound funds, for which the predicate crime occurred abroad, are either initially laundered abroad or within the developing country, and ultimately are integrated into the developing economy. Fourth, outbound funds, constitutes laundered fund originated in the developing country and integrated outside the economy or

capital flight. Fifth, flow-through funds originate and integrate in the developed country, by using the financial institution of developing country during the period of layering.

As a result, developing countries risk losing control of their domestic economic policies as money laundering activities and other economic and financial crimes are capable of dwarfing government budgets and destabilize domestic markets. Moreover, money laundering impacts financial behavior and macro-economic performance in different areas of activity.

The social, economic, and political consequences of money have been elaborated into such categories:

1) *Reduction in foreign direct investment.* Influence on the investment competitiveness is one of the most significant results of shadow capital withdrawal abroad impact on economic development. Money laundering has significant international and foreign investment consequences for a country. As a rule, financial institutions that carry out money laundering operations faced with the risk of losing trust from potential investors and customers. Thus, for example, a range of money laundering operations has led to the bankruptcy of some banks particularly in the UK and Italy. In developing countries where domestic and foreign investors are considered as partners in development who stimulate the growth of the economy, a breach in confidence can be catastrophic in the long term. Moreover, as in such countries no motive to generate profits, money launderers, as a rule, invest their money in economic and commercial ventures of another countries, and accordingly, cause double damage of the country where such illicit funds are situated.

Thus, according to analysis of 2,752 firms in 53 developing countries: 1,278 firms in 18 transition countries, 910 firms in 19 countries in Latin America and 564 firms in 16 countries in Sub-Saharan Africa the effect of corruption on firm investment growth varies significantly by region: corruption has a negative effect on firm investments for Transition countries but has no significant impact for Latin America and Sub-Saharan Africa. Furthermore, among the variables included in the regressions (firm size, firm ownership, trade orientation, industry, GDP growth, inflation and openness to trade) corruption is the most important determinant of investment growth for Transition countries.

2) *Deteriorating financial sector reputation.* With the increasingly of money laundering activities in the economies of the developing countries, lack of information transparency and high level of corruption, developing countries having been finding it difficult to attract foreign investments which leads to economic destabilization, financial instability and, ultimately, threats to the financial security of the state. On the one hand, this reduces legitimate international opportunities and sustainable economic growth and, on the other – drawing international

organized criminal groups with undesirable reputations and temporary goal. Given this, most developing countries characterized with high level of corruption, insecurity, economic and financial instability and social unrest, have persistently failed to attract adequate foreign investments to boost their economic and financial growth.

3) *Growth of Corruption and bribery.* Essentially, the money laundering induces to the illegal activities of the organized crime and enables criminals to expand their criminal operations (drug trafficking, arms dealings, terrorism, human trafficking, etc.) [8, p. 1011]. In recent times, organized crimes have become major threats to political stability and security of many developing countries. Over the years, criminal activities have become more and more international and expansive in operation and the financial aspects of the criminal activities have become more complex as a result of the swift technological advancement coupled with the globalization of the financial industry. As such, the global financial services, more than any other sector, has remain vulnerable to the attributes of and practices of money laundering. On the economic and financial front of the society, money laundering, in effect, impairs and erodes the financial structures which are very vital to economic growth and financial stability of any nation [4].

4) *Lower public sector revenues.* In essence, the phenomenon of money laundering, together with other economic and financial crimes, reduces government tax revenue. Maiendra Moodley [7] in her article states that money laundering and its predicate offences are factors that contribute to the tax gap, as these activities decrease the amount of tax collected. These businesses and individuals would then need to launder the income that they received, and/or hoard this income to avoid being detected by. As a result, government revenue was reduced due to tax evasion, therefore impeding service delivery.

5) *Threatens privatization.* Lately, in developing countries, the operations of privatization, with the aim of economic growth, attracts money launderers and criminals. The main reason is 'legitimacy' that a money launderer is able to acquire by purchasing into a previous government corporation and/or by being linked to the high volume of transactions. As a result, government corporations are popular instrument for laundering money [3. p. 41].

In modern conditions, the problem of money laundering is relevant and requires the unification of efforts of the world community for its solution both at the level of the country and in the whole world. A significant variety of illegal operations and instrument's of their implementation greatly complicates their identification and evaluation process. Thus, the analysis and elimination of the main factors of money laundering, the identification of potential participants of this process, will lead to a reduction of potential threats to the country's economic development and its financial security, and will increase the investment attractiveness and competitiveness of the country.

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## **5.6 TAXATION OF INNOVATION: GLOBAL TRENDS AND PERSPECTIVES FOR UKRAINE**

Countries’ prosperity depends on different factors. According to the most widespread point of view, resource endowment is a background of economic growth, but global economic trends of several last decades contest unambiguosness of this statement. Thus, natural resources as a trigger of economic growth become less effective than innovations. OECD defines innovation as “the implementation of a new or significantly improved product (good or service),



or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations” [9, p. 46]. Natural resources could bring sustainability of countries’ economic development only in the case of using innovative methods of its development. Otherwise, its development becomes too expensive and besides could bring damage to the environment. Obviously, implementation of innovations needs significant investments and can have rather long payback period, but it doubtfully will bring many financial and non-financial benefits in long-term perspective. It should be noted that even fragmentary implementation of innovations at micro level could foster country economic growth. Nevertheless, it is better when there is certain innovation policy and strategy guidelines at the government level. Government can use different economic instruments to boost innovation activity but fiscal instruments are the most appropriate ones, and furthermore this group of instruments is rather various (tax rates, tax base, tax incentives, tax holidays and others). Tax incentives can be realized in different forms such as: tax deferrals –opportunity to postpone tax payments; tax allowances – possibility to decrease tax base by adding extra expenditures deducted from taxable income; tax credits – possibility to decrease tax liability [8]. So state authorities can use one of them or complex, combine them in different ways. Consequently, research of the peculiarities of taxation of innovation in different countries (both from theoretical and practical perspectives), efficiency of tax instruments in boosting innovation activity and perspectives of implementation of foreign practices in Ukraine are very urgent questions.

Importance of innovations is confirmed by appearance of a special type of economic system – knowledge-based economy. The cornerstone of the knowledge-based economy is investment in intangible assets and human capital. Thus, outcome of knowledge-based economy is innovation-based growth [12, p. 3].

Moreover, according to the Global Competitiveness Index [17] there are three stages of economic development of the country: factor-driven, efficiency-driven, innovation-driven, and the last stage is the most advanced one that acknowledge importance of innovation in triggering sustainable economic development. Economic system of the country that is on the innovation-driven stage is characterized by sustainable development, high social standards and welfare on the base of implementation sophisticated production processes and innovation technologies.

There are many papers that concern different aspects of tax incentives influence on innovation activity. For example, Chen P. et al [1] in their research found out empirical short-run and long-run effects of capital taxation on innovation and economic growth. Scholars discovered that capital taxation influence economic growth and innovation in different ways in long-run and short-run perspectives. Thus, in short-run increase of capital taxation negatively affected growth

of technology and economic growth, but in long-run negative influence on growth of technology is neglected and ensure positive effect on economic growth.

Keuschnigg C. and Ribi E. [7] provided a research on the impact of profit taxation on innovations. Scholars found out that subsidy in R&D from the state foster innovation activities of enterprises. They also empirically proved negative influence of profit tax (even small increase of the tax rate) on innovation activities of the companies. Authors concluded that providing of tax incentives and subsidies for innovation enterprises would result in boosting of country welfare.

Czarnitzki, D. and Hanel, P. and Rosa, J. M. [2] also realized a research on the impact of R&D tax credits on innovation in Canada (sample is a cross-section of 4,644 manufacturing firms). Using a non-parametric matching approach in order to control for a possible selection bias, they determined that R&D tax credits have positive influence on companies' innovation activity. Thus, they mentioned that this tax instrument is rather effective in triggering of innovation activity at micro level.

Some scholars also research outputs and efficiency of tax incentives in innovation sector in terms of the company size. Thus, Pricewaterhouse Coopers research on R&D Incentives [13] allows finding out that using of such tax incentive as wage tax credit in the Netherlands produces benefit-cost ratio (ratio of R&D spending to the loss in tax revenue from the tax incentive) of about 6.4 for small firms but only 1.02 for large firms. Therefore, we can conclude that fiscal preferences are more effective for small companies.

Besides, Gentry W. and Hubbard G. [6, p. 104] researched how taxes influence the willingness of entrepreneurs to enter to innovation sector. They found out that innovative entrepreneurs despite non-innovative ones may be unaffected by tax convexity.

Thus, we can summarize that using of tax instruments do influence innovation activity, and government authorities should consider it while developing economic (including innovation and investment) policy.

Obviously that combination of tax incentives and its efficiency differ significantly across countries, but OECD develop an indicator, which is aimed to compare the relative importance of R&D tax support across national tax jurisdictions [8]. It reflects profit before tax that company need to earn to offset R&D expenditures. B-index is calculated using the following formula (1):

$$B - index = \frac{1 - A}{1 - \tau} \quad (1)$$

where  $\tau$  – corporate tax rate;  $A$  – combined net present value of allowances and credits applying to R&D outlays.

B-index is an indicator that characterizes influence of taxation on decision of private sector representatives to invest in R&D. Basically, in practice it is more often used one minus B-index that illustrates tax subsidy rate.

Fig. 5.9 illustrates tax subsidy rate for USD 1 of R&D, large firms and SMEs in 24 countries in 2002. Analysis of the histogram allows us to find out a significant differentiation of the tax subsidy rates both between countries and different types of businesses inside one country (large firms and SMEs).

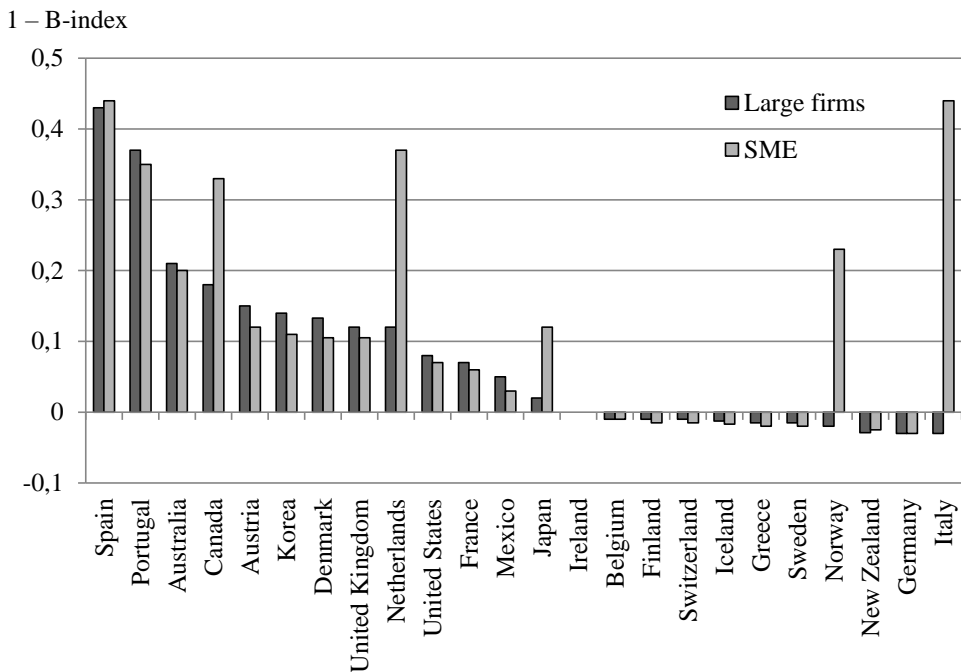


Figure 5.9. Tax subsidy rate for USD 1 of R&D, large firms and SMEs, 2002 [8]

Thus, in 2002 the highest level of tax subsidy rate for USD 1 of R&D for both types of businesses was in Spain (more than 40 cents per 1 USD of R&D expenditures were compensated through using of tax credit). Portugal had slightly less tax subsidy rate than Spain. Besides, considerably high level of tax subsidy rate for covering R&D expenditures were in Australia (near 20% of R&D investment), Austria, Korea, Denmark, United Kingdom (more than 10% for both types of firms). It is more preferable in some countries to use tax incentives only to stimulate R&D activity of SMEs, e.g. Canada and the Netherlands provides tax credit to cover about 30% of R&D expenditures for SMEs, while the scale of «1-B-index» in these countries is twice or

even three times less for large companies in comparison with small and medium ones. Besides, in Norway and Italy large firms finance R&D expenditures from their own profit while SMEs get tax subsidies >20% and >40% of R&D expenditures respectively. Nevertheless, legal entities in some countries were not subsidized with tax credit to cover their total R&D expenditures, but according to the Global Competitiveness Index 2002 [14] Belgium, Finland, Germany, Iceland, Switzerland, New Zealand, Sweden were nominated as core innovators (with more than 15 US utility patents registered per million population).

It is also should be noted that calculation of «1-B-index» for 19 countries in 2008 (Fig. 5.10) that most states actively introduce tax incentives to raise private sector investments to innovation activity (10-40% of R&D expenditures covered with tax subsidies).

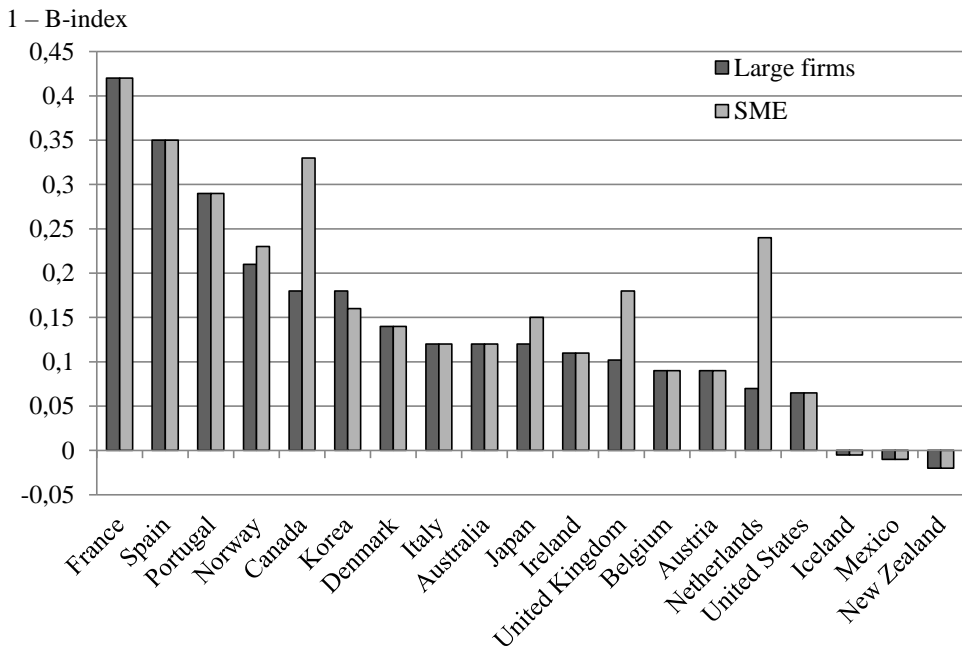


Figure 5.10. Tax subsidy rate for USD 1 of R&D, large firms and SMEs, 2008 [10]

Such countries as Norway, Canada, United Kingdom and Netherlands provide tax incentives for R&D activity in SMEs sector, while Korea is a unique example of stimulating R&D activity of large firms. At the same time, there were significant changes of approaches to boost innovation activity in some countries (in comparison with 2002). Thus, in 2008 France

becomes a leader in tax subsidy rate: compensation of R&D expenditures through tax incentives increased from less than 10% in 2002 to more than 40% in 2008, while Spain and Portugal lowered tax subsidy rate for USD 1 of R&D in almost 10%. It's should be mentioned that in 2008 all countries in the sample except Mexico were on innovation-driven stage of development according to the Global Competitiveness Report [15], but Iceland and New Zealand similar to the trend of 2002 have insufficient level of tax subsidy of R&D expenditures.

Results of the same OECD research in 2015 are presented at Fig. 5.11.

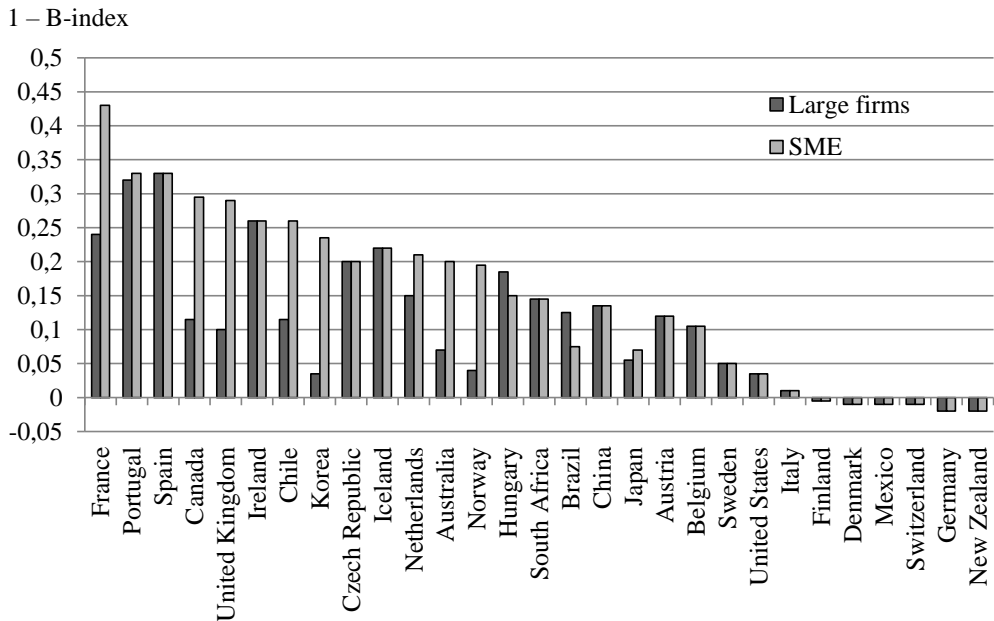


Figure 5.11. Tax subsidy rates for USD 1 of R&D, large firms and SMEs, 2015 [3]

Thus, Portugal and Spain had the highest level of tax subsidies on R&D activity in 2015 for both SMEs and large companies, while France state is on the leadership position in tax subsidizing of R&D expenditures for SMEs and continue to decrease financing of R&D expenditures with tax incentives in large companies. Most of countries that actively use tax incentives for boosting innovation activity are on the innovation-driven stage of development. Nevertheless, such countries as Chile and Hungary also have rather high level of tax subsidies for covering R&D expenditures (>10%), but they only move to an innovation-driven stage; while South Africa, Brazil and China are on efficiency-driven stage in 2017 [17]. Besides, using of tax

incentives for R&D support is more popular instrument than direct government funding as a percentage of GDP in such countries as Korea, France, Belgium, Ireland, Portugal, Canada, Japan, Netherlands, Australia, while Hungary, Austria, United Kingdom and Norway actively use both instruments – tax credit for R&D expenditures and direct government funding [11].

Thus, we can summarize that using of tax incentives (especially, tax credits for innovation expenditures) helps to spur innovation activity, which in turn ensure sustainable development of the country and high level of welfare. However, there are many various fiscal policy instruments of stimulating R&D activity, and some new ones appear almost every year. Thus, based on the above mentioned it is necessary to analyze some new approaches to foster innovation activity with tax reliefs that helps to develop a set of certain recommendations for Ukraine.

From 2012 there is possibility of deduction of the tax base of corporate income tax on the 100% of the sum invested in R&D (but not more than the tax base), besides companies may claim a refund of 40% of the amount invested in eligible equipment and intangible assets within the tax base in Slovenia.

Amendments to the Tax Code in Romania, enacted in 2013, included an increase in tax credit for R&D expenditures from 20% to 50%.

In Great Britain, there are two tax credit schemes for companies that carry out R&D expenditures. The tax relief rate for large companies is 130% and for SMEs is 225%. In addition, SMEs have an opportunity to convert taxable losses attributable to R&D relief into a payable cash credit at a rate of 11 %.

In France, until 2013, there was rather high rates of tax credit were for R&D expenditures (40% for the first year of use and 35% for the second year), which were replaced by reimbursable tax credit at 30% of all R&D expenditures up to EUR 100 million and 5% above.

The Netherlands tax system provides a number of tax incentives for companies involved in R&D activity. In particular, income derived from R & D activity is taxed under «innovation box» for innovative legal entities at 5% rate (the total rate in 2014 was 25%). The tax rate on wage costs for R&D activity is reduced: 35% for the standard wage up to EUR 250 000 and 14% of the excess. Self-employed who carry out R&D activity can reduce their taxable income on the sum that is less or equal EUR 12 310 (for starting entrepreneurs this amount is increased by EUR 6,157). In addition, 60% of current and capital R&D expenditures are offset by a tax credit. At the same time, there is an incentive system for the environmentally-friendly investments: compensation of 13.5%, 27% and 36% of the total amount depending on the type of investment [3].

For environmentally-friendly investments and a deduction of 13.5%, 27% and 36% of the investment amount is granted depending on the type of investment)

From January 1, 2016, Austria's tax legislation provided for an extension of the compensation for R&D expenditures from 10 to 12% when paying a corporate income tax. In Ireland, in 2016, the Knowledge Development Box was implemented – 6.25% of the corporate tax rate for profits from certain patents and copyrighted material derived from R&D carried out in Ireland (with a general tax rate of 12.5% [4]).

Since 2017, there is a new Law in Poland, which regulates core aspect of using tax incentives (concerning corporate income tax) for innovation activity stimulating: 1) an increase of tax deduction for R&D activity expenditure from tax base; 2) expanding of eligible costs for R&D activity for SMEs; 3) compensation of certain types of tax payments (under conditions laid down in the law); 4) abolished the taxation of income from the nominal value of shares in the commercialization of intellectual property rights by specialized institutions.

At the same time tax credit for R&D expenditures rose three times in 2017 in Island. However, maximum level of tax credit for internal R&D expenditures becomes ISK 300 million per company, and ISK 450 million for outsourced R&D services from unrelated firms, universities or research institutions [5].

Let's move to the genesis of Ukrainian policy on taxation of innovation. Emergency of tax incentives mechanism in the field of innovation is connected with the Law «On innovation activity» [18]. This law includes the next chapters concerned tax incentive to legal entities in innovation sphere:

- special mechanism of VAT payment: 50% of VAT on operations with delivering of good for innovation projects was not payed to the state budget but charge to a special account of the company and could be used for financing of innovation, R&D activities etc.;
- relief of corporate income tax payment: 50% of CIT liabilities could be accumulated by the company and used under the same scheme as for VAT;
- accelerated depreciation of fixed assets and annual 20% rate of depreciation of fixed assets of the third group;
- land tax payment at 50%;
- special procedure for custom duties of raw materials, equipment, components and other goods (except for excisable ones) necessary for the implementation of a priority innovative project (if they are not manufactured in Ukraine or produced, but do not meet the requirements of the project).

