STRUCTURAL RISKS AND SYSTEMIC DYNAMICS OF SOCIO-ECONOMIC DEVELOPMENT OF THE NATIONAL ECONOMY: THE EUROPEAN VECTOR

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Collective monograph

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Introduction

The low level of implementation of reforms and transformations under the Association Agreement between Ukraine and the EU is conditioned by the passivity and the financial inability of the existing state policy, a huge number of objectives and a small number of means of their achievement, the emergence of structural, institutional, investment and innovation risks and negative system dynamics of socio-economic development of the national economy, in particular: the absence of real opportunities to reform the policy of regulating the agricultural sector of the economy; the limited influence of the state policy on increasing the level of real incomes of population and reforming the system of social protection of employees and migrant workers; limited radical changes in the reorganization of local entrepreneurship and the slowdown in technological modernization of backward regions; market and sectoral transformations of the entities of the national economic system; imperfect budget mechanisms; the mismatch between educational potential and needs of innovative development of the economy of regions in conditions of the European choice.

The presented monograph is extremely important to Ukraine, because the economy of this country is on the verge of structural reforms that are needed for implementing the economic component of the agreement between Ukraine and the EU. At the same time, a number of objective reasons, having both internal and external nature, provoked a crisis in the development of Ukraine as an independent state. The aggression of Russia accelerates the formation and strengthening of civil society, which plays a significant role in combating the aggressor in all spheres, and necessitates reviewing the traditional model of economic and social development of the country. Therefore, the system dynamics in the national economy determine new directions of socio-economic development of Ukraine in the process of forming its own national security system.

The scientific paper consists of four parts, the first of which is devoted to the risks and threats of the investment and innovation development of the national economy; it also includes detailed researches that take into account the impact of the crisis in the Eurozone. Special attention is given to the identification of tendencies of the innovative processes development in the economy of Ukraine from 2000 to 2015; risks and threats to the system of investment and innovative activity of the economy are identified. The analysis of the dynamics and structure of world markets of interest rates and foreign exchange derivatives as well as the main trends and prospects of development of the modern derivatives market allowed determining ways to minimize structural risks of the national economy growth under conditions of

European integration. It is important to note that the monograph suggests interpreting the notion "investment policy of an enterprise" as a form of implementing the investment ideology and economic policy of the industrial and economic system at different stages of realizing investment activities and it supports the need for a strategic approach to the management of technological competitiveness of industrial enterprises.

The second part of the monograph includes some studies aimed at determining the theoretical and applied basis of the socio-economic model of branch reproduction of the economy of Ukraine. The experience of European countries shows that the solution to the problem of size and components of water use fees is closely linked to the notion of environmental policy efficiency. The low level of effectiveness of benefits distribution existing on the market requires an institutional reform that is designed to reduce the negative effects of bounded rationality of human behavior in the consumption of natural resources. The scientific and methodological approach to the definition of the notion "labor resources" and the results of evaluating the dynamics of their reduction demonstrate the risk of deficiency of this type of resources in 4 - 5 years. The scientific paper is strategic in nature as it contains elements of predictive development of individual resource components of the national economy. Thus, the authors attempted to predict the vector of labor potential reproduction of domestic enterprises in the short term.

The existing problems and threats of opportunistic transformations of the economic entities of Ukraine are most fully reflected in the next part of the collective scientific work. The authors are convinced that innovative development of the country lays the foundation for establishing and strengthening the competitive advantages of enterprises. Public support improvement, aimed at creating the positive innovative climate, is necessary for boosting innovative activity of the entities of the national economy. Given the high risk of deterioration of financial results of enterprises' activities in the context of structural changes in the national economy, it is vital to take anti-crisis measures. The proposed instruments of anti-crisis management of the economy are as follows: the reduction or optimization of costs, an efficient use of marketing and personnel policies, timely phased planning, and optimization of budgeting at each stage of the life cycle of companies. They will allow stabilizing the situation, reducing the impact of risks on its development and preventing a decrease in the market segment.