Consequently, on the early stages of the formation of legislation regulating innovation activity, significant tax incentives were set for innovation enterprises.

It should be noted that the effect of these tax incentives, starting from 2003, was suspended annually by the laws on the state budget for the relevant year, and in 2005 the relevant norms were removed from the Law of Ukraine «On Innovation Activity» at all.

The Law of Ukraine «On Corporate Income Tax» No.283 [19] included such tax incentives for innovative companies:

1) possibility of deducting from gross income the funds provided to the taxpayer from the State Innovation Fund on a reverse basis for the implementation of innovative projects in accordance with the procedure established by the Cabinet of Ministers of Ukraine (paragraph 4.2.14);

2) exempt from taxation the profits of enterprises included to the State Register of Enterprises, Institutions, and Organizations engaged in the development, implementation and use of energy saving measures and energy-efficient projects, but in the amount not more than 50% of the taxable profit (paragraphs 7.21.2). This statement was applicable for a period of five years from the date of earning of the first profit due to the increase of energy efficiency of production;

3) establishment of 20% accelerated depreciation rate for fixed assets of groups 3 and 4 for technological parks, their participants and joint ventures in compliance with the procedure established by the Law of Ukraine «On the special regime of innovation activity of technological parks».

Current tax incentives for innovative companies are presented in the Tax Code of Ukraine [20]. The Tax Code of Ukraine provides only some tax incentives in VAT and custom duties, namely: exemption from taxation of operations on import:

1) equipment that works on renewable energy sources, energy saving equipment and materials, means of measurement, control and management of expenditures of fuel and energy resources, equipment and materials for the production of alternative types of pile or for the production of energy from renewable energy sources;

2) materials, equipment, components used for the production of equipment that works on renewable energy sources; materials, raw materials, equipment and components that will be used in the production of alternative fuels or renewable energy production;

3) scientific, laboratory and research equipment, as well as components and materials provided by the project of a scientific park, registered in accordance with the Law of Ukraine «On Science Park» imported in Ukraine by the scientific park and partners of the scientific park within the framework of the implementation of such a project of a scientific park;

4) equipment and its components that are not manufactured in Ukraine and imported by the initiators of the establishment of industrial parks for the construction of such industrial parks



or by the participants of industrial parks for the purpose of carrying out economic activities within the industrial parks.

Analysis of modern trends and widespread practices of stimulating innovation activity with tax incentives in developed countries, and critical review of Ukrainian experience in this field prove the necessity of formation of efficient tax incentives system in Ukraine that would be aimed to boost private investments in R&D and support of the existed companies that are involved in innovation activity. At the same time, it should be noted that by 2016 Ukraine was stable among the states with the efficiency-driven stage of development according to the Global Competitiveness Index, while according to the results of 2016-2017, it was classified as a transition from factor-driven to efficiency-driven economies [16]. Loosing of positions in the ranking of Global Competitiveness Index indicates a recession in the economy and necessity to ensure its sustainable development. That is why support for innovation should be ensured not only by government grants but also by the existence of a clear mechanism of tax incentives.

Thus, tax incentives in Ukraine should be implemented for two basic taxes such as value added tax and corporate income tax, which ensure the most significant tax revenue to the state budget. Mechanism of applying tax incentives to stimulate innovation activity by reducing VAT payments can be implemented in two versions (both individually and in complex):

- 1) charging the amount of VAT liabilities from the realized innovative products or services produced by enterprises (part of the sum) to a special account, the funds of which can be used exclusively for the covering of R&D expenditures;

- 2) inclusion of R&D expenditures related to the main activity of the enterprise to the tax credit (both domestic and outsourced).

Reforming of the corporate income tax in order to stimulate innovation activity can be described as follows:

- 1) deducting full size of some part of R&D from the taxable profit (reduction of CIT tax base);

- 2) using of accelerated depreciation of fixed assets of the third and fourth groups used in innovation activity for the purposes of tax accounting;

- 3) reduction of the corporate income tax rate in proportion to the share of realized innovative products in the volume of basic products, with the establishment of quantitative guidelines for the minimum volume of sales at which the benefit can be applied.

Moreover, development of the efficiency tax incentives system in Ukraine should not only trigger the adoption of Tax Code to the guidelines of state innovation policy,

but also ensure methods of documenting and control income and expenditure for innovation activity and introducing a clear set of rules of the formation of gross revenues from innovation activity and identification of R&D expenditures that will be taken into account when applying for certain tax incentive.

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## **PART 6. GREEN ECONOMY AND SOCIAL RESPONSIBILITY AS AN INNOVATION DEVELOPEMT DRIVERS**

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### **6.1 TRANSITION TO SUSTAINABLE DEVELOPMENT OR IDEA OF ECOLOGICAL AND ECONOMIC SECURITY**

For more than half a century of its existence, the concept of sustainable development is very popular among the scientific community. Today, its ideas are present in most socio-economic, environmental and political development programs at the regional and state level. Sustainable development is declared as a new imperative for our and future generations, a new step of development which should leave humanity in its progress, which requires a rethinking of existing values, fundamental change in outlook, priorities, ethical and other rules and forms of rationality. During this time, both domestic and international scientists devoted hundreds of publications to the study of this issue [1, 2, 3, 4]. A number of documents (concepts, statements, etc.). [5, 6] represents the transition of a country on the principles of sustainable development.

In the period to 90th years in the former USSR, various aspects of sustainable development were the subject of research, considered schemes in the development and distribution of productive forces were reflected in the programs of scientific and technical progress and forecasts of socio-economic development in the long run, although they naturally, were not directly identified with the concept of "sustainable development" introduced later. Active dissemination of the idea of sustainable development in Ukraine, as in other countries, began after the UN Conference on Environment, held in Rio de Janeiro in June 1992. The documents of this conference, first of all, summons of the day of the XXI century, which is a strategy for further development of human civilization, firstly systematically and methodically completed description of the ideology of sustainable development. Since then, Ukraine observed a sharp increase in research and publications on this issue with most ideological in nature and largely dating back to the ideas of noosphere by V. Vernadsky.

However, despite more than half a century of its history, the overall development of the idea of sustainable development is now rather at the level of declaration of good intentions than meets the requirements of scientific theory. But documents on this issue taken at the state level are primarily political in nature and do not play a significant role in the activation process of

transition to the principles of sustainable development. A striking example of this is a UN conference in Johannesburg, where it was noted that the idea of sustainable development did not acquire global recognition and progress towards its implementation was negligible. L. Melnyk [3] notes, that sustainable development is one of the utopias of humanity, which, having no clear criteria limits as another "bright future", allowing infinitely to fantasize about the specific target orientation, ways and means to approach the ultimate goal. It is obvious that knowledge, that is proposed on sustainability today, leaves more questions than specific teaching position and information base.

For a long time the existence of the term «sustainable development» of humanity not only failed to formulate the basic methodological approaches to achieve it, but even agreed on the possibility and legitimacy of the existence of such phrases as sustainable development in general. In this case it is just about adapting this concept to the modern scientific outlook.

However, there is more serious methodological contradiction, as the M. Golubets' [7] sustainable development is impossible in the region or in any other field separately. The principles of sustainable development can be realized only if systemic and functional relationships between all the blocks (economic, social, demographic, cultural, technological, technical, transportation, environmental, etc.) of each whole heosotsiosystem. It was not a correct approach to talk about sustainable development in the context. Since the ecological integrity of the Earth and growing economic relationship of the international community make it impossible to achieve sustainable development in individual countries or regions of the planet, because the international aspects of the ideas in the field of sustainable development are highlighted. Therefore, implementation of strategy transition to sustainable development will be impossible if humanity can not agree in the person of its leaders more than two hundred countries, all nations and people in the world on how best to conduct their affairs so that future generations could turn up and meet their vital needs at the level of current [4, p. 23]. Given the current geopolitical situation it is practically impossible due to historical, cultural, religious and other differences of the earth.

In addition, it should be noted that the public understands and embodies the principles of sustainable development only on a very high level of development of productive forces and production relations. An example of this transition is the most economically developed countries in high-resource-economic activity that creates sufficient conditions for solving complex environmental and social objectives. Japan began actively implementing environmental policy at achieving GDP per capita at \$ 1,600 a year, and Taiwan – only at the level of \$ 5500. According group of economically developed countries – the leaders of the modern world progress brought the idea of sustainable development on the basis of their own interests, no alternative option of

socio-economic development [8]. As an example, only half of the world, including the U.S. have not ratified Kyoto Protocol it. Go to the model of sustainable development associated primarily with the degree of economic strength of the state, the reliability of its playing structure, capable of forming high and stable domestic consumption and accumulation funds for economic and natural reproduction [8, p.25]. Feasibility model of sustainable development is to enhance investment and innovation. Therefore, developing countries are in serious economic, political and social conditions, very difficult, if not practically possible to move from raw-oriented economy to innovation, which is one level more complex and requires intensive knowledge explored. Moreover, implementation of sustainable development does not guarantee the rapid growth of human welfare, but requires hard work and consolidate the efforts of politicians, managers, scientists and all progressive people of the state.

Another condition of sustainable development is a political will by top officials on how to go through this difficult journey. In light of the frequent changes of policy of developing countries, and as a consequence of economic and political instability, and in some states and authoritarian regimes governing the implementation of this provision it is also very problematic.

Besides, the concept of sustainable development requires a change of belief and redefining values. Therefore, this strategy can not be determined based on the traditional common notions, stereotypes of thinking, it requires elaboration of new scientific approaches that meet not only current realities but also the proposed development prospects. But when it comes to the future, which is always rather vague, one can not definitely say something about the consequences.

Based on the above considerations the transition to sustainable development is possible only under the condition of the formation of the noosphere (the sphere of mind) where the measure of national and individual wealth will be the spiritual values and knowledge of a person who lives in harmony with the environment. This prospect distant future. Therefore, we currently offer to sell the idea of ecological and economic security. Ecological and economic security – a state of stability, dynamic balance and protection of territorial social system despite the dangerous influence of biotic, abiotic or anthropogenic factors, stopping the supply of raw materials or attempt to economic dictates.

The need for security is one of the most basic needs of humanity. Genesis of security as a social phenomenon, has its origins in the biological nature of man. The starting point of this concept can serve as a fundamental biological instinct for survival. Despite the fact that security is not something substantive (material), it is peculiar characteristic and necessary condition of life and vitality of the real world objects. Therefore, it is quite specific category, which aims to protect and promote the vital interests of human society and the state.

When considering simple systems (such as simple enterprise economic system, forest ecosystem), the authors quite properly isolated their security (economic, environmental). Due to the fact that now the scientific and technical human activities (work) caused transformation of simple systems to more complex ones, it is now difficult to say just about the ecosystem. Today the vast majority of ecosystems is created by human or controlled by it. This refers to forests, fields and meadows. Virtually there are no longer sites of person not involved in economic activity. Now we are dealing with socio-ecological-economic systems (sees). Sees consists of three subsystems: ecological, economic and social, which are closely interrelated and influence each other. The state of each subsystem acts as a condition and as a consequence of development and operation of the other two subsystems. All elements in the system are equivalent but the coordinating role belongs to the man. Connectedness of the three subsystems of the system is reflected in changes that characterize the final states of the subsystems within a long period of development. We can not determine by environmental or economic security in accordance with state parameters that characterize this system. Definition of indicators system through economic or environmental safety no longer supports the existence of all subsystems and, consequently, the whole system, therefore, is appropriate to introduce a large integrated indicator. This indicator is ecological and economic security. The concept of ecological and economic security that arose in connection with the transformation of environmental, economic and social system into one sees, describes the state of the system parameters and is a condition of its existence and development.

Based on the definitions of ecological and economic security for its study, there are two methodological approaches. The first one is the study of ecological and economic security by studying the level of load sees. The second approach is the study of ecological and economic security, the study of performance sees. The second methodological approach is believed to be more appropriate.

Ecological and economic security provides maximum system performance, violating the minimum balance (quantitative measures of communication between subsystems) at various external influences, increased resistance to these impacts and preserve the ability to regeneration. That is to achieve an equilibrium of interaction between society, production and the surrounding natural environment, the harmonization of relationships based on their compliance with the laws of the biosphere. Ecological and economic security to ensure such internal interactions of system elements, where high rates of expanded reproduction of production, economic growth and improving people's well-being are accompanied by preserving, continuous improvement and development as separate spheres, and the whole environment. In real life

problem of ecological and economic security has to take into account organically progressive socio-economic development of society with its activities to maintain and improve the surrounding environment. That is not the rejection of economic growth, and its planned implementation is not in contradiction, and in complete harmony with the environmental laws of the natural environment, and social patterns of social development. Ecological and economic security is a "reasonable" balance between the maintenance of the environment and the pace of economic development, in which steady social progress is ensured. This is possible only under the conditions: when accumulation (reduction) potential of environment occurs, compared with rates of economic growth potential, and speed of human actions does not exceed the rate of adaptation systems. The use of forest resources must be below their current rates, and anthropogenic impact on forest sees are to be in the borders of its capacity. Preservation of these principles will ensure continuity and almost boundless economic growth in modern conditions of scientific and technological progress.

Ecological and economic security sees is achieved when the guarantee is provided, sustained and long-term development, and simultaneously economic, environmental and socio-hygienic criteria are achieved:

- under the economic criteria we will understand the production of certain goods and services in accordance with the requirements specified volume;

- under the environmental criteria we will understand the high stability over a wide range of external conditions, where high performance meets high biomass;

- under sanitary criteria we will understand the characteristics of human habitation, which guarantee a long life expectancy, creating hygienic conditions of work and rest.

Criteria for ecological and economic security – a requirement to value performance sees when they are within the specified limits. The main criteria for ecological and economic security is the ability to provide reliable existence, reproduction and development sees, quickly restore critical social reproduction in a critical reduction in the supply of resources or internal crises character.

State environmental and economic security is determined by analyzing the values of indicators of ecological and economic security. Indicators of ecological and economic security – a system of indicators by which we characterize the state sees, that is quantitative information that shows the state sees in the change of time. Indicators are a tool for measuring the state sees, on the basis of its quantitative and qualitative characteristics. Indicators make it possible to determine the state sees environmental and economic security in practice by comparing them with the appropriate parameters.

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## **6.2 STATE REGULATION OF THE SOCIAL AND ECONOMIC DEVELOPMENT OF THE NATIONAL ECONOMY OF UKRAINE IN CONDITIONS OF THE ECOLOGICAL RISK ESCALATION**

The concept of economic security is an integral part of any country for a present day. The notion of the “economic security” is derived from the concept of the “national security” [6] by many researchers, and it can be defined as a protection system of interests of the citizens and country, which ensures a stable state of the national economy, timely prevention and neutralization of real and potential threats to the national interests of the country. Put it simply, the security is a protection against the threats in certain areas of activity and management. These two concepts are always jointly considered.

The term “threat” reflects the possibility of the occurrence of certain conditions of technical, natural, economic or social nature, due to which the adverse events and processes may occur [9, p. 49]. In this case, there is a need for economic regulation to prevent or reduce the probability of such events.

State regulation of the economy is a system of measures for the implementation of the supporting, compensatory and regulatory activity of a country, aimed at creation of the adequate conditions for effective market functioning and solution of complex socio-economic problems of the development of national economy and society [15, p. 36].

The objects for the regulation of the national economy can be the conditions, processes, relations, elements and sectors of the national economy, the functioning of which is not provided satisfactorily or is not provided at all.

The acceleration of a growth and the increase of a scale of goods production and consumption, an active usage of the resources were considered, certainly, as positive trends in the



development of the civilization [14, p. 7]. But at the same time, the number of potentially dangerous objects increases, mainly in congested areas, that increases the risks of the emergencies (Table 6.1), which threaten the life and health of people, cause significant material damage, pollute the environment [11]. Therefore, there is a need to consider the concept of the ecological threats, as well as the escalation of the development of ecological risk.

Table 6.1

Statistics on the Emergencies in Ukraine in the period from 2010 to 2016 [2]

<b>Emergencies data</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Total amount of the emergencies, including:	254	221	212	143	143	148	149
Man-made cause	135	134	120	75	74	63	56
Natural cause	108	77	74	56	59	77	89
Social cause	11	10	18	12	10	8	4
Material damage by emergencies, ths. UAH	984 704	102 750	237 551	352 255	198 853	532 723	265 306

Distribution of each type of the emergencies in their total number in the percentage ratio can be observed in Fig. 6.1.

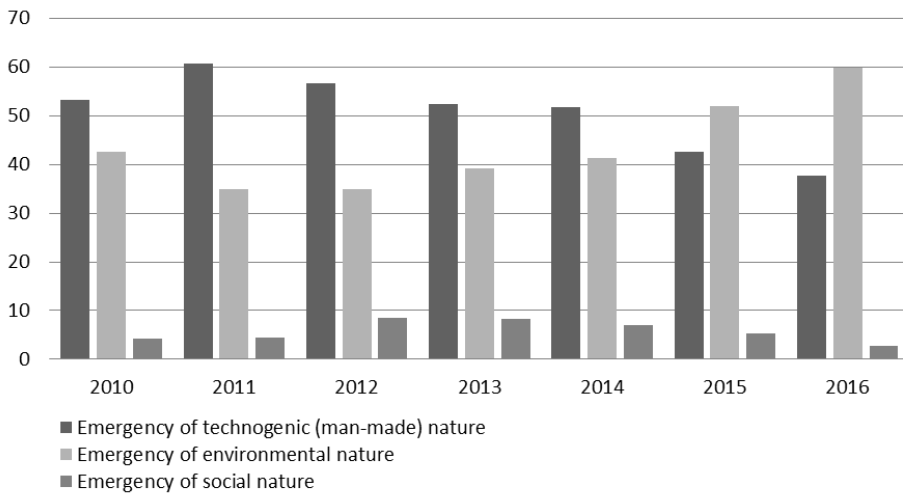


Figure 6.1. The percentage ratio of a certain type of the emergencies in their total number

As it can be observed, the fluctuations in the man-made emergencies lead to the increase of the natural emergencies ratio, and therefore to the ecological threats.

The ecological threat is a possibility of causing total or partial destruction of the environment in a result of uncontrolled economic development, technology lag, natural and anthropogenic disasters [13].

The number of ecological threats is increasing along with a growth of today's technological crisis. As for the technogenic safety of Ukraine, there are problems of safe operation of power units of nuclear power plants, chemical hazardous facilities, dams and hydroelectric power stations, explosive and fire hazardous facilities, transport hubs (including airports and railway stations), main pipelines. The accidents in a transport and road traffic accidents make a major contribution into the risk of technogenic emergencies growth [11]. Therefore, a systematic approach to a study of the emergencies, the assessment of the levels of technogenic and natural hazards in certain areas, reduction of the risks of the accidents and disasters is an urgent task, the solution of which will contribute to the increase of the national security level of the country.

Modern society gets a much better sense of the fact that further development is impossible without establishment of severe control over the potentially dangerous industries. The role of state regulation mechanisms is to act as a level risk guarantor, which is acceptable for the society, taking into account the entire complex of socio-political, economic, scientific and technological, ecological and other requirements.

The ecological risk is a probability of unfavorable consequences for the ecological resources due to economic or other human activities, thus, an exceedance of ecological and economic potential [9, p. 51].

The determination of risk assessment should be based on the results of monitoring of the technical condition of the potentially hazardous facilities, statistical data on failures, incidents, accidents and emergencies of man-made nature, monitoring of the data on hazardous geological, hydrometeorological processes, the state of natural complexes, etc., statistics on natural hazards phenomena, as well as on the results of simulation and forecasting of the relevant dangerous events, situations [11].

Based on the definition of ecological risk, it is possible to identify several successive stages of risk development. Consider them visually in Fig. 6.2 [10, p. 210].

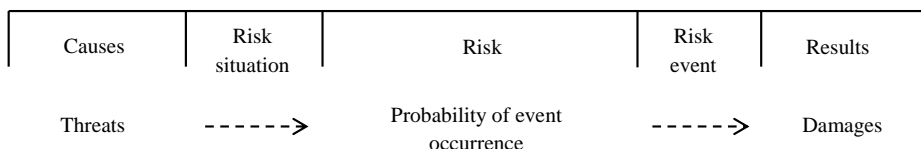


Figure 6.2. Stages of the risk development

The following steps can be used for a general risk analysis scheme that includes:

- identification of the risk factors. It is the development of a unified method for collecting and reporting the information on the economic activity of an entity, identification of the possible threats and situations leading to them, frequency assessment of such situations, collection and processing of data for past damages;

- direct risk assessment. It is an integral risk assessment, obtaining of average indicators according to a type of the risk and revealing the statistical regularities at the certain enterprises;

- risk management. It is an assessment of risk management skills of an entity and the availability of the resources to eliminate the effects of adverse situations.

As the need to ensure the environmental safety is highly recognized in Ukraine, the processes of the ensuring of environmental safety concern both state ecology-responsible bodies and non-governmental organizations (associations). The state ecological services carry out the constant examination and monitoring of ecological state of air, water resources and soil. They conduct the ecological control of the activities of enterprises (organizations), carry out an environmental examination of the economic or other activities that can have a negative impact on the environment, etc. [13].

In terms of the state control and regulation of national economic security, there is a large system of normative and legally stipulated acts in Ukraine. The main ones are shown in a Table 6.2.

However, despite the significant system of normative and legislative acts in Ukraine, organizational and administrative, economic, scientific and methodical and engineering methods of state risk management are still poorly developed, that nowadays makes impossible to ensure the level of security for the citizens, adopted in the economically developed countries.

Effective implementation of the state policy in the protection of the citizens and territories from man-caused and natural emergencies, prevention of them, reduce of the number of possible victims and property damage requires the definition of reasonable proportions in allocation of material and financial resources to prevent such emergencies and reduce the risks of their occurrence [11].