In the final part of the monograph, the scientists identified a number of problems and structural imbalances, which should be overcome by the efforts of the authorities regarding the development and implementation of activities within the framework of government economic policy. The solution for these problems will

contribute to the formation of a rational structure of GDP and it will create a basis for further growth of competitiveness of the national economy and improvement of the position of Ukraine in the world rankings of global competitiveness. Certainly, the European Union supports the less developed regions of member countries with the purpose of increasing their competitiveness and stimulating economic development indicators. However, most researches have shown that despite all efforts of the EU government, the inequality of regions remains significant, particularly in terms of economic efficiency and infrastructural development. Therefore, with the aim of enhancing local entrepreneurship and ensuring technological modernization of regions, the introduction of the "smart specialization" strategy is proposed. Among the ways of stimulating the development of economically backward regions, one suggests strengthening of competitiveness by using externally regional knowledge and participating in international networks of added value creation. It is proved that only the promotion of international cooperation by the state is the key to the successful solution for the problems of bilateral and interstate relations of Ukraine. The essence and theoretical bases of transnational integration of the agricultural sector are studied.

Today, the transitional model of national security is exhausting its possibilities, while being in the state of crisis. The emergence of this model, under pressure of irresistible circumstances of military and political nature, was inevitable. However, currently, there is an urgent historical need to change it, because it has almost exhausted its potential and does not work well. In addition, dynamic structural benchmarks and the European vector of socio-economic development of the national economy become one of the main indicators of overcoming the systemic crisis, calling for systemic changes and being one of the factors of these changes.

The team of editors of the monograph is convinced that the research paper, which is presented to a wide range of scientists, business representatives, teachers and candidates for a PhD, will draw attention to the means of promoting the implementation of reforms and changes in the national economy in the process of global and local transformations, structural imbalances, and social risks. The elimination of these negative phenomena requires involving a significant number of scholars and experts and it will contribute to the scientific substantiation of the directions of effective cooperation between Ukraine and the EU within the framework of implementation of the economic component of the Association agreement.

Part 1

RISKS AND THREATS OF THE INVESTMENT AND INNOVATION DEVELOPMENT OF THE NATIONAL ECONOMY: THE IMPACT OF THE EUROZONE CRISIS

University of Economy in Bydgoszcz, Publishing House

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RISKS AND THREATS TO THE INVESTMENT AND INNOVATIONS IN THE ECONOMY OF UKRAINE

Abstract. *The tendencies for development of innovative processes in the economy of Ukraine during 2000-2015 are singled out. In particular, the analysis of the volume of sold innovative products and their shares in Ukraine as well as the analysis of indicators of innovative activity of industrial enterprises are conducted; the share of innovation-active industrial enterprises of Ukraine by types of innovative activity and the level of financing research and innovative activities in Ukraine are defined; the level of creation and use of high technology by the spheres of application in the real sector of the Ukrainian economy is determined.*
According to the results of the analysis, systemic risks and threats to investment and innovative activity of the Ukrainian economy are revealed. They are: unequal allocation of capital, investment structures, research and innovative organizations, their intellectual and personnel potential in the territorial aspect; the reduction in the number of organizations performing research work and their human potential (especially, in business); a small fraction of the research organizations satysfying the needs of the subjects of separate kinds of economic activity with significant added value (industry, transport and communications, construction)

JEL Classification System: O 016, O 310
Key words: economic development, innovation, investment, financing, innovation, systemic risks, threats

Introduction. In the context of post-industrialization, global changes in the world economy and global uncertainties, a key challenge to the national economy is to create conditions that would result in the formation and implementation of successful reforms and lead to sustained economic growth. The intensive factors (investment, innovations) are of vital importance among factors to ensure stable development of the national economy. Accordingly, the openness of the economy of Ukraine and the necessity of its integration into the world economic environment as a country with a competitive economy intensify the need for early implementation of an innovative model of development.

An innovative type of development is characterized by shifting the focus onto the use of new progressive technologies, the transition to the production of high-tech products, advanced organizational and managerial solutions in the innovative activity, which concern both micro-and macroeconomic development processes such as the creation of technoparks, technopolicies, the implementation of the resource efficiency policy, intellectualization of all production activities, softization and servicization of the economy, etc.

The aim of the study is to establish modern trends of economic development in the national economy of Ukraine, identify its features in the context of carrying out the investment and innovative activity, as well as risks and threats to its implementation. The relevance of the immediate implementation of innovative processes in the activity of economic entities of Ukraine is proved by the fact that, historically, our state had a powerful industrial and resource potential, the use of which would allow, to a great extent, meeting the needs of domestic consumption with the help of the goods produced on the domestic territory, and also increasing the volumes of export, thus improving the place of the state in the system of the international division of labor.