Table 6.2

## Ecological risks on the different stages of risk development held at legal acts

Stage	Legislative document	Determination of ecological risk
Reasons of occurrence		
I.	The Law of Ukraine “On the Fundamentals of National Security of Ukraine” from 19.06.2003 No.964-IV [6]	Identification of ecological threats to ensure the national security of the country (Art. 6, 7)
	The Law of Ukraine “Licensure of Types of Commercial Activity” from 2.03.2015 No. 222-VIII [3]	Identification of the activities that don't pose a threat to the environment (Art. 3, 7, 9)
	The Law of Ukraine “On Extremely Dangerous Objects” from 18.01.2001 No.2245-III [4]	Identification of the threats caused by the activities of business entities (Art. 9)
Risk situation		
II.	The Law of Ukraine “On Legal Grounds of Civil Protection” from 24.06.2004 No.1859-IV [8]	Identification of negative situations, precautionary measures and timely response (p. I)
Risk		
III.	The Law of Ukraine “On the Main Principles of State Supervision (Oversight) in the Area of Commercial Activity” from 05.05.2007 No.877-V [5]	Risk Assessment of the business entities (Art. 5)
	The Law of Ukraine “On Environmental Protection” from 25.06.1991 No.1264-XII [7]	Assessment of the environmental safety measures, the definition of environmental norms and standards (p. V, VI, VII, VIII, XI)
Risk event		
IV.	Ministry of Emergencies of Ukraine Degree “On Asseveration of Classification Features of Emergencies” from 12.12.2012 No.1400 [12]	Identification of the high risk situations
Outcomes		
V.	The Law of Ukraine “On Environmental Protection” from 25.06.1991 No.1264-XII [7]	Responsibility for damages and economic assessment of negative consequences (p. X, XV)

Based on the analysis of the growth rates of production volume of the enterprises and material damage from the emergencies, it is possible to trace distinct correlation between them (Fig. 6.3). At the same time, the statistics on the expenses for environmental protection measures demonstrates that the state strives to cover completely the material damage, caused by the emergencies (Table 6.3).



Figure 6.3. Dependence of material damage, caused by the emergencies on the production volume of the enterprise as a percentage [1; 2]

Table 6.3

Statistics on the correlation of state expenditures on environmental protection and material damage from the emergencies in the period from 2012 to 2016, thousands of UAH [1]

	2012	2013	2014	2015	2016
Material damage from the emergencies	237 551,0	352 255,0	198 853,0	532 723,0	265 306,0
Current expenditures on environmental protection	13 924 654,3	14 339 060,4	13 965 726,0	16 915 535,2	19 098 224,8

Thus, the important goals of state regulation of the national economy of Ukraine should include the development of the principles of general strategy of sustainable economic and social development of the state, taking into account the environmental risks. At the same time the new types of technological processes, social organization and management, the ability to solve environmental problems and reduce any environmental threads that pose a significant threat to the national, and, at the same time, to the economic security of Ukraine should be developed.

At the same time, taking into account the specific nature of the category of environmental risk, it is necessary to highlight a number of problems that can be the subject of further scientific researches:

- reliability of the analyzed information, access and openness to the analysis of risk events that have already occurred;

- diversity and multi-system of the influential factors on the risk probability;

- ecological risk assessment as a specific categories in time;

- problems of financial risk assessment.

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### 6.3 PROBLEMS AND PROSPECTS OF TRANSITION TO GREEN ECONOMY IN RUSSIA

The theme of the transition to a green economy was on the political agenda in the late 2000s. Programs and strategies for the transition of the OECD countries to a "green" economy have been developed ("In June 2009, the ministers of 34 countries signed the Green Growth Declaration, saying that they would" strengthen their efforts to introduce green growth strategies both in terms of their measures to overcome the crisis and beyond, recognizing that " green "and" growth "can be inextricably linked." They instructed the OECD to develop a Green Growth Strategy that integrated economic, environmental, social, technological aspects of development into a single integrated framework, as well as aspects of international development assistance. "The green growth declaration adopted at the OECD Ministerial Council meeting on June 25, 2009 [4, p. 27].), and international instruments have emerged that have contributed to changing the economic, political and environmental landscape [7], leading to the development of recommendations for the transition to a green economy in developing countries [2, 12, 13].

Having signed a number of international documents, Russia was also in a situation where the next logical step should be the adoption of the ideology of a "green" economy. This decision was not completely unambiguously perceived in political and economic circles and caused various disputes that called into question of the possibility for Russia to copy Western development schemes. In this regard, a number of ministries and departments have been concerned about problems and prospects, and most importantly the concept of the country's transition to a "green" economy [9]. So, in 2013-2016, the Ministry of Natural Resources, Ministry of Economic Development and Ministry of Industry initiated a series of studies on "green" issues. Their goal was to prepare proposals for the initiation of the concept of the transition of the Russian Federation to a "green" economy.

– A team of the Department for Nature Management and Environmental Problems of the Council for the Study of the Productive Forces of the Ministry of Economic Development and of the Russian Academy of Sciences (now the Ministry of Economic Development and Trade of the RF Ministry of Economic Development) was involved in these studies.

The work included several directions:

– first direction – Analysis of the problems of sustainable development and justification of priority directions of the environmental policy of the Russian Federation in the long term.

– the second direction was the development of scientifically grounded recommendations and proposals for initiating the development of the concept of transition of the Russian Federation to a "green" economy based on:

– the third direction is to study the processes of measuring the "green economy" and "green growth" from the point of view of developing proposals for the GG / GE forecast indicators.

– the fourth direction is scientifically grounded methodological recommendations for the inclusion of the environmental component in investment projects for the development of Russian regions

– the fifth direction is the analysis of the dynamics of greenhouse gas emissions, preparation of the draft scenario of greenhouse gas emissions for the period up to 2020.

All these topics to some extent are fundamental for making a decision on the transition to a "green" economy.

– analysis of international documents and recommendations of conferences, summits on environmental protection and sustainable development in the theory and practice of forming state policies in the field of "green economy" [9].

– the main components of the green economy concept [7].

– analysis of measures and methodological approaches adopted by international organizations and foreign countries in the field of "green" economies.

– mechanisms for making managerial decisions at the state level on the transition to a green economy policy (international experience).

– preconditions for the development of the "green" economy in Russia: the legislative base, the experience of implementing the directions of the "green" economy [8].

– evidence-based recommendations and proposals for initiating the development of the concept of transition of the Russian Federation to a "green" economy.

– scientifically grounded methodological recommendations for the inclusion of the environmental component in investment projects for the development of Russian regions

– analysis of the dynamics of greenhouse gas emissions, preparation of a draft scenario for greenhouse gas emissions for the period up to 2020.

The analysis of international documents and recommendations of conferences, summits on environmental protection and sustainable development in the theory and practice of forming state policies in the field of green economy became the basis for the first direction.



The work of the international community has evolved in several directions. In particular, it singled out 15 global environmental problems that threaten humanity and impede sustainable development:

1. Pollution: The air, water and soil pollution that we have achieved require millions of years to recover. The industry and the exhaust gases of automobile engines make the main contribution to pollution. Heavy metals, nitrates and plastics toxins are responsible for pollution of the environment. Water pollution is caused by oil spills, acid rain, urban sewage; air pollution is caused by various gases and toxins released by industrial enterprises and plants and by burning fossil fuels; The pollution of the soil is caused by industrial wastes, which deprive the soil of the necessary nutrients.

2. Global warming: Climate change is the result of human activities leading to greenhouse gas emissions. Sustained growth in energy consumption is one of the causes of climate change. If humanity does not change its ways, experts predict that temperatures can rise by 1.4 to 5.8 ° C between 1990 and 2100.

Global warming leads to an increase in the temperature of the oceans and the earth's surface, causing melting of polar ice, rising sea levels, and unnatural precipitation, such as floods, snowfalls or desertification. (60% of the world's population lives in a 100 km zone of the sea coast).

3. Overpopulation: The planet's population reaches an unacceptable level when the land faces a shortage of resources, such as water, fuel, food and territory, to provide all its inhabitants. Demographic explosion in less developed and developing countries, exhausts already scarce resources. Intensification of agriculture, which must provide the population with food, damages the environment through the use of chemical fertilizers, pesticides and insecticides. Overpopulation is one of the most important environmental problems that can lead to geopolitical conflicts.

4. Depletion of natural resources: Depletion of natural resources is another global environmental problem. The result of the consumption of fossil fuels leads to the emission of greenhouse gases, which is responsible for global warming and climate change. Throughout the world, people are making efforts to switch to renewable energy sources, such as solar, wind and earth energy (geothermal energy). The cost of infrastructure and maintenance of these sources has fallen sharply in recent years. (According to the World Bank, in parallel with the doubling of global GDP in 1981-2005, 60% of the world's flora and fauna degraded.) The OECD forecasts showed that by 2050 – if no radical measures are taken – the planet Earth will lose two-thirds of the plant and animal life) [7].

5. Waste generation: Resource consumption. Developed countries are notorious for producing excessive amounts of waste or debris, which are then buried in oceans, in storage facilities on land or in the territories of less developed countries.

At the beginning of the last century, Academician V.I. Vernadsky calculated that out of the total volume of energy carriers and raw materials, up to 6% of the finished product reaches the consumer, the rest goes to waste at different stages of the technological chain. On average, one kilogram of the finished product accounts for 25 kilograms of waste. And even the ready-made consumer products after some very short time become household waste ... About 20 tons of various raw materials are consumed for clothes, clothes and housing for a year, but, as already noted, only 5-10% passes into the final product, and 90-95% immediately goes to waste.

Utilization of nuclear waste entails enormous health risks. Plastic, fast food, packaging and electronic waste threaten the well-being of people. Disposal of waste is one of the environmental problems that require urgent action (More than 5 trillion plastic items weighing more than 250,000 tons were dropped into the sea).

6. Climate change: Climate change is another environmental problem that has surfaced in the last decade. The reason for the change was global warming, which is due to an increase in atmospheric temperature, due to burning of fossil fuels and emissions of harmful gases. Climate change carries a whole fan of harmful effects, which is not limited to melting polar ice, changing seasons, the emergence of new diseases, frequent flooding and a change in the general weather scenario.

7. Reduction of biodiversity: Human activities lead to the disappearance of wildlife species and habitats. Eco-systems, which have been developed and developed over millions of years, are in danger. The balance of natural processes, such as pollination, is crucial for the survival of the entire ecosystem. Another example is the destruction of coral reefs in various oceans that support a rich marine life. (The marine population of vertebrates declined by 49% from 1972 to 2012, and the population of species of fish used by humans was halved).

8. Destruction of forests: Our forests are natural carbon dioxide sinks and oxygen producers, and also help in regulating temperature and precipitation. Currently, forests occupy 30% of the land, but every year the surface of the countries occupied by trees disappear. This is due to the growing demand. Trees give the population food, shelter and fabrics. Deforestation also means cleaning the area, which allows the use of land for residential, industrial or commercial facilities.

9. Ozone layer destruction: the ozone layer is an invisible protective layer around the planet, protecting us from the harmful rays of the sun. The critical depletion of the ozone layer is due to atmospheric pollution caused by chlorine and bromide (CFCs). After these toxic gases reach the upper layers of the atmosphere, they contribute to an increase in the hole in the ozone layer, the largest of which is above the Antarctic. CFCs are banned in many industries and consumer goods. The ozone layer is valuable because it prevents harmful UV radiation reaching the Earth. This is one of the most acute environmental problems.

10. Acid rain: Acid rain occurs due to the presence of some contaminants in the atmosphere. Acid rain may be caused by burning fossil fuels or volcanic eruptions or rotting vegetation that emit sulfur dioxide and nitrogen oxides into the atmosphere. Acid rain is a known environmental problem that can have a serious impact on human health, wildlife and the state of water bodies.

11. Water Pollution: Water, on which life on earth depends, is becoming scarce. Industrial development fills our rivers, seas and oceans with toxic pollutants, which are a serious threat to human health. The population is struggling for clean drinking water and this turns the problem of water scarcity into economic and political issues.

12. Oxidation of the ocean: This is the direct impact of excessive CO<sub>2</sub> production. The acidity of the ocean has increased over the past 250 years and by 2100, it can increase to 150%. The main effect is on mollusks and plankton, which play in the ocean the same role as the core in human life.

13. Growth of cities: Today the border has crossed and the urban population of the planet now exceeds the number of rural residents. The result is land degradation, increased traffic, environmental problems and health problems. The constantly growing demand for land displaces the natural environment consisting of flora and fauna.

14. Public health problems: Modern environmental problems pose a threat to the health of people and animals. The biggest threat is dirty water. Pollutants cause respiratory diseases, such as asthma and cardiovascular problems. Increasing the temperature of the air environment contributes to the spread of infectious diseases. The accumulation of toxic substances from sea, oceanic and river water by fish and marine animals leads to disturbances in human DNA (3 billion people are the main protein due to fish, 10-12% of the world's population is associated with fisheries and aquaculture).

15. Genetic Engineering: Genetic modification of foods using biotechnology is called genetic engineering. Genetic modification of food leads to an increase in toxins and diseases.

Genetically modified crops can cause serious environmental problems, such as altering the DNA of wild animals.

Most of the international norms that formed the gold fund of legislation on the "green" economy are aimed at resolving these issues. They can be reduced to several steps:

At one time, both in Russia and abroad, the concepts of "green economy" and green growth "have caused a lot of controversy. It was believed that sustainable development did not imply growth, but was focused on sustainability [8]. However, in the rapidly changing world, the content of these two concepts has undergone changes, and, starting in 2015, in the scientific literature, the acronyms GE and GG increasingly began to appear through the slash. And they were used equivalently. Therefore, the proposals on the Concept of the transition to a green economy no longer caused such heated arguments as before.

At the same time, the issue of GG / GE measurement was very important, as it fell just at the time when the economic community became burdened by GDP measurements, as not reflecting the essence of economic development in countries. It is known that this discussion falls on 2009-2015.

The measurement system for the measurement was composed by GG / GE around the same time. It relied on already existing dimensions in a wide variety of spheres, carried out by international institutions (Table 6.4). And the 2012 summit was the impetus for the development of these dimensions. To this end, a new international institute was created. By 2014, under his leadership, a system of indicators and assessments was proposed. The first three states on which the system was tested in 2015 were Ghana, Mauritius and Uruguay.

Table 6.4

Examples of natural assets [4]

<b>Subject</b>	<b>Indicators</b>
Water resources	Share of fish stocks in safe biological limits
Forest resources	Directions and volumes of the forest The area is restored or re-planted / afforested Forest area taken under management
Mineral and energy resources	Available reserves / Mineral reserves The volume and value of natural resources
Earth and soil	Types of vegetation cover, transitions and changes in cover Degree of top soil loss on agricultural land, other land Land area where sustainable land management practices were adopted
Water resources	The amount and quality of available renewable resources
Biodiversity	Area under effective status of protected areas (including marine protected areas) Areas of forest, agricultural and aquaculture ecosystems with the implementation of sustainable management Dynamics of number and risk of extinction of certain species

However, the proposed evaluation system was adjusted, because it was very cumbersome, which was typical for most calculation systems. Quantitative assessment of the forecast indicators and indicators of "green" growth and the "green" economy as part of the forecast of long-term socio-economic development of the Russian Federation for the period up to 2030 (Table 6.5).

To implement the Concept, it was necessary to develop mechanisms for making managerial decisions at the state level. However, this work seemed quite difficult. Russia has established its own procedure for making such decisions, whereas in most European countries the list of actions could be described as a series of steps:

First step. Identification of key sectors of the green economy and growth.

The second step is the development of the Strategy or the White Paper.

Step three. Choice of policies.

Step Four. Road map.

Step Five. Branch tasks.

Step Six. Regulatory and legal support.

Step Seven. Financial support for the implementation of the green economy.

Step eight. Information Support

Step the ninth. Basics of measuring the "green" economy.

Step ten. Update.

However, by this time, when the materials of this study were ready, the experience of the Republic of Kazakhstan in the transition to a green economy, as well as the first results of introducing green technologies in the West, significantly cooled the desire of the state authorities to immediately develop the Concept.

The next step was to determine the conditions for the transition to a green economy, which were as follows:

- "green" purchases;
- subsidies for the "green economy" in return for subsidies to unsustainable production and consumption;
- investments in sustainable infrastructure, including public transport and renewables
- institutional changes (councils, etc.);
- raising awareness, etc.;
- the transition to a "green" economy largely depends on the solution of two equally important tasks: maintaining the structure and functions of ecosystems (the ability of ecosystems to recover) and resource efficiency.

Table 6.5

## Examples of natural assets [4]

<b>Recommended Indicators</b>	<b>The current value of the indicator</b>	<b>Indicator value in 2030</b>
Total emissions of pollutants (million tons)	32,6	16-20
The volume of emissions of pollutants from stationary sources (million tons)	19,2	12-14
The intensity of emissions of pollutants (specific emissions) (per unit of GDP, t / million rubles of GDP)	0,3	0,2
The intensity of emissions of pollutants from stationary sources (per unit of GDP, t / million rubles of GDP)	0,38	0,22
Capture and neutralization of atmospheric pollutants, departing from stationary sources (in%)	76	98
Emissions of CO <sub>2</sub> (million tons)	2201	2200
Carbon intensity (thousand tons / million rubles of GDP)	0,07	0,03
The abstraction of water from natural water sources for use (million m <sup>3</sup> )	77640	75000
Water capacity (billion cubic meters / billion rubles of GDP)	0,12	0,06
Discharge of contaminated sewage (million m <sup>3</sup> )	15966	8000-9000
Number of surface sources of centralized drinking water supply that meet sanitary and epidemiological standards (in%)	64,3	99
Volume of generation of production and consumption wastes (million tons)	4303	2500
Intensity of generation of production and consumption wastes (t / million rubles of GDP)	90	33,8
The volume of used and neutralized production and consumption waste (million tons)	1990,7	2250
Total volume of production and production of energy resources (million here)	1694,0	1750-2150
Total energy consumption (million here)	1043,1	1200-1300
Energy intensity (ratio of energy consumption to GDP) (in%)	100	61
Renewable energy sources (total energy production) (billion kWh)	0,5	35-61
Area of the territory with forest cover (million hectares)	771	790
Percentage of the territory with forest cover (in%)	47	48
The area of all specially protected natural areas (million hectares)	211	270
Specific weight of specially protected natural territories in the total territory (in%)	11,7	15
Total amount of expenses directed to environmental protection (billion rubles)	91	1100
Investments in fixed assets aimed at protecting the environment and rational use of natural resources, in% to the level of 2007	108	203
The share of expenditures aimed at protecting the environment in GDP (in%)	0,2	1,5
The number of people living in especially polluted cities (million people)	55,1	10-12
Number of cities with a high and very high level of atmospheric air pollution, units.	126	34
Share of housing stock equipped with running water (in%)	78	99
The share of urban and rural housing stock, equipped with sewerage (in%)	74	98
Emissions of suspended solids (thousand tons)	2,3	1,5-1,7

The researchers compared the results obtained before 2050 with the allocation of an additional 2% of GDP and a "green" version (Tables 6.6–6.8).

Table 6.6

The results of the allocation of an additional 2% of GDP for the transformation of the world economy into a "green" one in comparison with the investment of 2% in the scenario of normal development [author's research]

Indicators	2011	2015		2020		2030		2050	
		The scenario of normal development	Green	The scenario of normal development	Green (%)	The scenario of normal development	Green (%)	The scenario of normal development	Green (%)
GDP (in constant US dollars)	69344	79306	-0,8	92583	-0,4	119307	2,7	172049	15,7
GDP per capita	9992	10959	-0,8	12205	-0,4	14577	2,4	19476	13,9
Total employment	3187	3419	0,6	3722	-0,6	4204	-1,5	4836	0,6
Calories per capita	2787	2857	0,3	2946	0,3	3050	1,4	3273	3,4
Forest area (billion hectares)	3,94	3,92	1,4	3,89	3,2	3,83	7,9	3,71	21,0
Demand in water (km <sup>3</sup> / year)	4864	5275	-3,7	5792	-7,2	6784	-13,2	8434	-21,6
Burial of waste (billion tons)	7,88	8,40	-4,9	9,02	-15,1	10,23	-38,3	12,29	-87,2
The ratio of emissions to biological capacity	1,51	1,60	-7,5	1,68	-12,5	1,84	-21,5	2,23	-47,9
The need for primary energy (million tons of oil equivalent / year)	12549	13674	-3,1	15086	-9,1	17755	-19,6	21687	-39,8
Share of renewable energy in primary energy demand (%)	13	13	15	13	17	12	19	12	27

Table 6.7

Potential for renewable energy production in Russia [author's research]

Types of power plants	Potential, billion kW • h		
	Technical	Economic	Industrial
Hydrostations with a power of <25MW	372	205	6-10
Windy	6517	32,6	70-90
Geothermal	34905	335	40-60
Thermal (biomass)	412	203	90-130
Tidal	253	61,6	16-45
Solar	2714	435	5-10

Table 6.8

Forecast indicators of the dynamics of domestic demand for the main types of energy resources in Russia for the period up to 2035 [author's research]

Indicators	2010 fact	2012 fact	2020 forecast *	2025 forecast *	2035 forecast *
Consumption of primary fuel and energy resources (million tons of equivalent fuel)	993	1013	1100 1086	1158 1136	1260 1212
Consumption of oil (processing) (million tons)	250	271	275 265	273 262	270 255
Gas consumption (billion cubic meters)	459	469	523 513	549 536	586 569
Consumption of solid fuel (million tons of equivalent fuel)	177	176	173 172	179 172	192 178
Power Consumption (billion kWh)	1021	1052	1217 1191	1335 1287	1570 1458

At the meeting of the State Council on the issue "On environmental development of the Russian Federation for the benefit of future generations", held on December 27, 2016, President has said: "On the agenda is a step-by-step transition of Russia to an environmentally sustainable development model that includes three components: increasing the efficiency of the entire national economy through its greening and improving the quality of life of residents."

The environmental direction was laid in a number of strategic documents, including the recently approved Strategy for Scientific and Technological Development of Russia. It was outlined the most acute environmental problems of the Russian Federation, which require a priority solution. The following tasks are set:



- achievement of cardinal reduction of emissions of harmful substances into the atmosphere;
- reduction of discharges into water bodies and soil, first of all due to technological re-equipment of industry, introduction of the best available technologies;
- development of the environmental information system;
- neutralization of production and consumption wastes.

Thus, the main directions of the green economy, which will develop in the Russian Federation, were identified.

The report, which relies heavily on the research that the authors of the monograph carried out together with leading environmentalists of our country, analyzed the environmental problems and challenges, substantiated the need for transition to green, environmentally sustainable development as a national strategic priority, highlighted the issues of Russia's ecologically sustainable development, global environmental problems, environmental quality at the current levels of pressure on it, threats to the environmental safety of the Russian Federation for the period up to 2050 ode.

Ensuring sustainable development is a broader theme than the "green" economy, but the latter is one of the mechanisms to ensure the set tasks. And the linkage of these concepts is the result of the environmental policy that was also formulated at the State Council and found expression in environmental reform.

Today, the country is implementing environmental reform. The first direction of its implementation is comprehensive programs for waste management, as well as for the collection of accumulated industrial waste. According to the Minister of Natural Resources, over the past four years, 4 million tons of garbage have been harvested in the Arctic zone of Russia, Siberia, the Far East, the Caucasus, the Volga region, and the Baikal natural territory. The authors of the monograph participated in the work to eliminate the accumulated environmental damage on Franz Josef Land.