However, an inefficient structural and innovative policy has led to the excessive saturation of the domestic market with imported products and the driving out of domestic producers, which is critically dangerous to the security of the national economy (especially for its components, such as macroeconomic, financial, external economic, social and food). Thus, in 2013, the share of goods manufactured on the territory of Ukraine in the total retail turnover fell to 58.1% (and has decreased over the last 5 years by 12.4 p.p.), and non-food items – to 39.3% (a decrease over the same period was 18.3 p.p.) [1].

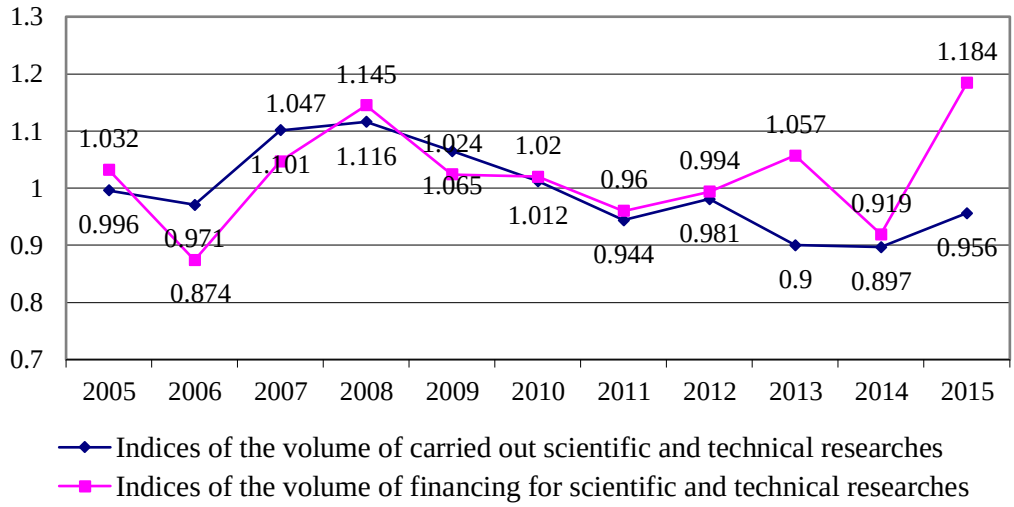
For many commodity groups of agricultural and industrial products, the production of which has traditionally been competitive for Ukraine, the share of domestic goods decreased to 10-15%. The tendency to increase import volumes of goods and services in Ukraine remains stable. Over the past five-year period, the indicator has increased by 2.3 times. While the pace of import growth is significantly higher than the growth rates of GDP and industrial production. The consequence of these negative trends is the decrease in the volumes of domestic production and GDP, driving out domestic producers from the domestic market, the reduction of the level of employment and the decrease in tax revenues, the existence of crisis phenomena in basic types of economic activity and their focus on the production and selling raw material, to a greater extent, or its only primary treatment.

[1] Internet resource of the State statistics service of Ukraine [Electronic resource]. – Available at: http://www.ukrstat.gov.ua, accessed 15.03.2017

It is known that the characteristic peculiarities of the innovative activity are its high expenses capacity and the dependence on investment, risks and a long payback period of investment, availability of material and technical, intellectual and personnel potential of the innovation-active entity. Therefore, it can be carried out only by those economic agents that have access to investments or are able to fund such works using money attracted from external sources (budget, business sector, non-residents, directly from educational and research institutions, etc.).

As we can see (Fig. 1), there is a close correlation between changes in the volumes of financing for scientific, scientific and technical works in Ukraine and the volumes of their carrying out, which proves the dependence of the research activity as an important prerequisite for the creation and implementation of innovations on expenditure on it.

Figure. 1. The indices of the volumes of scientific, scientific and technical researches and their funding in Ukraine in 2005-2015



Sourse: compiled on the basis of [2], p.65, 103; [3], p.116, 220-224

Obviously, this can be explained by the desire of educational and research structures to get a maximum of allocated funds under conditions of insufficient financing for this activity in the country (the share of total spending in Ukraine in 2015, in the GDP accounted for only 0.62%, including at the expense of the state

[2] Scientific and innovative activity in Ukraine in 2015: Statistical compendium. – K.: State statistics service of Ukraine, 2016. – 258 p.
[3] Scientific and innovative activity in Ukraine in 2012 : Statistical compendium. – K.: State statistics service of Ukraine, 2012. – 288 p.