The second direction of environmental reform is technological regulation through the law on the best available technologies. The law is of a complex nature, aimed at improving environmental supervision and control, environmental impact assessment, environmental regulation, and stimulation of activities in the field of environmental protection. Each of these elements is implemented in stages in the period from 2015 to 2025, with a planning horizon of 2035.

The third direction is the development of a system of protected natural areas and conservation of biodiversity.

"Neither today, nor in the foreseeable future, our country can not abandon the use of natural resources, but we must clearly understand the mechanisms and processes of measuring natural capital. It is required to form a system of national accounts that assesses the state of the environment and the cost of environmental goods".

For the transition to the green economy, not the most promising policy was chosen, and we still have to atone for the consequences of this decision.

The policy is fixed by a series of normative acts, some of which have not been developed, and the other has not yet gained experience in law enforcement.

Article 42 of the Russian Constitution establishes the right of everyone to a favorable environment, reliable information about its condition, compensation for damage caused to health or property by an environmental offense.

More than 40 laws have been adopted recently that allow solving many of the above problems, provided that the relevant funding is provided. The law on environmental standards has been adopted. The law on the turnover of the forest has been adopted, and the processing of the forest without damage to nature could bring billions of dollars of net income a year, but for this it is necessary to build one and a half hundred of state-of-the-art enterprises. Under the new requirements of the legislation before January 1, 2018, sources of emissions and discharges at BAT facilities should be equipped with automatic monitoring and data transfer devices to government agencies, etc.

It is necessary to develop new normative acts and revise old ones in several directions, in particular:

- environmental quality standards;
- according to the requirements of the legislation, as from January 1, 2019, environmental considerations are subject to justification for obtaining new integrated permits for emissions and discharges by existing enterprises that are transferring to BAT.

It is necessary to shorten the time for carrying out state environmental reviews for low-quality facilities:

- according to the current legislation, each type of waste (there are altogether more than 4 thousand species) must be classified twice: once according to the norms of environmental legislation (five hazard classes), the second time according to the legislation on sanitary and epidemiological welfare of the population (four hazard classes); it is necessary to resolve this contradiction.

A block of solutions was proposed to implement this complex task in the medium and long term. It includes:

- changes and additions to the current legislation in the sphere of nature management and environmental protection;
- multi-level system of motivation;
- creation of clean production, including through the introduction of special market instruments;
- a set of measures for the development of renewable energy sources.

The issues of environmental education and enlightenment, as well as social advertising, should be brought to a new level. The need for environmental education was also discussed at the State Council. This issue has always been key in all countries moving to a green economy.

If a set of measures, albeit very limited, will be implemented, this will significantly accelerate the transition to a green economy, sustainable development and the ecologization of our life.

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## **6.4 GREEN ENTREPRENEURSHIP AS AN INTEGRAL PART OF THE NATIONAL ECONOMY CONVERGENCE\***

The Ukrainian ongoing economy can be characterized as the model of exported resources with the lowest price of energy and human resources. Unfortunately, above mentioned aspects are viewed as some Ukrainian competitive or unfair advantages at the world market. As the consequences, Ukraine has the huge disproportions and non-compliance of structural changes in all spheres. It should be underlined that ongoing economic model can't provide not only economic but also social and ecological stability. As a result, the number of social, economic and ecological conflicts have been increasing from year to year. In addition, the lack of parity between social, economic and ecological goals and neglecting their convergence and divergence relations justify the immediate changing the economic development ideology from the isolated model (without understanding the correlation and relation between the social, economic and ecological decisions) to cross-sectoral one, which is based on the main principles of sustainable development.

It should be stressed that the approach will be allowed to achieve the national economy convergence, where social, economic and ecological aspects will be in the parity and in the equilibrium. It means, all economics sectors, government decisions, new legislation should be analysed not as isolated parts but as integral parts of national economy.

On the other side, the snowballing effect of ecological problems appearance contributes to make more attention to the ecological goals. However, it will be solved without the limitation of the other economics spheres. It means, that all economic activities should be redirected to the green economy as a part of way to achieve the convergence of the national economy.

According to the results of analysing the EU practice, green economy is a collaboration of the following: green innovations; green market; green activities; responsible entrepreneur (Fig. 6.4).

In this case, according to the Ukrainian condition and potential the perspective way for future is developing the green entrepreneurship as a part of green economy. It should be emphasized that entrepreneurship sector is a driving force for economic development and growth. The results of analyzing the function of small and medium-sized enterprises (SME) in EU showed that in 2016 SME employed more than 133 million people.

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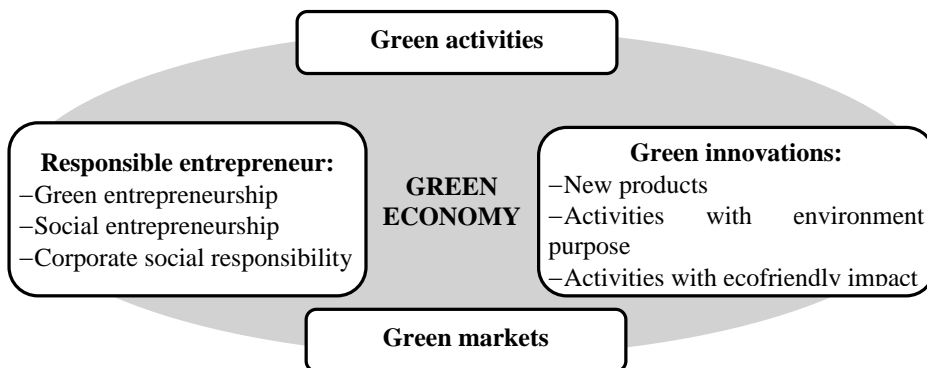


Figure 6.4. The main parts of the green economy [created by authors]

The SME sector as a whole delivered 57.5% of the gross value added generated by the private, non-financial economy in Europe during three months in 2016. By the way, in Malta and Estonia SME have generated the highest level of GDP. Thus, in these countries the gross value added is 74.9%. The lowest level in Poland – 50.1% [20].

In Ukraine in 2016 business sector employed approximately 2,3 million persons or 27.9%. Unfortunately, it is twice less in comparison with EU. Besides, the sales volume of products and services is 489.2 million UAH. The main indicators of SME are presented in Table 6.9.

Table 6.9

The main indicators of SME in Ukraine (2016)

(Compiled by the authors on the basis of the literature sources [19])

<b>Parameters</b>	<b>Total</b>	<b>Medium</b>	<b>Small</b>	<b>Micro</b>
Quantity of enterprises	1559161	281	5839	1553041
Persons employed, thousands	2307,2	28,0	135,2	2172,0
Sales volume of products and services, million, UAH	489204,6	14607,8	24807,4	449762,4

It should be stressed that as in EU, in Ukraine micro enterprises is the basis of SME. Thus, micro enterprises employ more the 2 million of persons and sale is more than 90% in total volume of products and services of SME. Moreover, if we analyse the dynamics of SME development we can see that all main indicators are increasing from year to year. For an example, in 2015 the quantity of enterprises is increasing by 2% compared with 2014 year (Fig. 6.5).

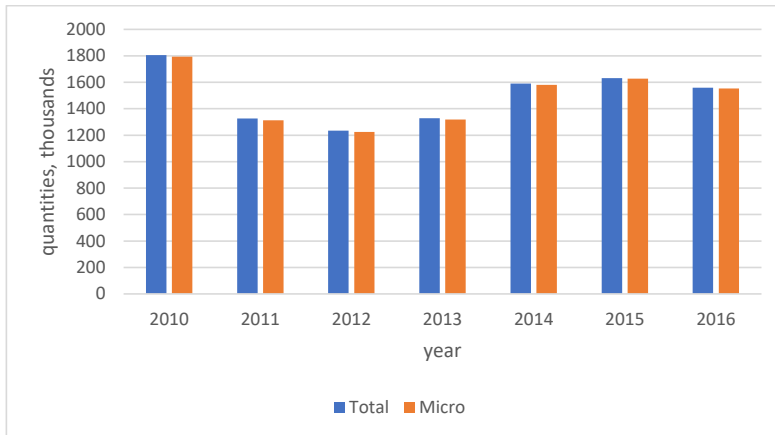


Figure 6.5. Dynamics of enterprises quantity 2010-2016

(compiled by the authors on the basis of the literature sources [19])

The sales volume of products and services also has been increasing from 2012 year. Thus, in 2015 it increased by 37.5% compared to 2014 year (Table 6.10). If we compare 2013 and 2014 we notice that increasing is only by 1.7%.

Table 6.10

Dynamics of the sales volume of products and services 2010-2014, mln UAH

(compiled by the authors on the basis of the literature sources [19])

Year	Total	Micro	Changing in %	
			Total	Micro
2010	230418,2	190055,3	-	-
2011	211215,8	181697,8	-8,3%	-4,4%
2012	256649,2	225449,1	21,5%	24,1%
2013	284238,1	244546,0	10,7%	8,5%
2014	289042,3	255906,0	1,7%	4,6%
2015	397473,3	358275,8	37,5%	40,0%
2016	489204,6	449762,4	23,1%	25,5%

Unfortunately, in 2016 we can notice the decreasing of the sales volume of products and services twice in comparison with 2015. It should be explained, that Ukrainian business sector has started to adopt the new conditions after EU integration process has been implemented, but the temp is not stable.

Above mentioned statement actualizes the necessity to redirect business sector to green entrepreneurship as a key factor of the future growth development.

Traditional “green entrepreneurship”, “ecoentrepreneurship” and “sustainable entrepreneurship” are used interchangeably. Moreover, despite of huge research in this sphere, the one approach to define the green entrepreneurship has not been formulated yet.

Thus, according to the EU studies green entrepreneurship is the activity of consciously addressing an environmental/social problem/need through the realization of entrepreneurial ideas with a high level of risk, which has a net positive effect on the natural environment and at the same time is financially sustainable [4].

Giovanni Marin justified that green entrepreneurship could be defined in terms of the technology used for production in any sector of the economy, or in terms of the sectors, in which firms were active, in which case our attention was restricted to parts of the economy producing specific types of output [5].

In the paper [6] green entrepreneurship is defined as an economic activity, whose products, services, methods of production or organization have positive effect on the environment.

The authors in the paper [7] indicated the difference between the way of looking at green entrepreneurship in developed and developing countries. Developed countries and international organizations tend to put more emphasis on the term ‘green’ and on market opportunities, while developing countries tend to focus more on the term ‘entrepreneurship’ and on market needs.

Chinese and Indian entrepreneurs, for example, are genuinely transforming the emerging economies by developing affordable products that meet the needs of the poor, but still need to become greener. Developed countries tend to spend large amounts of money on green innovation projects, but then face the missing link of entrepreneurs who move the product from a prototype to a commercially viable product [7].

Gibbs (2009) observes that sustainable entrepreneurship bases itself upon Schumpeter’s fundamental concept of “creative destruction” and today it has the potential to break the current economic model, which exhausts the Earth resources without possibility to substitute them with others or to give them enough time to replenish themselves naturally.

Sustainable entrepreneurship can turn into the driving force for the emergence of a new holistic sustainable system in the three dimensions – economy, environment, and society. Eco entrepreneurs are agents of change who destroy the existing conventional production methods, products, market structures and consumption models and replace them with new, superior ecological products and services. So, it may not be too far-fetched to say, borrowing from

Christensen's works, that they are disruptive innovators. Most authors mention the following characteristics as inherent to green entrepreneurs:

- they act as entrepreneurs realizing ideas with a high level of risk.
- they have strong internal motivation related to a heightened sensitivity to environmental problems.
- they address an environmental/social problem/need consciously and this is at the core of their business activity.
- their business activities have a net positive effect on the natural environment and at the same time they are financially sustainable.
- they consciously strive to contribute to a more sustainable future, contributing both with their social and environmental values.

To sum up, green entrepreneurship is the moving force of the economy, assuring green economic growth, technological and organizational innovations, and new workplaces with purpose to make positive impact and/or minimize the negative anthropogenic impact on environmental.

The results of analysis showed that green entrepreneurship had already received the mainstream and developed. Some of some examples of positive developing green entrepreneurship are described in the Table 6.11.

Table 6.11

Green entrepreneurship implementation examples in EU [16]

Country	Activities
Austria	On public level, there are funding structures to promote (green) entrepreneurship. The overall approach includes funding, but also mentoring/coaching by industry experts, who have in particular an entrepreneurial background. According to the intergovernmental agreement 2015, the city of Vienna promotes green initiatives, green jobs as well as social entrepreneurship, which does through different initiatives and funding.
Hungary	In 2013, the Hungarian Parliament adopted the new National Framework Strategy on Sustainable Development in Hungary for the period 2012-24. Framework Strategy is the first step of the sustainability transition. The environmental awareness is quite high among the young people, the education based on sustainability orientation could be exploited in developing a new green way of development
Ireland	The Green Economy presents a major opportunity for employment creation in Ireland and for the development of enterprises. The various government bodies providing green mentoring are funded by government
Spain	The main leading institution regarding green entrepreneurship in the environmental field is the Biodiversity Foundation (Fundacion biodiversidad), which launched The Green Entrepreneur Support Network (Red Empreverde), co-founded by the European Social Found, with more than 7.500 entrepreneurs of the green sector.



Besides, the relevant good practices (programs) identified at the European level are the following: The Green Entrepreneurship Europe in Europe; Ecopreneurs4climate by Ecopreneur.eu in Europe; EMCC in Europe; Quality Award (EQA); Youth and Environment Europe in Europe; SWITCHMED program in EU; PRO CONCEPT/schooltalk.at in Austria; The Green Entrepreneurship Europe in Europe; Green Business in Ireland; Eco-Recinnova by Red emprendeVerde in Spain.

For eco-entrepreneurs in Europe, such a situation provides considerable business opportunities. They can offer services to small and medium enterprises, but also to bigger companies to help them meet environmental challenges. They can promote resource efficiency or provide support in the face of new environmental regulation, sometimes even anticipating it to gain business advantages. Now the global Genentech market is estimated at US\$ 0,6 – 1 trillion and it is growing, and European companies are holding the greatest market share (Eco Innovation, 2016). Also it is noted that in recent years the development banks have been a key source of investing in green energy projects, committing more than US\$100 billion in 2012 (Fig. 6.6).

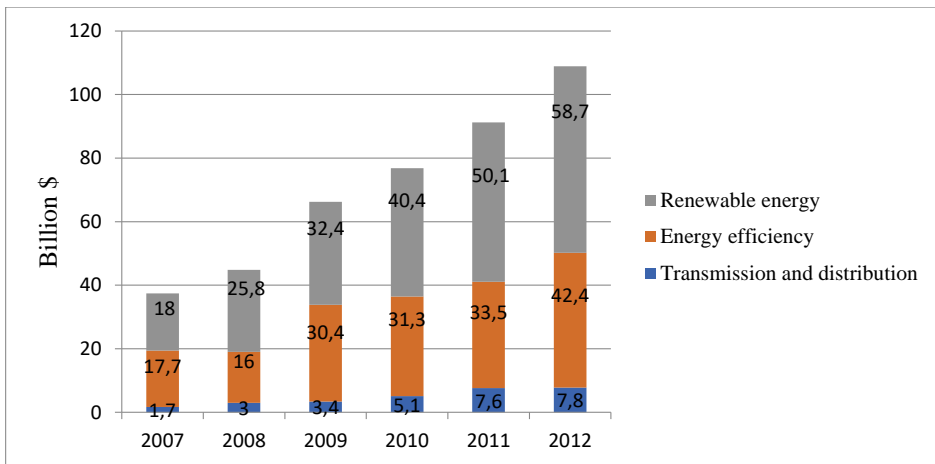


Figure 6.6. Funding for ‘clean energy’ projects [18]

Ukraine has a lot of environment problems, such as: high energy consumption in industrial and private heating; water and land pollution from chemical and metal industry; threats on biodiversity and use of resources in general; urban contamination and degradation of coastal environments; soil pollution and degradation due to inefficient agricultural activities; transport pollution in cities, landfills growth

The green entrepreneurship in this case is one of the necessary conditions for improving the environmental status, solving the problems with the rational use of natural resources, increasing the welfare of the citizen and integration into the European Union. It should be noted that in order to ensure the green of innovative development, a sufficient level of motivation for ecologization of innovation activity of enterprises of various sectors of the economy and society as a whole is required.

It is necessary to emphasize the mainstreaming for Ukraine's integrating to the European sustainable entrepreneurship space through providing the next activities.

Supporting in different levels of the green innovation. They must be put at the center of support efforts for green entrepreneurs, for small and medium enterprises. Easy entry and registration for eco-innovators provide clear guidance to available support offerings.

Encouraging experimentation and improvements: it has to be support for eco-innovators because for many branches in Ukraine it is a fairly new phenomenon. For entrepreneurs best World and European practices in different spheres of eco-entrepreneurship should be free and available (green products, technologies, approaches, energy savings).

Domestic adaptation of support activities: eco-entrepreneurs are not a homogeneous group, but comprise different types of entrepreneurs who act in very different sectors, markets and environments.

Mainstreaming sustainability in the supports system (economic and organizational with the specific relevant market instruments). Green entrepreneurship providing is not just an issue for the specific group of domestic eco-entrepreneurs that are highly mission-driven or active in specific green markets. Nowadays it is relevant for all entrepreneurs, no matter in which field of technology, sector or market they are active or intend to be active. Therefore, green business principles have to be deeply integrated at the state and local levels in order to be active in the development and support system.

Economic assessment and monitoring of effectiveness are not an end in itself, but should contribute to specific goals. Support systems for green innovation and eco-entrepreneurship should be designed to generate multi-purpose benefits (economic, ecologic, and social). This requires relevant assessment and monitoring tools (environmental audit, green standards, environment management system etc.) that will help to benchmark existing support systems, measure impacts and outcomes of support activities and provide information for policy makers and decision makers.

Ukraine eco-entrepreneurs should be not only interested in being more efficient and greener but as also be involved to be environmental problem-solvers. Future eco-entrepreneurial

solutions have to be innovative, long-term and beneficial to both the environment and the domestic economy. Since eco-entrepreneurship can be a win response boosting both environmental and economic performance, eco-entrepreneurs have been attracted increasing attention from society, create new job-places, policy-makers as reflected by the many EU programs supporting them. Furthermore, the developing of green entrepreneurship can be one of fundamental basic of the national economy convergence.

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## **6.5 THE PARTNERSHIP OF STAKEHOLDERS AS A GUARANTEE OF ECONOMIC SECURITY IN TERMS OF SUSTAINABLE DEVELOPMENT\***

Interests of economic security today demand creation of essentially new institutional environment focused on increase of competitiveness of economy through innovation, technological breakthrough, open data, modernization and innovative development, as economic security is a condition promoting entry of economy into the course of the advancing development.

One of the prerequisites for a successful operation of an enterprise in a changing environment is the effective management of the economic security of a business entity. At the stage of development of approaches to the management of economic security of enterprises the allocation of factors affect the economic security of enterprises. It should be borne in mind that in the process of operation, enterprises must adapt to changes in factors that directly affect the safety of functioning and the external environment, the proportion of factors which indirectly affects the stability of the enterprise.

Influence on the safety of enterprises' operation has the following groups of factors:

– political and legal factors (changes in the political system of the country, changes in the legislation, changes in the tax area, political instability, inefficiency of the system of state regulation, high level of corruption, etc.);

– personnel factors (outflow of personnel, staff turnover, physical aging of personnel, their knowledge, qualifications, work part-time);

– market factors (market share, competitive positions);

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\*The material is prepared according to the research work «Corporate Social and Environmental Responsibility for Sustainable Development: Stakeholders Partnership in the Real, Financial and Public Sectors of the Economy» № 0117U003933

– scientific and technical factors (low level of innovation in this area, difficulties with implementation of innovations in life, lack of support of innovative-active enterprises, etc.);

– economic factors (state of the economy, inflation rate, investment climate in the country, infrastructure development, conditions for attracting loans and changes in the credit system, competition in the market of building materials, changes in prices for construction materials, lack of personnel in the labor specialties);

– environmental factors (environmental pollution, changes in environmental legislation, etc.);

– socio-cultural factors (change in living standards, social instability);

– natural factors (availability and availability of resources) [2, p. 173-180].

An innovative component of the company's economic security is a system of enterprise security measures designed to:

1) ensure the widespread use of innovative innovations both in sales and production, and at other stages;

2) create an innovation-friendly climate both in the process of production and protecting the enterprise from internal and external threats [3].

Economic security should be considered as a decisive condition for the viability, activity and development of the enterprise. Confirmation of this approach can be found in the works of L.O. Voloshchuk [1, p. 218], Ju.O. Jarova [7, p. 259], S.V. Labunska [4, p. 283], A. Turylo [6, p. 226] and others.

Therefore, economic security should be considered as a decisive condition for the viability, activity and development of the enterprise. This, in its turn, defines the general purpose, functional goals and tasks of the enterprise's economic security system which is proposed to be considered as a set of interrelated elements (special structures, tools, methods and measures) that can ensure the security of business from internal and external threats. Accordingly, the formation of the system of economic security of the company involves maximally efficient use of its resource potential, the creation of adequate organizational structures, the development of appropriate mechanisms and responses that would ensure the stable functioning of modern and sustainable development in the future [5, p. 65-69].

The Earth Summit in Rio in 1992 alerted the world to a large number of pressing environmental and developmental problems and put sustainable development firmly on the agenda of the international community, many national and local governments and stakeholders. Many individuals, organizations and institutions have been responding to the challenge of sustainable development. Yet many still seem reluctant to take the need for change seriously, and

even more have not even learned how they can get involved and contribute. We have a long and difficult way to go if we want to live up to the values and principles of sustainable development and make them a reality. Taking one step beyond the stalemates which we face in many areas, we will need to learn how to listen to each other, to integrate our views and interests and to come to practical solutions which respect our diversity. Stakeholders are those who have an interest in a particular decision, either as individuals or representatives of a group. This includes people who influence a decision, or can influence it, as well as those affected by it [9, p.2].

Sustainable development is a mixed concept, comprising values (such as environmental protection and equity) and strategies (such as healthy economic growth, stakeholder involvement and global perspective). We can address it within different frameworks or discourses. For example, we can argue on the basis of a value-based approach, pointing to the ethical and/or moral need for equity, justice, self-determination and democracy. This discourse will lead to suggesting mechanisms to improve transparency, to enable meaningful participation and to create equal access to information, fair communication and consensus building, on the grounds that such political realities would further the realization of said values. people and the planet, and of inter- and intragenerational justice. Basic societal processes related to sustainability are economic and social processes, and those of governance and political participation, such as participation in, and the responsiveness of, decision making processes, but also the capability of institutions to accommodate changing conditions.