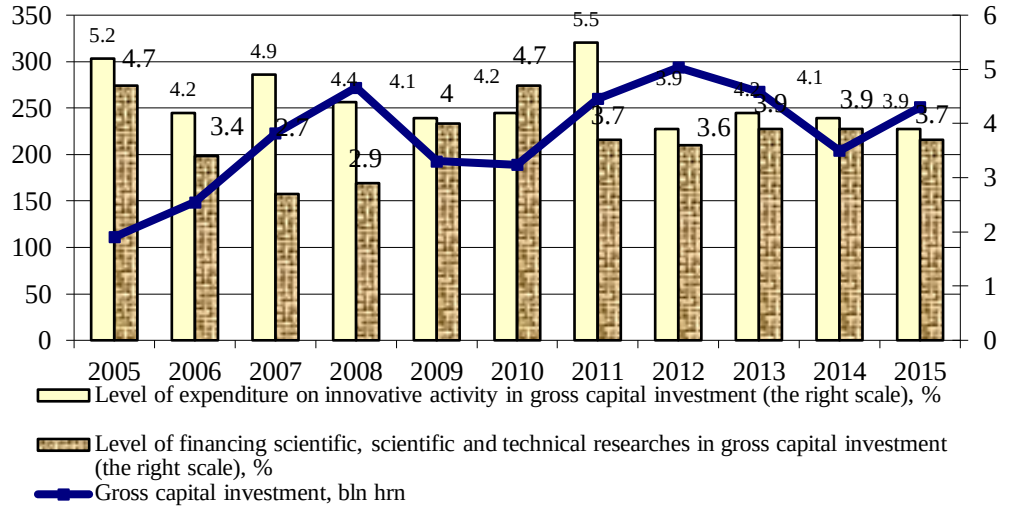
budget – 0.21%, while on average in the countries of the EU-27 it is 2.03%, and in Finland – 3.78%, Sweden – 3,37%, Denmark – 3.09%, Germany – 2.84%, and in Austria – 2,75% [4, p.64]).

However, there is a contradiction, when the volumes of funding are falling gradually, the amount of carried out works sharply goes down, because, firstly, some of them are long term ones, secondly, the part of them is implemented under the contracts of mutually beneficial cooperation, thirdly, the scientific interest in researches should not be determined solely by the financial factor.

Hence, the reduction in the indices of financing and implementation of scientific and research works in Ukraine for 2011-2015 should be interpreted as a negative trend. It is a considerable system macroeconomic risk, which has demotivating influence on scientific and research activity, and through it – on the innovative activity of domestic entities of the national economy and leads to deterioration of the investment environment for carrying out research activities and implementing their results into the real production.

The system risks and threats to the investment and innovative activity in the Ukrainian economy include small investment importance in this process (fig.2).

Figure.2. Gross capital investment and the level of financing for scientific and research and innovative activities in Ukraine in 2005-2015



Source: compiled on the basis of [5], p. 65, 86-87; [6]p. 77, 173; [7], p. 12

[4] Scientific and innovative activity in Ukraine in 2015: Statistical compendium. – K.: State statistics service of Ukraine, 2016. – 258 p.

[5] Scientific and innovative activity in Ukraine in 2015: Statistical compendium. – K.: State statistics service of Ukraine, 2016. – 258 p.

[6] Scientific and innovative activity in Ukraine in 2012: Statistical compendium. – K.: State statistics service of Ukraine, 2012. – 288 p.

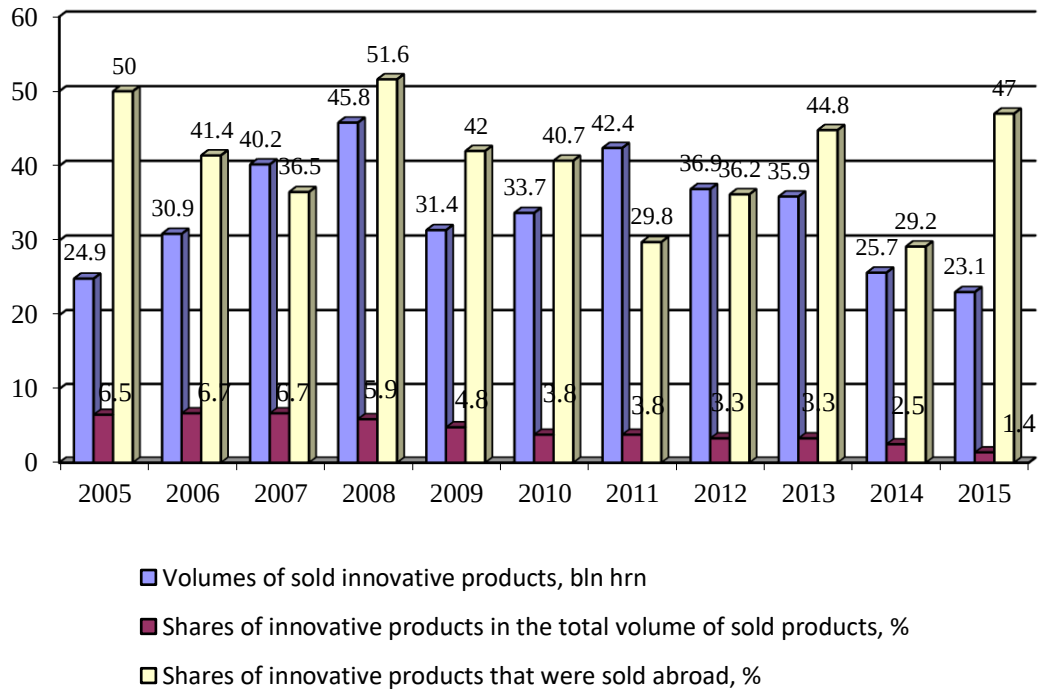
Thus, in our state, one can observe the rise of gross capital investment. Its decline, typical for the crisis of 2009-2010, was overcome, starting from 2011. However, first, in 2013-2014, the decline recommenced, and, second, as we can see, it did not deeply affect funding of the research and innovative activity. The characteristic reflection of this situation was the decline in the share of gross capital investment in the innovative activity in 2015 (by 1.6 p.p – from 5.5% to 3.9%), while the total volume of investment was increasing during the same period. In general, for the analyzed period, the share of investment that was directed by the domestic entities at innovative activities varied from 3.9% to 5.5%, which obviously is not enough for adequate innovative activities.

This is confirmed by the small amount of investment of the domestic enterprises in intangible assets, where a significant share is allocated for the creation, purchase and commercialization of rights to the objects of intellectual property. Thus, despite the rise in 2007-2008 to 6.4 bln hrn, in 2012, its value fell again about to the level of 2005 and amounted to 3.4 bln hrn. A logical consequence of that phenomenon is a small proportion of intangible assets (0.7%) in the structure of the national economy assets, whereas in the EU-27 countries this indicator is 30-40%. In our opinion, this is one of the factors leading to the low competitiveness of domestic goods and services. Nevertheless, it is positive that in 2014-2015, the volumes of investments in intangible assets in the domestic economy began to increase, reaching 17.6 bln hrn in 2015.

Let us pay attention to the fig. 3, where one can clearly observe negative trends associated with the decline in the shares of innovative products in the total volume of the sale of goods (works, services). Thus, in 2015, the share of innovative products in the total volumes of the products sold in Ukraine was only 1.4% and decreased to the level of 2005 by 5.1 p.p. (in quantitative terms – more than by 4 times). Here one can notice a dual threat. First, it indicates the decrease in the ability or motivation of the domestic enterprises to develop and place on the market the products with features of innovativeness. Second, it characterizes the decrease in efficiency of the innovative activity, because the proportion of such goods is reduced, and the financing of innovation is not high, but still it is growing.

[7] Capital investment in Ukraine in 2010-2015: Statistical compendium/ State statistics service of Ukraine. – K.: LLC «Avgust trade», 2016. – 115 p.

Figure. 3. The volumes of sold innovative products and their ratio in Ukraine in 2005-2015



Source: compiled on the basis of [8], p. 169-173; [9], p. 220-224, 226-227

Moreover, 2009-2010 and 2012-2015 were also characterized by the decrease in the volumes of innovative products sold by the domestic business entities – to 23.1 bln hrn (50.6% less than in 2008). It is a negative phenomenon too, and a more effective and balanced government policy should be focused on it. This is because up to 2008, the volumes of production and sales of innovative products were steadily growing (the growth rate for the period 2005-2008 on average per year was 122.7%) and due to it, an increase in the volume and share of domestic innovative products sold on foreign markets (1.6 p.p.) was achieved. Yet until 2015, the share of innovative products that are sold abroad has decreased to 47.0%.

Therefore, we consider these macroeconomic trends to be negative and such, which cause system threats to the investment and innovative activity of the domestic economy, because the further growth of the analyzed indicators can lead to a so-

[8] Scientific and innovative activity in Ukraine in 2015: Statistical compendium. – K.: State statistics service of Ukraine, 2016. – 258 p.
[9] Scientific and innovative activity in Ukraine in 2012 : Statistical compendium. – K.: State statistics service of Ukraine, 2012. – 258 p.

called "point of no return", when it will be difficult to restore not only the volume, but also the potential of innovative activities.