A legal relation existing between two or more persons contractually associated as joint principals in a business: the persons joined together in a partnership: a relationship resembling a legal partnership and usually involving close cooperation between parties having specified and joint rights and responsibilities. Synonyms: association, affiliation, alliance, cahoots, combination, conjunction, connection, hook-up, tie-up, togetherness. Related words: consociation, fellowship. Individual pursuit of self-interest coupled with the possibility of using a 'free-ride' position has been a main cause for environmental degradation. By contrast, sustainable development requires stakeholders – all of whom are polluters in some form – to build partnerships based on a sense of solidarity, collaboration and trust. Participatory should be designed 'to catalyze people into adopting an attitude that is oriented to cooperation rather than pursuit of individual interests' and forge new partnerships, even of unlikely partners. What does a partnership approach mean? Is 'stakeholder dialogue', for example around (inter)governmental decision-making, forging partnerships and leading to common action? Or is it entertainment for officials – perhaps some kind of 'cathartic entertainment' or ritualistic show-event? Are the stakeholders merely like jesters at medieval court, the only ones

able to speak of higher values and essential goals, of love and justice, vis-à-vis a ‘real world’ of power and capital? Invited to relieve the ones in power, articulating some ‘higher thoughts’, and enabling decision-makers to assert they have listened to the voices of ideals, visions, even religion? So that negotiators then may return to the conference room to make a decision, oblivious to what they have heard?

This does happen, and purely informing processes around official decision-making seem to be particularly susceptible to it. It can leave stakeholders frustrated and less inclined to contribute next time. Stakeholders’ criticism of this kind of process does not mean that stakeholder participation should (always) be part of decision-making. However, for participation to develop into partnerships, official bodies need to make clear to stakeholders – and themselves – what they embark on, what stakeholders are invited and expected to do, and how reliable that role will be. Partnerships need to be based on trust, equality, reciprocity, mutual accountability and mutual benefit. There are fundamental differences between sharing versus personalizing control and benefits; between listening versus imposing relationships; and between creating a shared vision versus winning and losing in a ‘business relationship’. All parties face the challenge of understanding the needs and concerns of the others and of cultural and behavioural change in order to create successful partnerships. ‘Common objectives or shared interests are obviously the most powerful motives for forming a partnership; but they are not sufficient in themselves. There are other factors which are necessary for both creation and sustainable operation of a partnership. These are trust, respect, ownership and equality. Without trust between people partnership is impossible. Trust is promoted when:

- there is a high likelihood that participants will meet again in a similar setting;
- interaction takes place face-to-face in regular meetings over a reasonable period of time and people have a chance to get to know each other;
- participants are able to secure independent expert advice;
- participants are free to question the sincerity of the involved parties;
- stakeholders are involved early on in the decision-making process;
- all available information is made freely accessible to all involved;
- the process of selecting options based on preferences is logical and transparent;
- the decision-making body seriously considers or endorses the outcome of the participation process; and
- stakeholders are given some control of the format of the discourse (agenda, rules, moderation, and decision-making procedure) [9, p. 28].

Partnership of stakeholders is used to describe processes which:

- aim to bring together all major stakeholders in a new form of communication, decision-finding (and possibly decision-making) structure on a particular issue;
- are based on recognition of the importance of achieving equity and accountability in communication between stakeholders;
- involve equitable representation of three or more stakeholder groups and their views;
- are based on democratic principles of transparency and participation;
- and aim to develop partnerships and strengthened networks between and among stakeholders.

The term Partnership of stakeholders describes processes which aim to bring together all major stakeholders in a new form of communication, decision-finding (and possibly decision-making) on a particular issue. They are also based on recognition of the importance of achieving equity and accountability in communication between stakeholders, involving equitable representation of three or more stakeholder groups and their views. They are based on democratic principles of transparency and participation, and aim to develop partnerships and strengthened networks among stakeholders. Partnership of stakeholders covers a wide spectrum of structures and levels of engagement. They can comprise dialogues on policy or grow to include consensus-building, decision-making and implementation of practical solutions. The exact nature of any such process will depend on the issues, its objectives, participants, scope and time lines among other factors. Hence, Partnership of stakeholders comes in many shapes. Each situation, issue or problem prompts the need for participants to design a process specifically suited to their abilities, circumstances and needs. However, there are a number of common aspects: values and ideologies underlying the concept of Partnership, questions and issues which need to be addressed when designing a Partnership and the stages of it. Our suggestions form a common yet flexible framework which we offer for consideration to those who design, monitor and evaluate Partnership. Reflecting upon the practical implications, there are numerous ways to design stakeholder involvement. These range from governments consulting stakeholders to creating multi-stakeholder dialogues and partnerships as part of official decision-making and implementation [9, p. 19].

So far, however, it looks as if stakeholder dialogues, ways of feeding them into decision-making and concrete follow-up are mostly being organized and prepared on a rather ad hoc basis. There is vast experience with participation at community levels and increasing experience at national and global levels. Yet studying and comparing the different approaches and distilling



some common but flexible guidelines from a stakeholder perspective is lagging behind. Governments and intergovernmental bodies, industry, NGOs, local governments and other stakeholders are trying out various approaches. Thus many different set-ups come under the same flag. Furthermore, the relationship between stakeholder participation and decision-making remains unclear in many cases.

In Table 6.12 the effects of stakeholders' partnership for economic security are presented.

Table 6.12

The effects of stakeholders' partnership for economic security of an enterprise  
[author's research]

<b>Group of effects</b>	<b>Explanation</b>
Financial	refusal to carry out financial transactions, the risk level of which is excessively high; refusal to continue economic relations with partners, which are systematic violate contractual obligations; refuse to use in large volumes loan capital; reducing the share of receivables.
Innovative	management of innovation safety; an increase in the share of innovative goods and services in the structure of goods of the enterprise; increase the share of innovative approaches to enterprise management
Informational	information security management; clear division of responsibilities that should carry out responsible persons for the preservation of information and its confidentiality.
Personnel	a clearly formulated organization of the personnel management system; increase level of occupational safety at the enterprise, professional development of employees
Ecological	increasing investment in resource conservation, efforts for sustainable development
Interface	active participation in international exhibitions and seminars; application of advertising measures to increase consumers

Sustainable development requires a process of dialogue and ultimately consensus-building of all stakeholders as partners who together define the problems, design possible solutions, collaborate to implement them, and monitor and evaluate the outcome. Through such activities, stakeholders can build relationships and knowledge which will enable them to develop sustainable solutions to new challenges. In fact, the multi-stakeholder approach reflects some of the most frequently and fervently discussed issues in discussions on governance, democracy, equity and justice of recent years – transparency, accountability, corporate social responsibility, solidarity, good governance, economic justice, gender equity, and so on [9, p.33].

The aim of partnership of stakeholders is to bring together all relevant stakeholders in order to:

- promote better decisions by means of wider input; integrate diverse viewpoints;
- bring into the process those who have important expertise pertaining to the issues at hand;
- allow for groups un- or under-represented in formal governance structures to have their say in policy-making;
- create trust through honoring each participant's contribution as a necessary component of the bigger picture;
- create mutual benefits (win-win rather than win-lose solutions);
- develop shared power with a partnership approach;
- create commitment by enabling participants to identify with the outcome and to value it, thus increasing the likelihood of successful implementation;
- put issues of concern to stakeholders on to the political agenda;
- and allow for clear and shared definitions of responsibilities in the implementation of change.

In a real sense, they are designed to put people at the centre of decision-finding, decision-making and implementation.

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## 6.6 PORTFOLIO PARTNERSHIP OF THE PROJECTS STAKEHOLDERS TOWARDS SUSTAINABLE REGIONAL DEVELOPMENT

An important component of sustainable development is the innovative development of the country regions. Each region solves the tasks of scientific and technological development, taking into account characteristics, traditions, available resources and needs of this region.

In the global economy, there is a number of organizational and economic measures intended to improve the scientific and technical development of the regions. Among them there are the creation of technology parks and business incubators, which work effectively in developed countries. It suggests the need to find new mechanisms. The main institutes of innovation process in Ukraine are the scientific institutes, high-tech business and bodies of state administration. But universities are not taken as partners, serious participants of such process.

In this context, it is interesting to consider the point of view of Henry Etzkowitz: Professor of Stanford University and the Center for Business Studies of the University of Edinburgh Business School, author of the new model for organizing the innovation process – the model of the “Triple Helix” [1]. This model represents the union between government, business and university, which are the key elements of the innovation system of any country.

During the interaction of the components of the Triple Helix, they can, in addition to their main roles, perform each other functions. Thus, the process of internal transformation happens – the second level of innovation in innovation. This ensures more qualitative and efficient execution of the top-priority functions of the triple-helix model elements. In addition, each component of the spiral becomes a source of innovation itself, as a result, contributing to the emergence of creative potential from other members of the helix.

So, the authorities, performing the regulatory function, often act as a venture capitalist, which is classified as entrepreneurial activity. Business fulfilling production activities, in-parallel makes researches, supports in-service training of employees and the exchange of knowledge in order to create joint ventures company, thereby partially fulfilling the role of the university. Universities, in an effort to find practical application of their research, provide technology transfer, create business incubators that stimulate the development of new firms. Therefore, they carry out the function of entrepreneurship. However, it should be noted, that, by partly performing each other's functions, each component of the Triple Helix retains its primary key role and inherent uniqueness.

It also should be noted, that vertical mechanism of economic development is the common feature of post-Soviet countries. On the contrary, the Triple Helix is defined the

interaction and mutual understanding of the horizontal ties between the actors. The basis of its success is the regional system of research and development, which is focused on solving problems at the local level.

According to H. Etzkowitz, the use of a Triple Helix can significantly improve the state of regional development, using available resources. However, the use of this model in Ukraine is possible only by taking into account the specific unique features of its regions. For example, solving existing regional problems becomes impossible without the necessary budgeting and civic engagement. It is obvious that during the last years, after the crisis, it is difficult to imagine the full financing of regional projects without their implementation within international projects. This, on the one hand, it greatly broadens the field of international activity and, on the other hand, provides a significant opportunity to improve the socio-economic situation of special regions and the country as a whole.

Thus, there is a new organizational innovation that advances innovative regional initiatives. At the stage of project implementation, which will solve existing regional problems, budgeting will be provided at the expense of the state, civil groups and international projects. After the implementation of the project the result will be transferred to the property of the community, for example, communal. At the operational stage of the result there is a problem of implementation of technical innovation. Higher education institutions can achieve this better, as they are updating the old one or creating a new business activity, based on intellectual capital. Only when the stakeholders of the project act, according to the criteria for maximization, an effective implementation of the project will be possible.

It stands to reason that the implementation of one project will not be able to provide a comprehensive solution of one or another problem. This can be done by creating an appropriate portfolio of projects that will make such a combination of projects. The total effect of it can be considered as necessary and sufficient to achieve the strategic goal. The portfolio of projects is a set of projects and programs combined to ensure the ease of management, as tools for implementing strategic plans.

The core of portfolio of projects management is the benefit analysis for organization of the entire set of executed projects and risks associated with them by collecting, analyzing and summarizing all information, that relevant to the projects, needed for management decisions, the rational allocation of resources between projects and assessment of methods and tools of project management processes. Thus, portfolio of projects management provides:

- determining the structure of portfolio of projects (systems for evaluating the effectiveness of projects and matching the strategic goal of the portfolio of projects);

- portfolio of projects formation (direct selection of projects, which will be a part of portfolio, according to the established system of project effectiveness assessment)

- implementation of portfolio of projects planning (taking into account the specificity of selected projects to plan the optimal portfolio of projects implementation considering the limited resources);

- portfolio of projects management (efficient portfolio of projects management involves continuous monitoring of project parameters, review of portfolio priorities, balancing them, change management).

Specifics analysis of these tasks in the field of portfolio of projects management suggests that socio-economic development is the main goal of regional projects implementation. Therefore, it would be viable, for example, to form a portfolio of social projects at the regional level. Portfolio approach as a mechanism for implementing a set of projects involves: the focus on achieving the strategic goal; maximizing the profit of a portfolio by obligatory contribution of each component; the possibility of rational allocation of scarce resources; providing a proper level of return at a given level of risk. Taking into consideration that social projects will not have high commercial returns, the portfolio of projects balance will ensure the best balance between projects with high risk and high returns and low risk and low return projects. Creating a portfolio of projects will enable the successful implementation of the entire set of social projects, that is directly included in the strategy of the region.

A “Triple Helix” model assumes the presence of a university as an obligatory component. The role of the university in the model is undeniable. In the era of economy of knowledge, when the key factor of state competitiveness is new knowledge and technologies, universities are an important resource for knowledge-intensive production. According to Etzkowitz, universities must become entrepreneurial institutions, but retaining their academic component and working in three interrelated areas: training, research, innovative implementation of high technologies and their market launch (technological transfer). Today there are two ways of becoming an entrepreneurial university. The first is the creation of a management system, mechanisms and tools that enable teachers, students and university graduates to create innovative companies (for example, the MIT – Massachusetts Institute of Technology). The second way is to form a management team, that will act as an entrepreneur. Such university has a powerful academic center, as well as a variety of funding forms (the Technical University of Twente, Golan). The first stage of solving the task of integrating the university into the economy is the construction of innovative infrastructure and the development of relations with innovative companies.

Regional development of an entrepreneurial component is important for the region. The feature of an innovative enterprise is that it always involves an increased risk. Portfolio approach is often used to minimize project risks and optimize the success characteristic of an innovative project. This allows you to quickly and flexibly reorient your business in line with changing external conditions, relevant scientific and technical developments and consumer requirements. Another specific feature of innovative business is constant innovations – the main factor of the success of an innovative enterprise. Today, most of the progressive innovations are based on the creation of knowledge-intensive and competitive products. Research institutions, especially higher education institutions, should take the lead in this process, since they often have unused scientific and technological potential. But it should be noted that it should be reoriented to the problems of regional development. As world experience shows, even economically developed regions need to intensify existing scientific and technical potential, which will provide higher chances for maintaining and increasing the competitiveness of enterprises located in the region, creating additional jobs through the creation of new and expansion of existing ones, attracting private investments, including foreign capital. The last-mentioned will provide new opportunities for obtaining additional financial resources for regional development.

Such scenario of development can be realized, if the national peculiarities of Ukraine are considered. It is the absence of a critical mass of small innovative enterprises, which is a component of business in the Triple Helix model. Selecting this component as a separate element of the system allows you to define it as the weakest one. And this requires its enhancement. Therefore, today the feature of forming a regional portfolio of innovative projects within the "triple spiral" model is the emphasis on projects implemented by small innovative enterprises, their support from big business and regional authorities. The innovative developments of local universities should make the basis of these small innovative enterprises. The implementation of these projects will enable large businesses to obtain innovative products for their development, universities – to commercialize the results of their scientific development, and regional authorities – to obtain socio-economic development of the region.

The formation of a regional portfolio of innovative projects within the Triple Helix model can be a significant impulse for regional development and, in general, for the state innovation system. All stakeholders will benefit from this: manufacturing ventures will receive new ideas and developments from universities, young specialists will train to work in new economic conditions; scientists will be able to find new applications of their knowledge, possible additional sources of funding, which is very important, considering the significant reduction of public funds for the science development. With allowance for this, the human capital (knowledge and

experience of people accumulated in the process of training and direct production activity in previous years) should become more actively employed, which is so necessary for the economic development of the state regions.

In recent years, a large number of international projects have been implemented on the territory of Ukraine. Moreover, projects, that can significantly improve its socio-economic development, are having the special interest of our society. For example, the Swiss-Ukrainian project DesPro [2] hold competitive tenders for the selection of documents submitted by different communities for participation in grant projects that support decentralization of power and socio-economic development of communities. At the same time there is a significant increase of social activity and unity of community by common interests. Local authorities also compulsorily take part in realization of such projects. Like a majority of international projects, DesPro supports projects that are on the list of its activities. But implementation of these projects cannot fully ensure the further socio-economic development of the community, because, firstly, there is no inescapable innovations, and, secondly, there is a large number of community-supported projects beyond such list.

Possible solution of this problem may be the forming by international projects the portfolio of projects not by one specific direction of socio-economic development of the communities, but by the indicator of the social effect of the implementation of the entire portfolio with different areas of activity. Many research papers are devoted to portfolio design, but most of them consider portfolio formation as a tool for maximizing financial returns with limited resources and/or within the strategic goal of the organization.

An indispensable part of this portfolio of projects should be innovation. Developed countries for a long time have been actively supporting socio-economic development of communities as a guarantee of a high living standard of society and the country in general. Since the years of independence, the authorities of Ukraine have also tried to take into account the community's opinion when developing and approving laws and regulations aimed to create an active communication system between the parties of the social dialogue. But it is undeniable that in our country this process is much slower than, for example, in European countries. In turn, European countries implement international projects to maintain a satisfactory state of development of other states and to eliminate social tensions associated with low living standards.

For example, the international Swiss-Ukrainian project DesPro “Support of Decentralization in Ukraine” [2] aims to achieve three main goals: improving utility

services through greater integration of community groups and associations; arrangement and improving of the integration process of services, provided to the community, into the local government system; introduction of the analyzed experience during the decentralization, received in the process of the project implementation, in the pilot regions at the national level.

In 2007-2009 during the first phase of the international DesPro project – the decentralization of power in Ukraine, the villages of the Vinnytsia region and the Autonomous Republic of Crimea were involved in the project. The results are presented on DesPro sites. Existing living conditions of the rural population in Ukraine are simply unacceptable. A large number of wells, constructed in Soviet times, make significant pollution, and, in its turn, deteriorate water quality. Therefore, they require immediate reconstruction. The water supply problem is particularly acute in the summer, when most of the existing wells dry up. For this reason, the main areas of activity of grant projects in this period were: provision of a network of water supply for rural population, sewage, solid waste utilization.

The second phase of the project acted from 2010 to August 2013. The geography of its activities was expanded by means of Sumy region. From 2013 to 2017, there is a third phase of the project in Ukraine. Vinnitsa, Dnipropetrovsk, Ivano-Frankivsk, Poltava and Sumy regions are involved in it. If, for example, in the Vinnytsia region all three activities are implemented, in the Sumy region this international project acts in one direction. It solves the topical issues – the lack of drinking water in the rural area. In the Sumy region artesian water is used, which is by all means one of the best Ukrainian water basins, but outdated equipment and understated conditions of existing water pipes make consuming quality drinking water impossible. The allocation of funds to an international project for the reconstruction of the water supply system and the creation of new water supply networks has become a kind of stimulus for a more intensive solution to this problem. In addition to DesPro, local governments and communities have joined to the financing of the water supply project. Such activity of the population has become the basis for the formation of cooperatives, which mostly make a "lion's share" in financing projects and get reconstructed water supply systems in communal ownership.

As we see, in essence, the mechanism of partnership of stakeholders in the projects, mentioned above, is similar to the mechanism of partnership of institutions (actors) of the innovation Triple Helix model. According to the model, the internal transformation of institutions implies that, in addition to fulfilling their key functions, they are engaged in solving the tasks of other actors. Thus, they are revealing a new, second level of innovations



in innovation. In local community projects, this internal transformation acts through co-financing. But unlike the Triple Helix, where universities are the main actor, as the main source of innovation, in this partnership such mechanism is absent. The results, obtained during the implementation of grant projects, have a real social effect, but this effect cannot be considered as a social innovation. This is required to get a specific project product and its “trigger” to get the result. Organizationally partnership of stakeholders of local community projects is based on a cluster model. The product of the project is the established functioning system, the activity of which eliminates the social problem of the community and gives certain preferences to other actors. The participation of universities should be a guarantee that innovations will be introduced in the project product and / or the results of its use. Practice shows that as a result, the population receives basic services (water supply, waste utilization, energy saving, etc.). Innovation will serve as a guarantee that the operation of the project product will be effective and efficient over a sufficient period of time. In the absence of innovation, there is no guarantee that basic services will not quickly become obsolescent and, as a result, their effectiveness and efficiency will plummet. Therefore, the introduction of innovations in the local community’s projects will be a guarantee of effectiveness and efficiency over a long period of time.

The solution of the problem with lack of drinking water was to motivate communities to find effective ways to solve other pressing issues. Under such conditions, the international DesPro project should consider the possibility of conducting a competition for grant projects on the criterion of maximizing social benefits. With this approach, there is a problem of choosing the appropriate projects for the portfolio. Since the most common criteria for portfolio formation, obtaining maximum financial benefit with limited resources and/or implementing the strategic objectives of a particular entity, are not essential to obtain the greatest effect from the implementation of social projects (in this case, of socio-economic community development projects), then other criteria will be relevant. Such a criterion may be the maximization of the social effect. The most appropriate for social projects is to evaluate not individual projects, but the portfolio of projects, taking into account the synergistic effect of knowledge dissemination of individual communities, whose projects are involved in the portfolio, among other communities whose projects are also in this portfolio. All communities have different lists of their own social interests (Fig. 6.7). Therefore, for the effective selection of projects, each community should express the attitude to the possibilities for implementation of other projects from this portfolio after consummation of their own project.

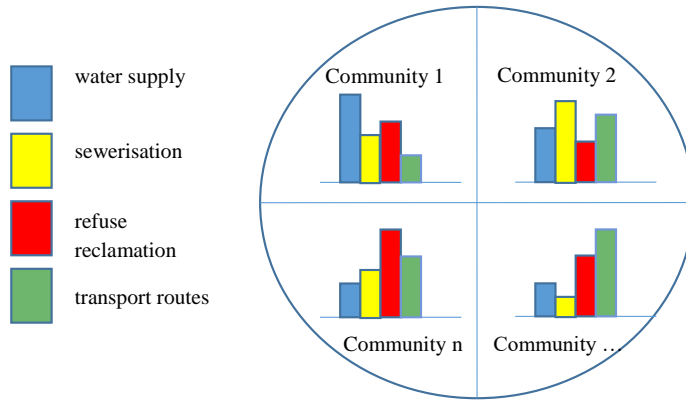


Figure 6.7. Map of the social interests of different communities (developed on the basis of [4])

This information is taken into account when you calculate the social effect of a portfolio. The funding is recommended for those projects, the combination of which will maximize the social impact of the entire portfolio, but not an individual project. In order to implement this approach, each of the portfolio projects has to be presented as an internal standard of project implementation. Thanks to him, the accumulated knowledge can be transferred and used by other communities.

In the case of using the proposed approach, the implementation of international projects will take place in several stages (waves) (Fig. 6.8, where  $SE_1$ ,  $SE_2$ ,  $SE_3$  is the social effect of the first, second and third wave respectively).