The system threats include the deterioration of the infrastructure of implementation and support of the investment and innovative activity in our country. Thus, it is bad, that in the period of transformational changes in Ukraine, a lot of industrial and innovative development zones and high-tech productions were lost and the innovative, scientific and technical potential, the number of subjects (and their capabilities) of the institutional infrastructure of the innovative activity were significantly reduced.

Hence, one can observe an uneven distribution of resources for the development of the investment and innovative potential of regions, their concentration in cities, old industrial areas and areas with excessive capital, which resulted in interregional asymmetry of the institutions of research, innovative and investment activities, non-coordination of cooperation of the investment and innovative activity representatives and economic agents. All this reflects the dominance of shifting the focus from long-term returns of investment in innovation to short-term super profits mainly in the commercial and intermediary sector.

The creation of regional innovation centres, which today comprise 13 units, was aimed at improving the management of the innovative activity development. However, their financial support from the state is suspended and the real activity is almost non-existent. Even the Internet resources of these organizations do not work.

However, paradoxically, with the underdeveloped institutional infrastructure of the investment and innovative activity, the domestic economic entities think that the main reasons for their low innovation activity are financial and pricing factors. Whereas the lack of information about advanced technologies is viewed as a real barrier only by 1% of innovation-active enterprises and 2.1% of non-innovative enterprises; the lack of information about markets is viewed as an obstacle by 0.8% and 1.9%, respectively; the difficulty of finding partners for innovative activities – 2.4% and 5.3%, respectively [[10],p.6-7].

We believe that there is a clear risk of unawareness of the need and directions that concern the development and functioning of a network of institutions to support the investment and innovative activity on the part of the domestic business representatives, particularly in the basic types of economic activity. Thus, shifting these tasks solely on the state is objectively futile, given the funding difficulties and less effective use of funds because the demand should be directly from the businesses

[10] A survey of innovative activity in the economy of Ukraine for the period of 2008-2010. – K.: State statistics service of Ukraine [Electronic resource]. – Retrieved from: http://www.ukrstat.gov.ua.

that realize the necessity and are willing to finance the cooperation with the investment and innovative structures. It is also a threat to economic security of the state, because it prevents the development of intellectualization processes of the national economy and the formation of institutional support, which is necessary for it.

We think that major domestic enterprises of industry, agriculture, construction, transport and communications have to initiate activities for establishment and development of so-called "platforms" of scientific and technological, innovative cooperation of people who represent education, the scientific and research sphere, the investment and innovative infrastructure and business. However, unfortunately, most of them are not aware of that, and it is proved by a low innovative activity of the domestic industry representatives (table 1).

Table 1.The indicators of the innovative activity of industrial enterprises and the financing of innovative activities in Ukraine in 2000, 2005, 2010-2012

Indicators	Years							Growth rates (% / p.p.) to 2015	
	2000	2005	2010	2011	2012	2014	2015	2000	2014
Number of enterprises involved in innovative activity, units (including according to structure and directions of the innovative activity):	**1705**	**1193**	**1462**	**1679**	**1758**	**1609**	**824**	**48,3**	**51,2**
- Researches and developments,% (including% from the overall number of industrial enterprises)	25,6 (4,6)	26,6 (3,2)	21,0 (2,9)	19,8 (3,2)	17,3 (3,0)	28,3 (2,8)	22,1 (4,7)	-3,5 (+0,1)	-6,2 (+1,9)
-Acquisition of rights to have patents and licenses to use objects of industrial property,%	3,6 (0,6)	9,5 (1,1)	6,8 (0,9)	6,3 (1,0)	4,9 (0,9)	8,3 (0,8)	3,2 (0,7)	-0,4 (+0,1)	-5,1 (-0,1)
- Purchase of machinery, equipment and software,%	33,1 (6,0)	46,0 (5,5)	51,2 (7,9)	63,3 (10,3)	62,3 (10,9)	53,3 (9,9)	46,7 (9,8)	+13,6 (+3,8)	-6,6 (-0,1)
Number of industrial enterprises that have introduced innovations, units (including according to the structure):	**1491**	**810**	**1217**	**1327**	**1371**	**1208**	**723**	**48,5**	**59,9**
- They have introduced new or improved methods of	27,9 (4,1)	49,6 (4,1)	42,9 (4,9)	45,6 (5,8)	43,6 (5,9)	41,7 (4,6)	47,1 (8,4)	+19,2 (+4,3)	+5,4 (+3,8)

production of goods,% (including% from the overall number of industrial enterprises)									
- They have practised the production of innovative types of goods,%	92,0 (13,7)	77,8 (6,4)	50,5 (5,8)	55,1 (7,1)	51,3 (7,0)	54,5 (6,0)	48,7 (8,7)	-43,3 (-5,0)	-5,8 (+2,7)
Volumes of financing for the innovative activity, bln hrn (including according to the structure and directions of the innovative activity):	**1,8**	**5,8**	**8,0**	**14,3**	**11,9**	**7,7**	**13,8**	**7,7**	**179,2**
- Researches and developments,%	15,1	10,6	12,4	7,5	10,4	22,8	14,8	-0,3	+8,0
-Acquisition of rights to have patents and licenses to use objects of industrial property,%	2,5	4,2	1,8	2,3	2,4	0,6	0,6	-1,9	-
-Purchase of machinery, equipment and software,%	61,0	54,8	64,0	73,2	70,1	66,5	80,6	+19,6	+14,1
Share of enterprises introduced innovations, in the overall number of enterprises, involved in the innovative activity,%	**87,4**	**67,9**	**83,2**	**79,0**	**77,9**	**75,1**	**87,7**	**+0,3**	**+12,6**
Volumes of funding the expenditure on the innovative activity per enterprise, mln hrn (including according to the areas of the innovative activity):	**1,0**	**4,8**	**5,5**	**8,5**	**6,5**	**4,8**	**16,7**	**16,7**	**3,5**
- Researches and developments	0,6	1,9	3,2	3,3	3,9	6,2	9,2	15,3	148,4
- Acquisition of rights to have patents and licenses to use objects of industrial property	0,7	2,2	1,4	3,1	0,5	0,6	2,6	3,7	4,3
- Purchase of machinery, equipment and software	1,9	8,3	6,0	9,9	7,3	5,2	23,8	12,5	4,6

Source: compiled on the basis of [11], p.141, 146; [12], p.163,192-193

It is positive, that the number of the enterprises engaged in the innovative

[11] Scientific and innovative activity in Ukraine in 2015: Statistical compendium. – K.: State statistics service of Ukraine, 2016. – 258 p.

[12] Scientific and innovative activity in Ukraine in 2012: Statistical yearbook / State statistics service of Ukraine. – K.: Avgust Trade, 2013. – 288 p

activity until 2012 has been increasing. In 2012, there were 1758 units, which was 4.7% more than in the previous 2011. Nevertheless, in 2015, these business entities amounted only to 824 units. For fifteen years, the number of such business entities has decreased by more than twice (51,7%), which is negative.

Not quite positive trends occur in the structure of the innovative activity of industrial enterprises. Thus, over the period 2000-2015, the emphasis has been very much shifted towards the purchase of machinery, equipment and software (the share of the enterprises engaged in such innovations increased by 13.6 p.p.). Obviously, this contributes to the modernization of the technological base of the domestic production, but the share of the enterprises that carried out researches and developments has decreased by 3.5 p.p. and the share of the business entities, which carried out the creation or purchase of intellectual property, almost remained unchanged. Therefore, we can conclude that in the domestic industry, product innovations are given insufficient attention. Moreover, that is a threat of low competitiveness of domestic products and the reduction of production safety of the national economy.

The threat to the investment and innovative activity is the fact that less than 90% (87.7% in 2015 and by 2000 the rate was almost unchanged (an increase amounted to 0.3 p.p.) of enterprises introduce innovations (of the total number of innovation-active enterprises), and even fewer of them practise the manufacturing of innovative types of products. This is an additional confirmation of giving much less attention to product innovations compared to the technical and technological innovations. In our opinion, the government should implement a number of organizational-economic and training activities designed to stimulate the increase in the volume of financing and execution of works on creation and introduction at the subjects of the Ukrainian economy of product innovations and improving in this way the financing structure of the innovative expenditure. Hence, as of 2015, in the structure of financing of the innovative activity, the expenditure on the purchase of machinery, equipment and software dominated and amounted to 80.6% (the rate has increased over the period 2000-2015 by 19.6 p.p.). At the same time the expenditure on researches and developments accounted for only 14.8% (the rate decreased by 0.3 p.p.), and on the activities in the field of intellectual property – only 0.6%.

Thus, the threats of low patent protection of new domestic technologies and marketing support (marketing and market innovations) of the domestic production due to low activity concerning creation and use of business names (trade marks, brands, names of the geographical origin of goods etc.) can be traced here.