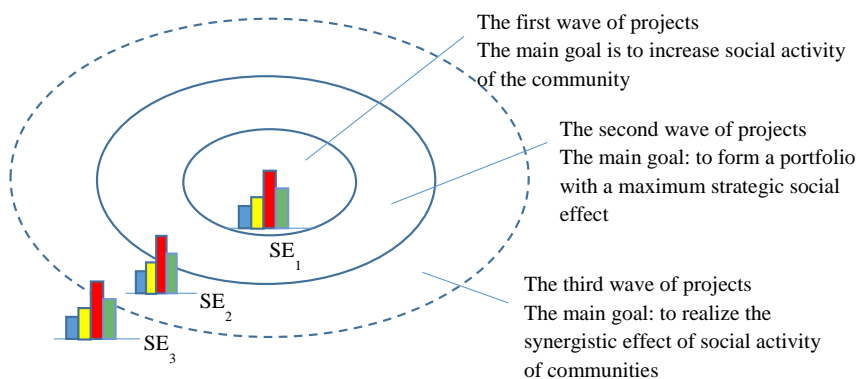


Figure 6.8. The main goals of the implementation stages of international projects (developed on the basis of [4])

Mathematically, the formation of a criterion for optimizing the portfolio of second wave projects can be represented as follows:

$$\text{Target function} \quad \sum SE_2 + \sum SE_3 \Rightarrow \max \quad (1)$$

$$\text{Limitation:} \quad \begin{cases} \sum F_2^{IP} < [F_2] \\ \sum F_3^{IP} < [F_3] \end{cases} \quad (2)$$

where  $F_2^{IP}$ ,  $F_3^{IP}$  are financing of the second and third stage of project respectively by the international project;  $\Phi_2$ ,  $\Phi_3$  are general, aggregate financing of the second and third stage of the project.

$$\text{Financial condition:} \quad \sum B_3 > \sum B_2 > \sum B_1 \quad \text{and} \quad \frac{\sum B_3}{\alpha_3} = \frac{\sum B_2}{\alpha_2} = \sum B_1 \quad (3)$$

where  $B_3$ ,  $B_2$ ,  $B_1$  are costs of the third, second and first stages respectively;  $\alpha_3$  – a ratio that shows how financing of the third stage is greater than the financing of the first;  $\alpha_2$  – a ratio that shows how funding the second stage is greater than the funding of the first.

Based on the material, written above, we see that the question of how to take into account social activity of the community during the implementation of grant projects and after their consummation remain relevant.

The positive results of the consummation of grant projects stimulated residents and other communities to implement similar projects. And communities that have already implemented such projects have continued to search effective solutions to other problems.

On this basis, we can conclude that social innovations appeared due to successful implementation of the first grant projects. Social innovations are “new and significant forms of social practice, social interactions and relationships, as well as significant changes in mentality, mental mood of society (new forms of spiritual practice)” [3, p.228]. The social innovation guarantees the possibility of decentralization of power in Ukraine. Only in conditions if community has and wants to change something, some progress in the of decentralization of power can be made.

Today there are no universal models of regional development. This can be explained by the difference in economic structures, specialization and research competence of the regions, technological development, innovation and knowledge, territorial placement, etc. Therewith, regional development can ensure the implementation of portfolios of projects

for socio-economic development of communities with the participation of international projects, local authorities, universities and communities that can improve the quality of life of the entire population of the region.

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## **6.7 SEGMENTATION OF RESOURCE CYCLE AS A TOOL FOR MANAGEMENT OF CLOSING AND SLOWING THE LOOP**

### **Circular economy and new challenges for EU member states**

With the adoption of the Seventh General Union Environment Action Programme to 2020 «Living well, within the limits of our planet» [8], the management of resource and waste is gaining new meaning: «to move towards a lifecycle-driven «circular» economy, with a cascading use of resources and residual waste that is close to zero». This strategic target was reflected after several years in the «Closing the loop – An EU action plan for the Circular Economy», which outlines the general measures for preserving the value of materials in the economic system for as long as possible and emphasizes the key role of research and innovation in this field. The Commission is currently launching a number of calls under the Horizon 2020 that relate to the gradual transition to a circular economy model with a focus on the connection between the objectives of the economy and the environment preservation, and there is no doubt that in the near future, each EU member state, including Ukraine since the signing of the Association Agreement, will be forced to form their own national strategies for preserving the value of materials and products in the economic system for as long as possible.

The measures of this Action plan [7] cover whole product life cycle, i.e. from production and consumption to recycling, as well as the market of secondary raw materials. The implementation of the goals of the circular economy will be occurred through the production and consumption fields. In production the focus will be placed on cycle-oriented design and the

development of new industrial processes; as for the consumption field, the emphasis is placed on the marking system that will provide consumers with information on the environmental characteristics of the product, its durability, reparability.

A more complete definition of the circular economy in terms of identifying possible processes that require optimization is given in the work of Geissdoerfer et al., [9], where the circular economy is defined as regenerative system where inputs and wastes, emissions and energy losses are minimized due to slowing, closing and narrowing of material and energy flows; it can be achieved through design, maintenance, repair, reuse, recovery, modernization and recycling [9]. In terms of its content, all processes directly related to the closing and slowing of material flows are circularly-oriented. As a result, these processes lead to a narrowing of flow at the previous stages of the material lifecycle, as well as to narrowing the flow of undesirable outputs (waste) produced per unit of the final product. In general, decreases the number of primary material used per unit of product by replacing the primary material by the  $i^{\text{th}}$  turnover material, and the volume of such replacement reflects the result of regenerative system. The problem of obtaining a qualitative material of  $i^{\text{th}}$  turnover, capable of competing with the primary, directly belongs to the formation of the system ability to provide these competitive advantages. In our opinion, this problem lies in the area of managing of closing and slowing loop potential – the potential of preserving the value of materials/ products/ product's parts for as long as possible in the economic system. There is no doubt that this potential needs to be formed, built up and fully used.

To date, there are different approaches to the managing of the processes of preserving the value of material in the economic system which are based on the circular strategies for product life extension and product recycling [3]. The optimization of product lifetime can be reached by development and realization of slowing-oriented resource loops strategies, the material turnover with maximum number of turns can be achieved by force of closing-oriented resource loops strategies. Mentioned strategies are implemented through business models. One of the archetypes of sustainable business models is to create the value from “waste”, i.e. create new value from what is currently perceived as waste. Within this archetype such forms of business models as industrial symbiosis, closed-loop business models, cradle-to-cradle, under-utilised assets and capabilities are concentrated [3; 6].

According to one of the reports [16], the linear «take – make – dispose» economic model relies on large quantities of cheap, easily accessible materials and energy, and it is a model that reaches its physical limits. By the definition mentioned there, a circular economy is an industrial system that is restorative or regenerative by intention and design. It shifts towards use of renewable energy, eliminates the toxic chemicals use, which impairs reuse,

and aims for the elimination of waste through the superior design of materials, products, systems, and business models [16].

So, in our opinion, for the coming-to-be the circular economy as a new model, that will gradually supplant the linear economy, a study of the resource cycles [12] seems promising from the point of view of the development of these cycles towards saving the step-by-step created value of the material/ products / detail at the chain «material – product – used product – upgraded product – raw material – material’ – product’».

### **Contents of the concept of the resource cycle and its application in the conditions of a linear economy model**

The issues of material cycles and product cycles, as well as processes of «cyclicality» or «circularity», are not new in environmental economics. From the point of view of rational use of natural resources, the mentioned issues were reflected in the concept of resource cycles [12], industrial metabolism [1], closing and slowing the loops [14], anthroposphere metabolism [2], industrial symbiosis [16], «cradle to cradle design» or regenerative design [5; 13] etc.

The concept of resource cycles is developed by Komar I.V. In fact, it is the scientific basis for determining the ways to rationalize the use of natural resources both for individual sectors of economy and for different level territories – from the local industrial units to specific regions and countries and up to the global level. The precondition for the emergence of the concept of resource cycles is the theory of energy production cycles developed by Kolosovsky N.N., this theory was further developed by Osipov V.A. and Sharygin M.D. in the concept of resource-based energy-material cycles. Kolosovsky's theory of energy production cycles emerged while studying of economic regions. He considered a set of issues predominantly embraced the connections of a resources sources and production location. The analysis of cycles at all its stages or phases, which underlies the Komar's concept of resource cycles, substantially expanded the scope of the resource problem. Unlike the production cycles, the resource cycles cover all stages of transformation and movement of a substance/ group of substances of nature.

By definition, the resource cycle is a set of transformations and spatial displacements of a certain substance or group of substances occurring at all stages of its use by human (including its identification, preparation for exploitation, extraction from the environment, processing, consumption, return to nature) and proceeding within the social link of the general circulation of a certain substance on Earth [12]. The author of the concept emphasizes that the exchange of substances between society and nature has a clearly expressed character of the polycyclic process and the total flow of substances within the system «nature – society – nature» can be divided into separate resource cycles. He divided the resource cycles according to the type of the main

involved substance or combination of substances. At the same time, I. Komar noted that each cycle acquires a number of accompanying and additive sub-cycles are developed on the basis of a diversified use of the main resource and additionally involved in the economic turnover of primary materials [12]. The author divided the entire set of metabolism between society and nature into the following resource cycles and sub-cycles:

- 1) the cycle of energy resources and energy with sub-cycles of electrochemical and hydropower;
- 2) the cycle of metal resources and metals with a coke-chemical sub-cycle;
- 3) the cycle of non-metallic raw materials with a group of sub-cycles – mining chemical, mineral and building materials;
- 4) the cycle of forest resources and timber with a wood chemical sub-cycle;
- 5) the cycle of soil, climate resources and agricultural raw materials;
- 6) the cycle of fauna and flora resources with a series of sub-cycles that are developed on the basis of biological resources [12].

It is important to note that the first three cycles operate on the basis of non-renewable resources, and the last three operate on the basis of renewable resources. For the latter, the final and initial stages of cycles are combined into the reproduction processes of these resources.

Individual resource cycles significantly differ by duration. On the basis of duration, I. Komar singled out the short-term cycles that ensure the biological existence of man and the long-term cycles covering the production and consumption of durable goods (i.e. the material substance of these goods is in an equilibrium state for a long time). The considered processes of substance exchange between society and nature, proceed and change not only in time but also in space, and are associated with the formation of various territorial structures of resource cycles (planetary structure of resource cycles, regional structure). The territories are distinguished by a distinct originality of local structures of their resource cycles and their distinctive metabolic processes occurring within the framework of «territory – environment». Each territory has its own peculiarities of the organization, functioning and development of each individual resource cycle. They are very clearly distinguished within the sectoral economic areas of different taxonomic order. Typical combinations of productions and processes have modifications caused by local economic-geographic specificity, the originality of the links between individual energy-production cycles, the territorial features in technology and the processing raw materials technology. Therefore, the same cycle, which is located in different economic and natural conditions, as a rule, has unequal structural features [15; 12].

According to Kholina V.N. [10] the most effective application of the concept of resource cycle at the meso-level – the level of the resource and industrial area, i.e. the part of territory where the cycle of extraction, processing, consumption and disposal of waste associated with a particular natural resource is quite fully represented.

However, it is necessary to understand the actual problems of that time in the field of environmental economics arising from the linear «take – make – dispose» model of economy.

### **The development of resource cycles in the context of a circular economy**

The cycles are developing over time, this means a change in their structure, some cycles are replaced by others, and completely new cycles are formed. The emergence of new cycles is due to scientific and technological progress and the involvement in the economic circulation of previously unused raw materials and fuel and energy resources. It is also possible to reconstruct already existing cycles, since the transition to new types of raw materials and energy changes the nature of technological production processes [12].

The development of aggregate resource cycles, that is the change in established territorial structures, in the context of a circular economy acquires slightly different benchmarks. Circular economy excludes the use of toxic and harmful substances/ materials in the production of products, maximum replaces the non-renewable resources by renewable, reduces the waste to zero [16]. Consequently, if it is not possible to replace harmful material, then it is necessary to develop a resource cycle in the context of the renewability of this material. The involvement of new resources is required only to meet increasing needs and cover the inevitable losses – abrasion, chemical scattering, etc.

In our opinion, the development of resource cycles in the context of a circular economy acquires a broader meaning – preserving the value of not only the material, but also the product/ module/ detail. The saving of the value of product/ module/ detail means, firstly, to extend the lifecycle of product/ part through repair, modernization, reconstruction, and secondly, to extend the lifecycle of material through recycling. The providing of slowing and closing loop processes in the economy is associated with the development of a certain segment of resource cycles – the multiple transforming the material into product (Fig. 6.9). The development of this segment occurs towards reproduction of material/ product/ parts. This segment encompasses certain phases of the resource cycle that are performed as if in a spiral in a certain sequence, at that each loop of the spiral representing the product lifecycle. The latter can be considered as a sub-segment of the resource cycle – the multiple upgrading of the product (for slowing the loop).



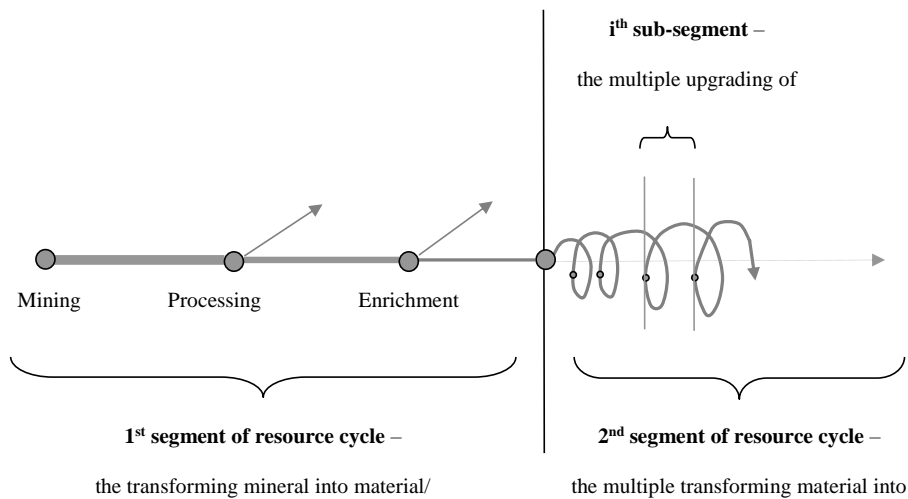


Figure 6.9. Segmentation of resource cycle as a tool for management of the closing and slowing material flow processes (author's research)

So, after the initial matter in the form of a mineral has gradually acquired the form of a material, this material falls within the scope of a system that is able to ensure, first of all, multiple reproduction of material in the chain «material – product – used product – upgraded product – raw material – material' – product'». Being within this system, the material is transformed by the phases of the cycle, changing its form/ status, and the final and initial stages of cycles combine the processes of reproduction of this resource. Consequently, resource cycles, which in essence function on the basis of the non-renewable resources, can be reconstructed through the reproduction of materials that occur not in nature but within the anthropogenic regenerative system. Such a system is characterized by a number of interrelated cyclically-oriented processes, as well as by adequate inputs and outputs, an output of previous process is an input for the next process.

Since the circular economy is simultaneously aimed at closing and slowing the loops, and these goals can often be mutually exclusive or in a certain sense be contradictory (for example, durable material does not yet mean recyclable), there is a need to harmonize these two benchmarks. We argue that the goal of closing the loop in most cases has a higher priority than the goal of slowing the loop, because, first of all, it is oriented at the equivalent narrowing of material flow within the first segment of resource cycle (see Fig. 6.9),

and this segment is often characterized by a large integral damage to the environment in comparison with the second segment. In addition, the flow of undesirable outputs, with respect to the system, is narrowed too.

Nevertheless, the preservation of the value of product and parts for as long as possible is of no less importance than the material value, since the period of «frozen value» caused by repair or modernization and the total social costs for these processes are much less in comparison with the recycling of product. Thus, the problems of slowing and closing the loop can be coordinated not within the product lifecycle only, but within the cycle of multiple material turnover which is a set of product lifecycles by structure – the second segment of resource cycle.

Taking into account the marked above, we assume that the segmentation of the resource cycle can be an effective tool for sustainable management of material resources in particular in circular economy providing context. To ensure slowing and closing flows (as well as narrowing as a consequence of these processes), the resource cycle can be divided into two following segments:

1) the transforming of mineral into material/ materials (mining – processing – enrichment);

2) the multiple transforming of material into product. The last segment can be represented as a cycle of multiple material turnover when it is used successively in a certain range of different products (for closing flow).

Within each turn (sub-segment) of a cycle of multiple material turnover, it is important to distinguish a cycle of multiple product turnover (for slowing flow). It is noteworthy that actions for slowing and closing flows inevitably lead to narrowing flows which concentrated within the first segment. In other words, the development of the first segment of the resource cycle is also due to the development of the second segment.

Briefly summarizing the above, it should be noted that the development of resource cycles in the context of a circular economy acquires a new meaning – the saving of the step-by-step created value of the material/ product/ part. By definition, the resource cycle is a set of transformations and spatial movements of a certain substance or group of substances occurring at all stages of its use by human. The saving of value of material / product/ part means prolonging/ extending the lifecycle of product/ parts through repair, modernization (slowing the loop), and extending the lifecycle of material through recycling (closing the loop). We suggest that the slowing and closing of loops processes providing in the economy is associated with the development of a certain segment of individual resource cycles towards its reproduction, in particular the second segment – the multiple transforming the

material into product. This segment forms a cycle of multiple material turnover which by its structure consists of a range of product lifecycles, along this range the specific material consistently used. Also we suggested, that in order to increase the turns number of specific material cycle in the economic system, it is essential to form the optimal range of products. It is necessary for the rational allocation of the explicit (and available) circularity potential. The optimal range of products for multiple material turnover is sequence of products, for which the same material is used, arranged according to the change of the quality characteristics of the material at the end of each turn. Such range can be formed on the basis of consecutive selection of the most acceptable products from point of view of the minimal loss of initial value of specific material. Therefore, inherently, the optimal range of products forms a cycle of multiple material turnover with maximal number of turns. If the optimal range of products is modeled, the producers of these products will form the demand for the material of specific  $j^{\text{th}}$  turn; and manufacturers of certain products will be deprived of the right to use the primary material. Finally, it is important to note that the circular economy is simultaneously aimed at closing and slowing the loops, and these goals often contradict each other, and therefore need to be harmonized. In our opinion, the segmentation of resource cycle is an effective tool for managing the processes of slowing, closing and narrowing of flows in the economy, since it allows to connect appropriate goals and to justify the priorities either to preserve the value of material or to extend the product lifecycle in case of the opposite goals.

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## **6.8 SOCIALLY RESPONSIBLE INVESTMENT: CONFLUENCE OF MONEY AND ETHICS**

Meaningful events that form the new face of the world clearly show that the attitudes concerning our future are markedly changing: Paris Agreement (2015) dealing with greenhouse gas emissions mitigation, adaptation and finance, **European Parliament Directive (2014/95/EU) on disclosure of non-financial and diversity information, EU efforts to ensure sustainability, transparency and accountability, the creation of the Transparency Register (2011) operated by the European Parliament and the EU-Commission, 17 Sustainable Development Goals of the 2030 Agenda for Sustainable Development** adopted by world leaders in 2015. New concerns about the how to make our world the better place to live significantly effect the investment world. The awareness about global warming and climate change, pollution and loss of biodiversity, overfishing and desertification, poverty, discrimination and working conditions and corruption stimulate clients activity and demand for transparency about where and how their money is invested. More and more investors are interested not only in financial gain but also in the social impact of their investments.

Socially responsible investment is associated with social innovation. Social innovations are perceived as innovative activities and services motivated by the goal of meeting a social need and that are predominantly developed and diffused through organizations whose primary purposes are social [13, p.8]. From this point of view a social innovation cardinally differs from business innovations which are stimulated by profit maximization. Socially responsible investment, as a type of social innovation is the way of investment process that combines the investors' financial objectives with their concerns about Environmental, Social and Governance (hereafter ESG) issues, in order to better capture long term returns for investors, and to benefit society by

influencing the behaviour of companies [7, p. 9]. Socially conscious investors seek to make investment decisions not only to make money, but also to create a truly sustainable future by owning the shares of most responsible companies and making profits herewith having a positive impact. Hence socially conscientious investors hone their interest to align financial profit maximization strategies with social concerns [16, p. 4]. According to M. Chamberlain, the SRI approach is to invest in stocks and bonds from those companies and counties or municipalities that promote certain actions or eschew those, which participate in offending actions: you reward those that you agree with by investing in their companies and avoid buying shares of those companies that offend your core values [3, p. 2].

There is no unified approach to SRI, so different terms are used. Depending on the attitude, target and strategy investors use the following terms: socially responsible investing; socially conscious investing; community investing; ethical investing; green investing; impact investing; mission-related investing; responsible investing; sustainable investing; values-based investing, triple-bottom-line investing. R. G. Eccles points out that in the investor's world, the general term "Socially Responsible Investing" has been subdivided into concepts such as exclusions (SRI based on values), impact investing (market returns, positive impact and performance), sustainability-themed investments (relatively new), norms-based screening (relatively new), and ESG quant (sustainability performance is one part of a quantitative model that includes many other factors) [5, p.4]. Global sustainable investment alliance takes an approach that SRI is a generic term covering sustainable, responsible, socially responsible, ethical, environmental, social investments and any other investment process that incorporates environmental, social and governance issues [8, p. 6].

SRI now is playing a great role in promoting responsible investment as values and aims of investors are changing. Investors take into account environmental problems and product safety, compliance with international norms and standards, religious beliefs, shareholder's engagement and investing in poor communities. World financial crisis emphasized the urgent need for social responsibility for the sustainable functioning of financial markets. Still there are some doubts about the potentialities for successful development of SRI (Table 6.13).

SRI is becoming a growing area of interest for the investor's community both in developed and developing markets investing in equities, bonds and real estate. Search for a stable long-term competitive and sustainable return is becoming more and more important for most investors in order to fulfil their fiduciary duties and assist local communities by developing products that will yield community and environmental benefits.

Table 6.13

## Factors promoting and limiting Socially Responsible Investment

<b>Factors promoting SRI</b>	<b>Factors limiting SRI</b>
Responsibility for the client and fiduciary duty	Low level of awareness of SRI as an investment option
Clients demand and their need for transparency	Increased investment risks
Personal values and goals	Lack of knowledge
Institutional mission	Absence of qualified counselling and expertise
Aspirations to contribute to advancements in social, environmental and governance practices	Lack of prospective products, promising investment options
Promotion of the stronger corporate social responsibility	Limiter possibilities of control
Need to build long-term value for companies and their stakeholders	Distrust in information provided by companies and concerns about distorted information (greenwashing)
Concerns about the impact of short-termism and search for a stable long-term competitive return	Difficulties to make solutions based on an analysis of companies annual reports, suspicions for “window dressing”
Pressure from competitors	
Transfer of the assets for the next generation	
Initiatives and support from companies board	
Possibility to solve climate change and other environmental problems	
Assistance to local community development	
Growth in the issuance of Green bonds	
Possibilities for greater diversification	

Despite that, there is a believe that SRI tends to underperform the overall market as investment returns can be lower while this is the most important factor for prevailing part of investors. Now a number of organizations are assessing mutual funds and other investment firms on their returns and the evidence is that MSCI KLD 400 Social Index out-performed S&P 500 in the period of April 1990 – March 2016, the same results were obtained in the period April 1990 –June 2015 [12, p. 1]. Deutsche Asset & Wealth Management and University of Hamburg in 2015 conducted a study which was based on the aggregation of the findings and data of 60 academic review studies. The results showed that only 10 per cent of the studies revealed a negative environmental, social and governance criteria and corporate financial performance relationship with a significant share of positive results, 47.9 percent of which in vote-count studies and 62.6 percent in meta-studies project positive findings [6, p.4].

SRI offers a wide range of strategies – combining different issues in different ways. The way how issues are applied to an investment options, can be specified as the SRI „approach“ or

SRI „strategy“. The classification given by the Global Sustainable Investment Review becomes a global standard of classification [9, p. 3].

*Negative / exclusionary screening:* the exclusion from a fund or portfolio of certain sectors, companies or practices based on international standards or conventions, ESG criteria or using Norms-based screening. In keeping with the desire to limit their reputational and financial risks, to reveal value-based investment approach, the elimination strategy is most commonly used in the following sectors: 1) tobacco production; 2) alcohol production; 3) weapon production; 4) gambling; 5) adult entertainment. Other areas, that are often refused to invest, are experiments with animals, nuclear energy, and genetically modified organisms. The application of this strategy has been steadily increasing over the past year.

The application of Negative / exclusionary screening strategy is criticized as such an approach which limits the investment in the sectors or industries traditionally treated as “sinful” in certain areas but at the same time providing positive, sustainable characteristics in other areas. Limitation of “sinful” sectors or industries in the investment portfolio can also hinder potential diversification and / or growth of capital opportunities, as well, any self-imposed portfolio constraints can often also present constrained portfolio growth potential [4, p. 3]. Hong and Kacperczyk provided an evidence of significant effects of social norms on markets by studying the investing environment of “sin” stocks – publicly traded companies involved in the production of alcohol, tobacco, and gambling. They found out, that there was a significant price effect on the order of 15-20 percent from large institutional investors shunning “sin” stocks [10, p. 35].

*Positive / best-in-class screening:* investment in sectors, companies or projects selected for positive ESG performance relative to industry peers. Best-in-Class is one of those “positive strategies” and other approaches that fall under the same classification: Best-in-Universe and Best-Effort [7, p. 12]. This approach is a pragmatic view that aims at promoting the best practices of companies despite the industry it operates. SRI fund can invest in the oil or gas sector despite the fact that sector activities are related with carbon emissions, but only in those companies which are the “best in class”, as portfolio carbon footprint is very important to responsible investors. In fact, Best-in-Class approach can integrate many dimensions, not just carbon emissions, i.e. all ESG criteria. Best-in-Class ESG portfolio consists of companies that meet both an ESG and financial criteria.

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*Norms-based screening*: screening of investments based on compliance with international norms and standards, also with exclusions of investments that are not in compliance with norms or standards or over and underweighting. This strategy enables the investors to assess the extent to which companies respect issues that impact ESG criteria by sticking to global norms on environment security, human rights, labour standards and anti-corruption. Global norms are set out in international initiatives, declarations, protocols, convention and guidelines such as the OECD Guidelines for Multinational Enterprises, the ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy, the UN Guiding Principles on Business and Human Rights, the Universal Declaration of Human Rights, the UN Global Compact, the Kyoto Protocol, The Montreal Protocol, the Oslo Convention on Cluster Munitions, the Ottawa Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, Conventions on Biodiversity, UN Framework Convention on Climate Change, UN *Convention against Corruption*, *The UN Declaration on the Rights of Indigenous Peoples and others*. When it is fixed that the companies which are in the portfolio violate one of these standards, investors conduct a deeper analysis and take actions: 1) removal from the portfolio; 2) participation / cooperation. Practice shows that one and the other actions are used to a similar extent. Norms-based screening can be used as a standalone strategy, or together with other strategies, mostly Negative / exclusionary screening and Corporate engagement and shareholder action.

*Environment, social and governance (ESG) integration*: the systematic and explicit inclusion by investment managers of environmental, social and governance factors into financial analysis, so sustainable investment criteria are used alongside traditional financial criteria in managing and selecting investment. ESG performance indicators may include key performance indicators: Environmental: climate change (gas emissions), environmental management systems and compliance, efficiency (waste, water, and energy), other environmental issues (e.g. toxics, biodiversity), etc.; Social: workplaces health and safety, human capital management, stakeholder management / license to operate etc.; Corporate Governance: board effectiveness, corporate



conduct (e.g. bribery and corruption), etc. Besides them, investors need appropriate supplementary indicators according to most important aspects. These may be based on internal and external audits, on which basis the company shall develop the supplementary indicators [11, p. 196].

*Sustainability themed investing:* investment in themes or assets specifically related to sustainability. This strategy includes plenty of themes, which allow investors to pick up specific areas of investment, representing a close link to sustainable development. Themes that cover this strategy are preferred by investors who wish to focus on one or more issues. Fund managers select companies that fit their investment priorities supporting and encouraging progressive, dynamic, sustainable businesses. Such events as adoption of The Sustainable Development Goals in 2015, global agreement on the reduction of climate change adopted in UN Climate Change Conference in Paris (2015) encouraged investors to redirect capital forward the transition to a low carbon economy, renewable energy, buildings sector, land use / forestry / agriculture, water management, waste management; also to healthcare, education, safety, well-being, gender equality, jobs and economic growth, etc. The appearance of new products and herewith new investment possibilities stimulated the growth of sustainability themed investment. A Sustainability themed investing strategy is used as a standalone strategy or together with other strategies, in most cases with Positive / best-in-class screening, Environment, social and governance integration, Norms-based screening.

*Impact / community investing:* targeted investments, typically made in private markets, aimed at solving social or environmental problems, and including community investing, where capital is specifically directed to traditionally underserved individuals or communities, as well as financing that is provided to businesses with a clear social or environmental purpose. Impact investors seek to get measurable social and environmental benefits together with financial return. Much attention is paid to impact investing ability to generate market-rate returns, some investors are satisfied with below-market-rate returns as the valuable roles below-market investments can play in the market, including taking on more risk, investing in untested models or regions, and, in some cases, preparing businesses for scale investors [1, p. 5]. Impact investors as well as Sustainability themed investors actively track the financial performance of their investments with respect to the Sustainable Development Goals (SDGs) and COP 21 agreement.

*Corporate engagement and shareholder action:* the use of shareholder power to influence corporate behaviour, including direct corporate engagement, filing shareholder proposals, and proxy voting. Corporate engagement and shareholder action has a very strong relation with fiduciary duty, because shareholders are stewards of assets and they are responsible to their beneficiaries for the management of those assets. Shareholder engagement is one of the most

promising and powerful tools in the SRI toolkit to foster change in the way in which companies conduct the business and to promote longer-term and constructive relationships between investors and their investee companies [14, p. 5]. In the 2013 Eurosif Shareholder Stewardship report, Eurosif revealed different motivations concerning ESG engagement: maximising risk-adjusted returns, improving business conduct, advancing ethical or moral considerations, contributing to sustainable development. Investors see engagement as a part of their fiduciary duty to beneficiaries, while industry experts note that one of the keys to constructive company dialogue is developing a business case for change and keeping up a good level of interaction with companies [14, p. 6].

The financial crisis disclosed that shareholders in many cases encouraged managers' taking excessive short-term risk, therefore the European Commission in 2014 published a proposal for the revision of the Shareholder Rights Directive. The proposal was one of the initiatives announced in the Commission's "Action Plan: a modern legal framework for more engaged shareholders and sustainable companies". The European Parliament and the Council in 2017 adopted a directive aimed at strengthening shareholders' engagement in big European companies. The new directive establishes specific requirements in order to encourage shareholder long-term engagement and increase transparency. These requirements apply to:

- 1) oversight over directors' remuneration;
- 2) identification of shareholders;
- 3) facilitation of shareholders rights;
- 4) transparency for institutional investors, asset managers and proxy advisors;
- 5) related party transactions [2, p. 2-9].

The new directive will help to encourage shareholder long-term engagement, enhance transparency between companies and shareholders (transactions, reliable remuneration policy, information about shareholders, etc.), and improve financial and non- financial performance of the companies.

Globally, in 2016 – 22.89 trillion USD of assets were professionally managed under responsible investment strategies, respectively -18.276 trillion USD in 2014, and 13.3 trillion USD in 2012. SAI assets in comparison with all professionally managed assets increased from 21.5 percent in 2012 to 30.2 percent in 2014 and reached 26.3 percent in 2016 [9, p. 3; 8, p. 3].

The largest sustainable investment strategy globally was Negative / exclusionary screening (15.02 trillion USD in 2016 and 12.05 trillion USD in 2014), next was ESG integration (10.37 trillion USD in 2016 and 7.5 trillion USD in 2014) and Corporate

engagement and shareholder action (8.37 trillion USD in 2016 and 5.9 trillion USD in 2014). Negative / exclusionary screening was the largest strategy in Europe, when ESG integration prevailed in the United States, Canada, Australia / New Zealand and Asia ex Japan. Japan’s primary sustainable investment strategy in 2016 was Corporate engagement and shareholder action [9, p. 8; 8, p. 8].

Investors use different SRI strategies at a regional level. In Europe Negative / exclusionary screening, Corporate engagement and shareholder action, Norms-based screening strategies are used on a similar scale. Least used strategy was Impact / community investing which prevailed in Asia. Corporate engagement and shareholder action together with Norms-based screening strategy are not yet in use in Asia and Australia / New Zealand. Positive / best-in-class screening overcomes other strategies in the United States while this strategy in Canada was rarely applied. Canada’s asset managers favoured Sustainability themed investing strategy (Table 6.14).

Table 6.14

Regional Share, by Asset Weight, in Global Use of SRI Strategies, % [8, p. 11]

Region	Negative/exclusionary screening	ESG integration	Corporate engagement and shareholder action	Norms-based screening	Positive/best-in-class screening	Impact/community investing	Sustainability themed investing
Asia	0.1	0.2	-	-	0.2	5.4	2.5
Australia / NZ	0.1	1.2	-	-	-	1.8	2.8
Canada	3.3	5.7	11.6	11.6	0.3	3.6	27.7
US	30.9	36.9	24.4	24.4	50.5	63.5	18.1
Europe	65.6	56.0	64.0	64.0	49.0	25.7	48.9

Elaboration of the situation in Europe revealed the growth of all main strategies. The use of *Best-in-Class* strategy has grown by 40 percent during the last two years (from 2013 to 2015), and 3.8 times from 2007. France was the leader in the Best-in-Class approach with a CAGR of 36 percent. Fast growth was observed in the Netherlands with a CAGR of 93 percent, in the UK with a CAGR of 58 percent and especially in Poland – CAGR of 2894 percent (very low starting point), and only Sweden reduced the assets under management (-52 percent CAGR). The growth rate of *Sustainability Themed* strategy during the last two years was 146 percent and increase 5.5 times from 2007. The largest increase was fixed in France, with a sharp boost with a CAGR of 213 percent, when other European counties also experienced growth with a CAGR from 8 to 100 percent. Large growth in some

cases can be explained by the fact that the countries did not apply this strategy or applied it on a limited scale. For instance, Poland experienced growth with a CAGR of 100 percent during the last two years, while this strategy was not in use at 2013. A similar situation was in Austria and Spain. Austria had an increase with a CAGR of 82 percent, and Spain with a CAGR of 91 percent. Investment directions were diverse but construction sector (24 percent), renewable energy (20 percent), water management (13 percent), energy efficiency (11 percent) were the most preferred themes. *Norms-Based Screening* in the last two years has grown by 40 percent. Information about the use of this strategy is collected only from 2009 and during 2009-2015 period the employment of this strategy increased by 415 percent. France was the leader and the Netherlands was the second in the row, while other European countries applied this strategy less frequently. However, fast growth was recorded in Switzerland with a CAGR of 152 percent, Poland with a CAGR of 89 percent, and Belgium with a CAGR of 58 percent. *Engagement and Voting* was the third most popular strategy in context of value of assets under management after Exclusions and Norms-based screening. The strategy grew by 215 percent in 2007-2015 period and 30 percent in the past two years with a CAGR of 14 percent. On European level the UK continues to be the leader in use of this strategy with dramatic growth and a CAGR of 22 percent. The Netherlands is the second by the value of assets; however a CAGR was only 5 percent. Switzerland reports a meaningful growth with a CAGR of 103 percent; still Finland, France, Italy, Poland registered the decline (Finland a CAGR of – 4 percent, France a CAGR of – 17 percent, Italy a CAGR of – 11 percent, Poland a CAGR of – 100 percent). Consistent growth of *Exclusions* strategy in Europe has shown its attractiveness for various investors. About 44 percent of professionally managed assets were acquired using one or more (voluntary) exclusions. The strategy has grown more than 6 times in 2007-2015 period and 48 percent in the past two years with a CAGR of 48 percent. On a country level, Switzerland leads with CAGR of 20 percent, and then Germany goes with a CAGR of 42 percent. The largest growth was fixed in the UK (99 percent CAGR), other European countries also increased market value of assets managed by Exclusions strategy [7, p. 2-30].

Sustainable investing represents a significant share of the market especially in Europe and Australia, where it makes up more than 50 percent of professionally managed assets, as well as in the United States and Canada, where its share is big enough and is constantly growing (Table 6.15).

Global sustainable investment assets increased, but at a slower rate than in 2012-2014 when the increase reached 61 percent (Table 6.16).

Table 6.15

## Proportion of SRI Relative to Total Managed Assets, % [8, p. 7]

Region	2014	2016
Europe	58.8	52.6
US	17.9	21.6
Canada	31.3	37.8
Australia/NZ	16.6	50.6
Asia ex Japan	0.8	0.8
Japan		3.4
<b>Global</b>	30.2%	26.3%

Note: Asia figure includes Japan in 2014, but excludes Japan in 2016.

Table 6.16

## Growth of SRI Assets by Region 2014–2016 [8, p. 7]

Region	2014, \$ billions	2016, \$ billions	Growth over period, %
Europe*	10.775	12.040	11.7
United States	6.572	8.723	32.7
Canada	729	1.086	49.0
Australia/New Zealand	148	516	247.5
Asia ex Japan	45	52	15.7
Japan	7	474	6689.6
<b>Total</b>	<b>18.276</b>	<b>22.890</b>	<b>25.2</b>

\*Note. In 2016 Eurosif changed SRI assets calculation methodology

Within two years Japan has been the fastest growing region, and information about Japan has been provided separately from Asia. But by now the proportion of global SRI assets in Japan is only 2,1 percent, when Europe reached 52.6 percent (63.7 percent in 2014) and the United States 38.1 percent (30.8 percent in 2014).

The popularity of socially responsible investment around the world is expected to continue growing more rapidly changing the world of present and future generations and giving new opportunities for all. Immense sums of money from the rapidly growing professional asset managers (retail or institutional) are channelled to environmentally and socially responsible companies and it is a chance for conscious investors to support sustainability and get financial benefits. As more information and more SRI funds become available, it becomes easier to form diversified portfolios in order to satisfy specific needs of SRI investors.

The companies with strong social and environmental track are gaining momentum and this contributes to customer's loyalty, and at the same time helps their triple-bottom line. Hence, SRI can change company's behaviour promoting social responsibility, transparency and accountability, stimulate social and environmental innovations.

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## **6.9 NON-FINANCIAL REPORTING AS A TOOL OF VISIBILITY COMPANY'S ACTIVITIES TO ENSURE SUSTAINABLE DEVELOPMENT\***

The development of entrepreneurship in Ukraine on the principles of corporate responsibility requires the search for effective methods for making managerial decisions, one of which is the creation of a comprehensive scientific and methodical approach to assessment of the economic, social and environmental impact on society. The absence of social cohesion on the carrying out market transformations and a high level of transaction costs of the interaction of economic entities causes the increase of the contradictions in the parameters of sustainable development of the economy and the country as a whole. To date, corporate social responsibility is at the stage of its formation in Ukraine. The representative offices of foreign companies are the most active in this field. They transfer the modern world practices, principles and standards, as well as the largest Ukrainian organizations to the Ukrainian basis.

Social or non-financial reporting is an effective tool for informing the stakeholders of the organization (shareholders, employees, partners, local community, international community and society as a whole) about the implementation of the goals that are set in the organization's strategic development plans for economic sustainability, social welfare and environmental stability. It should be noted that there is no single terminology on the title of reporting on various aspects of the social and economic responsibility of business (SERB) in world and domestic practice. In general, there are used such concepts as "Environmental, Social and Governance information (ESG)", "Social reporting", "Corporate Social Responsibility Reporting", "Corporate Responsibility Report", "Progress Report", "Sustainable Development Reporting", etc.

The organization that implements the principles of social and environmental responsibility in its activities, unites the goals of maximizing the profits with such goals of sustainable development as environment protection, improvement of population welfare as well as meeting not only the today's needs, but also of future generations (Fig. 6.10).

At the same time, certain control should be implemented both by the state through the system of regulatory legal acts and by the public (for example, through the influence of non-governmental organizations, including environmental ones) in order to achieve the set goals. For this reason, organizations should publish reports on their activities, and not only financial but also non-financial performance results, including reports on sustainable development and reports on

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\*The material is prepared within the research work "Corporate social and environmental responsibility for sustainable development: partnership of stakeholders of real, financial and public sectors of the economy" (Reg. No. 0117U003933)

social (or social and environmental) responsibility of business. In addition, the so-called integrated reports, which combine the financial and non-financial performance results of the organization, become more popular. Accordingly, after the publication of these reports, a certain reaction from the public is expected. This reaction may cause certain changes in the managerial actions of the organization in the future, because the results of the implementation of the mechanism of social (and social and environmental) business responsibility are effective enough. They create both material and non-material reward for the organization during the long-term period, ensure the strengthening of the organization’s positions in the market, the preservation of the consumer base, contribute to the improvement of organization’s reputation, brand value, the staff motivation and provide other advantages [1].

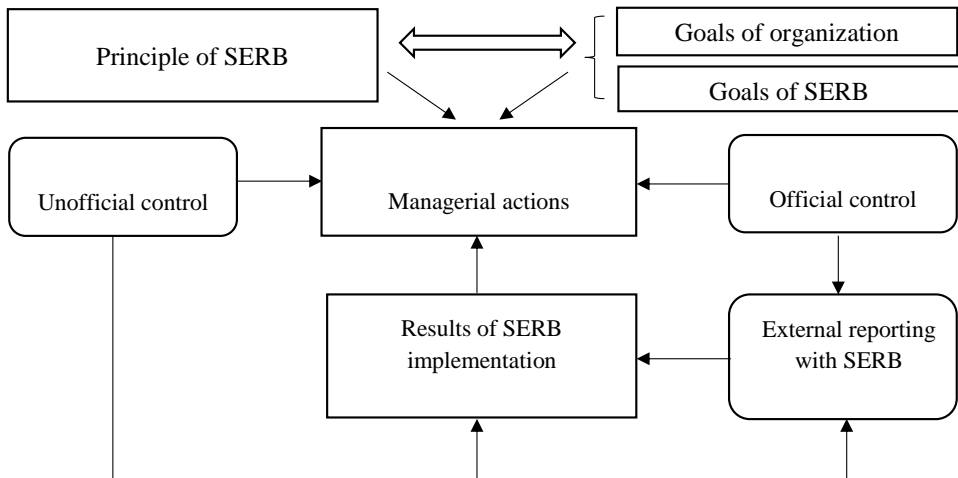


Figure 6.10. Conceptual foundations of organization development based on the principles of the social and environmental responsibility of business (developed on the basis of [1])

The importance of access to the information on the environmental, social and management activity of the organization is widely recognized both in foreign and domestic literature. The absence of transparent corporate information on the results of the organization activities restrains the responsible behavior. For organizations themselves, non-financial reporting is a tool of increasing competitiveness in the market and reducing the risks of activities. For communities and society that was affected by the organization activities, the disclosure of non-financial information allows to defend the rights and restore confidence in business. For investors and interested parties, non-financial reporting is also a way to enhance the stability and predictability of organization’s performance results in financial markets.



The foundations of quantitative and qualitative assessment of social and environmental responsibility were laid down by following fundamental international initiatives and standards [3; 14]:

- Global Reporting Initiative (GRI), which provides a methodology for integrated reporting and which includes the organization's economic, environmental and social performance results;

- EFQM Business Excellence Model is a model that describes the achievement of efficiency in the activities of economic entity in accordance with the interests of society;

- Account Ability (AA1000) is the basic standard that gives recommendations for assessment of the performance results of the organization from an ethical standpoint, taking into account the social responsibility of the business and the impact on the environment;

- ISO 14000 is the standard of environmental management, the purpose of which is to reduce the negative impact of production activities on the environment;

- SA 8000 is the standard of certification of economic entities in the field of labor relations, which, among other things, includes norms for the observance of safety in organizations and the health of employees;

- AA1000 AS is the standard of social reporting of organizations. It is developed by the British Institute for Social and Ethical Accountability, which is intended to assess the performance results of the organizations from an ethical standpoint and provides a procedure and a set of criteria by which social and ethical audit of their activities can be carried out.

In the international arena, the UN Global Compact has been working in the field of human rights, labor, the environment and combating corruption since 1999. This document was adopted on the basis of general consensus and is aimed at developing of social responsibility of business. Organizations from different countries of the world can voluntarily join the UN Global Compact in order to exchange experience and best business practices in the social field and in the field of environmental protection (and thus, without violating the principles of competition, to introduce principles of social responsibility not only at national level, but also at regional and global levels). This compact approved 10 fundamental principles of the social responsibility of business by such directions as environmental protection, protection of human rights, combating corruption and labor relations. At the same time, three principles in the environment field include environmental aspects, and suggest that economic entities should use the precautionary principle in environmental issues solving; should implement initiatives aimed at increasing responsibility for the state of the environment as well as promote the distribution and involve environmentally safe technologies [13].

In addition to the UN Global Compact, as long as there are several other regulatory documents that regulate the relationship of corporate social responsibility within the European Union, in particular:

- The Treaty of the European Community and the European Union (which guarantees free movement of goods, persons, services and capital to all EU citizens);
- ISO 9000 (a series of standards that are used to develop and improve the quality management systems of organizations).

The international standard ISO 26000 states that “social responsibility is a precondition for the survival and welfare of mankind” and the corresponding technical tools from the ISO 14000 series of standards should be taken into account while evaluating the organization’s environmental activities, including measuring greenhouse gas emissions, while assessing the life cycle, environmental labeling, etc. [7]. Thus, ISO 26000 is aimed to promote the sustainable development.

Domestic and foreign scientists are still looking for approaches to quantitative and qualitative assessment of corporate social responsibility and social and environmental responsibility of business.

V. Yevtushenko in her research [15] provides detailed overview of approaches to assessment of corporate social responsibility. At the same time, she emphasizes that it is necessary to combine qualitative and quantitative assessment methods for a comprehensive assessment of social responsibility of business.

For example, O. Chernykh [6] suggests a set of indicators for the quantitative assessment of the index of internal and external social responsibility of the organization and the index of social activities, as well as for a qualitative assessment of the social responsibility index. As a result, the author examines an integrated indicator of the level of social responsibility of the organization, which, in our opinion, can be applied with some modification to make decisions on the management of the thermal power enterprise at strategic level. At the same time, the share of the environmental component in the suggested methodology remains insignificant and is described only by qualitative indicators, such as environmental monitoring of production activities, programs on environmental protection and resource conservation, participation in international environmental initiatives, application of international environmental quality standards. At the same time, the criterion “presence/absence of this feature” is applied for these indicators.

It should be noted, that the experience of using qualitative indicators for assessing the level of social responsibility of organizations is quite widespread. For example, in research of N. Krichevsky and S. Goncharov [10], the following indicators are used:

- presence of a collective agreement in the organization;
- presence of an organizational structure in the organization, which is responsible for social policy conducting;
- publication of the annual social report about measures on corporate social responsibility that were conducted in accordance with international standards;
- determining of the attitude of society towards measures in the field of social responsibility of business;
- specific measures to support good business practice.

O. Berezina [3] suggests to take into account two main components in the index of social responsibility, namely “corporate citizenship” (payment of taxes, investments), as well as charity and social investment. At the same time, the author takes into account the ecological component only indirectly through health and labor protection.

N. Tovma [12] offers to assess corporate social responsibility with help of integral efficiency index of the social program, which takes into account both quantitative and qualitative indicators. At the same time, the author suggests to include such quantitative indicators as wage growth, employee turnover, admission of young specialists, etc. to the integrated indicator. There are collective agreement, a social report, etc. among the qualitative indicators.

O. Mazurik and T. Yereskova [11] distinguish the integral qualitative index of social investments, which consists of two partial indices: a quality index of social investments for a certain organization and a qualitative index of social investments for a certain feature.

Krichevsky and S. Goncharov [10] suggest to apply indicators of corporate social responsibility to employees, society, as well as indicators of environmental responsibility among all quantitative indicators. These scientists, as in the previous method, include the presence of a collective agreement in the organization, drawing up of social reports, etc. to qualitative indicators.

O. Vorona [14] uses a set of qualitative indicators to assess the level of social responsibility of business, which are united in four main groups: Personnel, Business, Society and Image.

In our opinion, the approach proposed by the Association of Managers is interesting. According to this approach the authors suggest a list of private indicators of quantitative and qualitative assessment of the index of social investments. Among the quantitative indices of social investments, it is proposed to use three main indices [4]:

- 1) index of unit social investments;
- 2) share of social investments in total sales;
- 3) share of social investment in the total amount of profit before taxation.

Financial reporting of the organization that contains information on the financial condition of the organization, the financial results of its activities, changes in equity and cash flow data for the period is one of the mandatory types of reporting. Non-financial reporting goes beyond the limits of financial risk management of the organization and stimulates business conducting in compliance with the principles of sustainable development. Financial and non-financial reporting complement each other, allowing stakeholders to get a more objective view of the organization. The differences of financial and non-financial reporting are presented in Table 6.17.

Table 6.17

Comparative characteristics of financial and non-financial reporting  
(compiled by the authors on the basis of [2; 8; 9])

Criteria for comparison	Financial reporting	Non-financial reporting
Purpose of compilation	Providing information on financial condition, financial results, etc.	Providing information on measures and results of activities in the social field, impact on the environment, etc.
Users	Internal and external	
Resources	Financial accounting data	Data of financial and management accounting, additional data on social and environmental activities of organizations
Submission form	Clearly regulated (according to the existing standards, the national legislation on accounting). Integrated reporting: balance; report on financial results; report on equity; report on cash flows; notes to the financial reporting	Free or in accordance with one of the system of standards, international norms ("Environmental, Social and Governance information (ESG)", "Social reporting", "Corporate Social Responsibility Reporting", "Corporate Responsibility Report", "Progress Report", "Sustainable Development Reporting", etc.)
Periodicity	Clearly defined: four/two/one time (s) per year	Undefined: once per a year or two or as needed
Degree of information transparency	Limited	Complete
Mandatory independent audit	Independent audit is mandatory for public organizations	Independent audit is mandatory for public and state organizations in some countries
Horizon	It reflects the results of the previous periods and the current condition	Reflects previous results, current condition and plans for the future taking into account the long-term strategy of organization
Level of responsibility	One-time material, criminal, administrative in compliance with the law and internal regulations	It is not defined by Ukrainian legislation, deferred and prolonged, affects further relationships with stakeholders
Types of measures	Value	Value, quantitative and qualitative
Types of indicators	Financial (economic)	Economic, environmental, social

To date, the corporate social responsibility as well as social and environmental responsibility of the organization in particular, are important. However, they are not the defining aspects of the business strategies of organizations, especially when it is referred to Ukraine. Sector analysis showed that the highest level of information disclosure on CSR can be observed on the websites of the companies of IT/Telecom, energy, agro-industrial complex, mining and metallurgical sectors. They have the level of disclosure that is higher than average. The companies of the sector have the lowest indicators of disclosure. Companies of IT/Telecom and mining and metallurgical sectors traditionally have high levels of information disclosure [5].

The dynamics of the number of companies that posted their CSR reports on the websites is given in Fig. 6.11.



Figure 6.11. Number of CSR-reports that were posted on the websites of 100 biggest companies of Ukraine (developed on the basis of [5])

Besides, CSR Development Center has determined that national and international companies have the same level of information disclosure. International companies, in contrast to national ones, pay more attention to the coverage of human rights issues (27.7% vs. 10%),

the disclosure of the CSR strategy (33.3% vs. 14.5%) and codes of ethics (33.3% vs. 26%). National companies provide more information about labor relations and availability of certificates of conformity to the standards of environmental management, quality, etc., than international companies [5].

It is important for companies to understand that interaction with stakeholders should not be limited only by informing them about achieved success. The interaction should be considered as a regular sequential process that is based on creating a dialogue between the company and its stakeholders. Keeping non-financial reporting and submission of it to stakeholders are the preconditions for demonstrating socially and environmentally responsible behavior of organizations.

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## 6.10 PARADIGM OF MANAGING ENVIRONMENTAL AND ECONOMIC SAFETY\*

Environmental and economic safety in enterprise activity is specified by incomes receiving, market positions holding, market advantages strengthening, sustainable development providing, etc. It is possible to provide safety only through right choice of the product policy, production optimal business-portfolio formation, which corresponds to the general goal of the enterprise, the views to interrelation between risk and incomes, the ecodestruction or ecoconstruction level at all producing, consumption, utilization stages of innovation during its life cycle and customer cycle.

For the study purpose hereof **innovation life cycle** is regarded as a system dynamic development process, which under some conditions constantly turns from intellectual to technical and economic one. In other words, **innovation life cycle** is the period of time, during which economic effect from creation, production, consumption and utilization of innovation is observed considering its market life. It comprises two interconnected cycles: *innovative* ("materialization" of ideas, inventions and investigations into new technically embodied production types, means and labor objects, technologies and organizations of production) and *market* ("commercialization" of innovations, which turns them into income source), which are superimposed on one another in time (Fig. 6.12).

**Customer cycle of innovation** is suggested to regard as a period when originating resource gets consumer's features, which are necessary for effective satisfaction of consumers' demands, during which one can see environmental and economic effect from its production, consumption and utilization in the long-term perspective. Its start has to be the moment from works beginning with attempts to embody material plan. Customer cycle of innovation shows environmental and economic estimation of the effect from creation, production, consumption of innovation, and also processing and destruction of wastes during innovation life cycle and after its exit from the market and from the consumption sphere. Contrary to the innovation life cycle, the customer cycle of innovation is not ended with stage of exit from market. It has also the ecoreaction stage (Fig. 6.12), during which environment continues to be under ecodestructive or ecoconstructive influence, made by the processes of production producing, consumption and utilization, which has not been sold at the market already [4]. Thus, customer cycle of innovation defines time aspects to get ecological and economic results of the innovation production, consumption and utilization during its

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evolutionary development and after its exit from the market. Traditionally, customer cycle of innovation curve character is connected with innovation life cycle curve characteristic. That's why their analysis and prognostication have to be conducted parallelly.

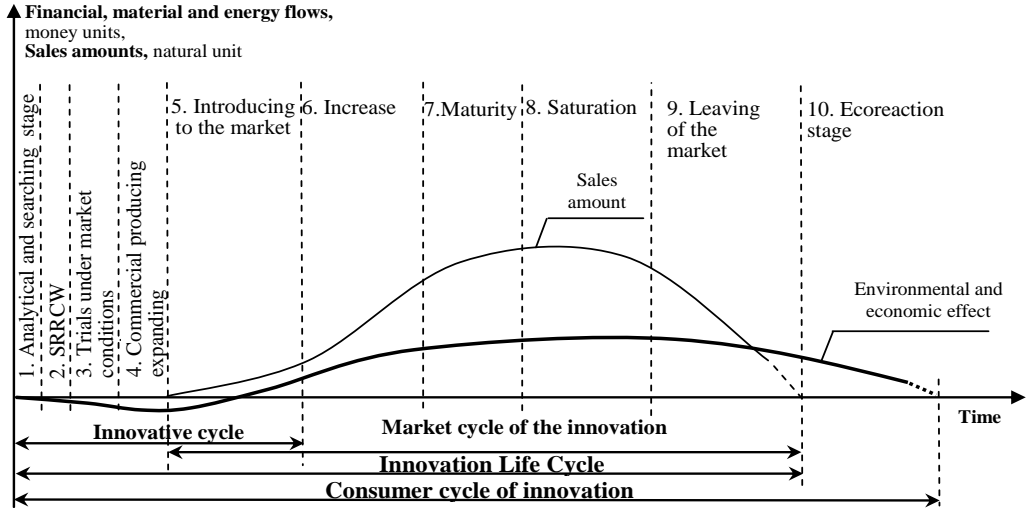


Figure 6.12. Correlation between innovation life cycle and consumer cycle of innovation [4]

It should be noted, contrary to the Life-Cycle assessment methodology unified in standards ISO 14040 (Environmental management – Lifecycle assessment – Principles and framework) and ISO 14044:2006 (Environmental management – Life cycle assessment Requirements and guidelines), its modification is proposed to use for environmental and economic evaluation.

Meanwhile, life cycle is observed from position of marketing approach symbiosis and Environmental Economics that will help to avoid double calculations in allied economic industries and at the same time to take into account investigation object's impact during its market cycle and at the ecoreaction stage. With purpose to unify indexes measuring units, it is better not to be limited with ecological estimation of the research subject impact on environment and to carry out economic estimation of its ecodestructive and ecoconstructive influence on the environment.

Thus, managing environmental and economic safety is based on the conception of the production business-portfolio formation that provides a high level of environmental and economic safety.

In general the following levels of environmental safety are distinguished [3]:



I Natural is not changed directly by human's economic activity (local nature feels only weak mediate impacts from global manmade changes).

II Balanced – speed of the reviving processes is higher or equal to the rates of the manmade breaks.

III Critical – speed of the manmade breaks exceeds rates of nature self-reviving, but great change doesn't take place in the natural system.

IV Crucial – reviving substitution of the previous ecological systems by manmade pressure for less ones.

V Catastrophic – hardly reviving substitution of the ecological systems under manmade pressure for less productive, strengthening of the less productive systems.

VI Collapse – not reviving loss of the biological productivity.

I-II levels of the environmental safety provide ideal conditions for human functioning, reviving and development, III-IV levels put at hazard the generations functioning, reviving and development, V level put at hazard the today's and future generations, VI – leads to human and other biological types of death [3]. According to thereof, I-II levels of the environmental safety correspond to the high level of environmental and economic safety.

Necessity of the portfolio production assortment comes from the product life cycle conception. As a result of scientific-technical progress development quickening, even the most successful goods get old and are substituted by those, which satisfy demands more effectively and have more integral effect on consumers and society from their production, consumption and recycling. This process is continual. That's why enterprises have to work simultaneously with three generations of innovations, which gradually follow each other. The ideal variant shows that sales amount dynamics has to provide stable increase of the financial flows at the enterprise from creation and realization of every innovation generation in relation to its economic effect maximization, or to stabilize them, as it is shown on example of innovations three generations uniting (Fig. 6.13).

The important conditions of achieving the high level of environmental and economic safety is work of an enterprise with environmental-oriented innovations, being socially responsible and being involved in resource-effective system of management of material and energetic flows, based on conception "zero wastes" and principles of circular economy.

The Fig. 6.13 shows that every new production generation development has to be started from that moment, when the existing innovative good with high demand is at the growing stage. In this case one can see some balance between incomes and runoff of the financial resources. It will make possible to use them effectively: square of the figure ABCD is equal to the total amount of the received incomes from innovation production and realization, that is in demand,

and that one, which leaves the market (figure ACD and ABD); the square of the figure EDF corresponds to the investments number to investigate and to organize new product. Thus, during the period, corresponding to the section AD, enterprise profit is formed owing to I and II generations innovations incomes. It allows to direct costs not only to investments in the investigation, creation and new production mastering (III generation innovations), and to enterprise development in other areas (in particularly, provision of nonproductive – social infrastructure, environmental measures, as well as activities for increasing its resource efficiency and energy efficiency, etc.). At the same time, when I generation innovation is at the stage of leaving the market, and II generation innovation is constantly coming from the growth to mature stage, and then saturation stage (it is ED in the Fig. 6.13), the enterprise gets the biggest total income, but its integral profit stays at the same stage as during time AE. Additional involving of the investment capital at the beginning of market leaving stage concerning III generation innovation does not cause misbalance in enterprise financial activity, which is effective, proved by its incomes constant integral level.

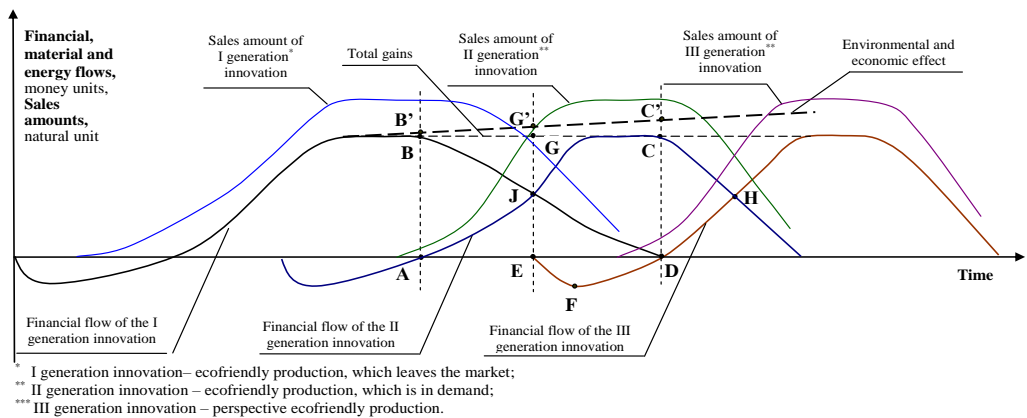


Figure 6.13. Model of the ideal uniting of three generations innovations

[developed by the authors]

It is important to note, enterprise activity ecologization allows to gain additional environmental and economic effect (it is the square of the figure B'C'CB) for the account of sales growth consequently following the increase consumers' loyalty to enterprise products, creation of closed cycle "production–consumtion–recycling", avoiding the irrational energy and human capital usage, reduction of costs for elimination of the consequences of the ecodestruction to the environment and employees, receiving less profits due to production hopd-ups (because of employees illness, strikes, etc.).

In order to provide sales amount increase (and thus efficiency) total profit curve must have slope. Optimal uniting of three innovations generations (Fig. 6.14), characterizing incomes integral level increase, allows enterprise to have the following advantages: to keep and strengthen market positions; to provide its development in other directions and sustainable increase of the profit in long-term period; to modernize producing funds (owing to reserve incomes (it is square of the figure ABGE – incomes from production, realization of the I and II generations innovations (thus squares of ABJE and AJE in Fig. 6.14)) during time, corresponding AE). In this case additional environmental and economic effect will increase more rapidly, than it has been showed on the previous figure (see Fig. 6.14). Besides, perceivable environmental and economic effect from I generation innovation will be observed much earlier, as it is showed on Fig. 6.14 (the square of figure OC'CB).

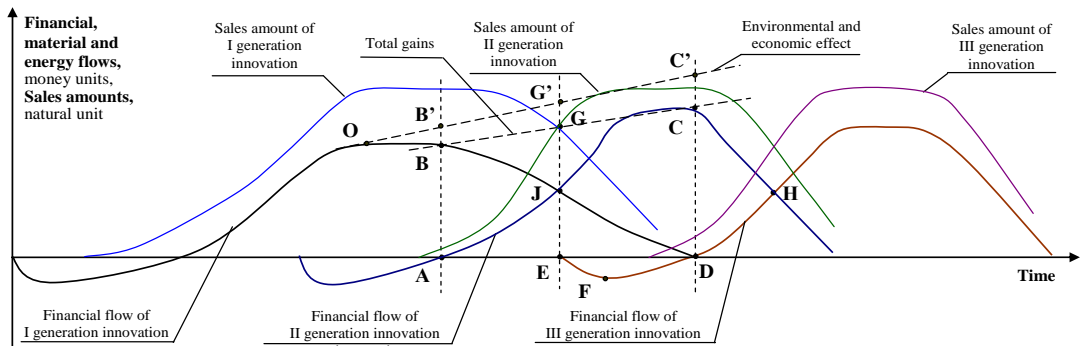


Figure 6.14. Model of the ideal uniting of three generations innovations, providing enterprise development [developed by the authors]

As it has been pointed above, the right uniting of various generations innovations is in the innovations life cycle control area. Prognostication of innovation life cycle stages and effective managerial decisions making in its crucial points allow to manage innovative activity economic and ecological security.

Logistic curve of innovation life cycle, which shows demand development dynamics (sales amounts) and financial flows (incomes) of the enterprise in time, is a tool, which allows to coordinate innovative activity and product policy at the enterprise. Progressive change of the existing tendency in the process of development proves the beginning of crucial moment, when the system comes from one stage into another one, i.e. it achieves the so called “trigger point” (“choice point”). It requires quick making of managerial decisions with purpose to stabilize the

system while transferring to another level and loss risk reducing. Making decisions, which differ greatly by their structure depending on innovation life cycle stage, is carried out on the basis of right choice estimation of the previous decisions, risk, prognosticated indexes in system development in future and expected ecological and economic effect by the chosen directions.

At the stage of the innovation creation crucial points are connected with decisions making process about project reasonability. Unsuccessful projects defects points match it. The most important among them are:

1) preceding selection of the best proposals among suggested ones concerning innovation investigation, which is conducted at the analytical and searching stage, based on innovation idea, target market, previous financial analysis study, estimation of the investigation possibilities and production, and making decision concerning reasonability of the business-project further realization;

2) making decisions on beginning of the innovation full-sized development, based on full financial and business-analysis, creation of samples and their testing in laboratory and market conditions;

3) decision making on commercial producing start and innovation introducing to the market.

The next group of crucial points is connected with innovation commercialization and decision making concerning marketing strategy choice at its market cycle stages. Let's observe specific nature of the transferring moments at every stage:

1) at the stage of market entering one makes decision on additional investments amount to produce and promote innovation;

2) at the stage of sales increase and maturity stage one makes decision on product quality and technical improvement increase, and also works to find ideas and to plan another innovation, which substitutes the current one and will be more effectively satisfy consumers' demands, are started, and decisions on its investigation starting are made;

3) at the maturity stage decision on expenses amounts is made to promote, realize the existing goods and to start bringing of the innovation to the market;

4) at the saturation stage expenses amounts are revised to stimulate demand on the ii generation innovation and to promote iii generation innovation to the market;

5) at the stage of market leaving one makes decision to decrease expenses amounts concerning existing goods, to improve features and to increase producing powers;

6) decision making on phase-out.

At every stage one has to make decision to investigate and to choose „forceful” enterprise strategy, transferring from one strategy to another that allows to achieve total goal of its activity owing to reaction to the possible market threatens.

Crucial points, ambiguity factors impacts and risk lead to essential increase of work period and enterprise expenses excess over the planned expenses. Owing to this fact, there is a necessity to increase efficiency to control innovation life cycle, to analyze current data and to form prognosticated indexes, matching innovation life cycle some stages, with purpose to make managerial decisions in time that will allow to reduce impact of the mentioned factors. Considering the above mentioned, one of the main tasks, which is valid within innovative process control, is prognostication of the innovation life cycle character and stages.

Thus, product policy planning at the enterprise is based on continues research, analysis and prognostication of innovation life cycle, some its stages duration. Innovation life cycle prognostication assists increasing of economic security at the enterprise, particularly: reducing of the losses risk, based on prognostication of actions development in possible situations in the market space total ambiguity; grounding of reasonability to realize innovative projects; and also providing of social ecological security, based on defining of possible changes in ecodestruction level after innovation introduction at the market during the whole consumer cycle of innovation.

In the management system prognostication of innovation life cycle allows to solve the following most important tasks: to provide ability of these or those results appearing in future (time of stages change, their duration etc); to foresee amounts of innovation sales; to define investments payoff term into investigation and production of innovations; to foresee possible changes of investments resources amounts depending on time of innovative production creation and production scales; to provide demand changing tendency. Besides, in the management system of ecological and economic security consumer cycle of innovation prognostication allows to solve the following tasks: to foresee possible ecological and economic results in future (time of stages change, their duration, dynamics of ecodestruction etc); to define investment payoff term into investigation and production of innovation both from the point of view of economic and ecological-economic efficiency.

Results of the conducted research allows to confirm about priority of consumer cycle of innovation investigation with purpose to manage ecological and economic security and reasonability to orient to further scientific studies for deeper investigation of its stages and crucial points.

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