One needs to specify that the above-mentioned risk of reducing the volumes of financing for the innovative activity is typical for innovation-active industrial

enterprises. Nevertheless, if in 2011, on average, one such entity spent on the implementation of innovative projects 8.5 mln hrn, then in 2015, the indicator increased to 16.7 mln. Moreover, the funding has increased in all types of work. However, this trend is caused not only by increased costs, but also by the reduction in the number of innovation-active companies. During 2000-2015, the expenditure of enterprises on the purchase of patents and licences to buy industrial property objects was small. This confirms the existence of a threat of reducing the patent protection level of the domestic entities in the real sector.

This is also evidenced by the data on the efforts of the enterprises belonging to the basic types of economic activity regarding the creation and use of high technologies (tab. 2). We want to note that, for example, in 2014, in agriculture, hunting and forestry only 11 units of high technologies were created.

Although, this indicator has increased until 2010 by 3.7%, it remains low. In the construction of such facilities, only 5 units have been created; it is 16.7% fewer than in 2010. Even for the industry, where 141 units of high technologies were created, the activity in this area remains low, moreover it is declining (in 2014, the quantity of created high technologies decreased by 27.7% compared to 2010).

Table 2.The volumes of creation and use of high technologies according to destination areas in the real sector of the Ukrainian economy in 2010-2014

Types of economic activity	Indicators	Years					Growth rates (%) 2014 to 2010
		2010	2011	2012	2013	2014	
Agriculture, hunting, forestry	Number of created advanced technologies, units	3	5	14	12	11	3,7
	Number of protection documents, units per: - invention	6	6	7	6	5	83,3
	- utility model	7	7	23	17	15	2,1
	- industrial standard	1	2	-	-	-	-
	Number of used: - inventions	12	4	-	-	-	-
	- utility models	9	-	-	-	-	-
	- industrial standards	10	-	-	-	-	-
Industry	Number of created advanced technologies , units	195	231	216	187	141	72,3
	Number of protection documents, units per: -	79	114	84	78	41	51,9

	invention						
	- utility model	274	226	274	219	114	41,6
	- industrial standard	14	136	161	95	181	12,9
	Number of used: - inventions	683	927	981	1081	1119	1,6
	- utility models	770	408	558	578	984	127,8
	- industrial standards	729	326	451	554	531	72,8
Construction	Number of created advanced technologies, units	6	3	2	9	5	83,33
	Number of protection documents, units per: - invention	4	1	-	1	-	-
	- utility model	4	1	12	11	9	2,3
	- industrial standards	-	-	-	-	-	-
	Number of used: -inventions	7	-	-	-	-	-
	- utility models	8	-	-	-	-	-
	- industrial standards	9	-	-	-	-	-
Transport and communication*	Number of created advanced technologies, units	16	9	40	8	2	12,5
	Number of protection documents, units per: - invention	2	14	4	-	-	-
	- utility model	4	13	13	1	1	25,0
	- industrial standard	-	-	5	-	-	-
	Number of used: -inventions	47	49	39	50	31	65,9
	- utility models	11	14	12	49	13	118,2
	- industrial standards	6	5	4	4	-	-

*Note: since 2012 – transport, warehousing, post and courier activities; information and telecommunication

Source: compiled on the basis of 13, p. 243, 250; 14, p. 217,210

The fact that the domestic enterprises of agriculture and construction do not use industrial property objects at all is also negative. If these types of economic activity in 2010-2011, involved certain efforts, then starting from 2012, they do not occur at all. The number of used inventions in the field of transport and

[13]Scientific and innovative activity in Ukraine in 2012: Statistical yearbook / State statistics service of Ukraine. – K.: Avgust Trade, 2013. – 288 p.

[14]Scientific and innovative activity in Ukraine in 2014: Statistical yearbook / State statistics service of Ukraine. – K.: Avgust Trade, 2015. – 255 p.

communications is decreasing. If in this kind of economic activity in 2010, 47 inventions were used, then in 2014, there were only 31 of them (34.1% fewer); there were 6 industrial standards in 2010 and in 2014 – none.

It is positive that the activity concerning the use of inventions, utility models and industrial designs in the industry is significantly higher. In 2014, the business entities of industrial spheres used 1119 inventions, 984 utility models and 531 industrial standards. However, there are negative aspects. Thus, if one can notice an increase in using industrial inventions and utility models, (the corresponding values of indicators in 2014 were 60.0% and 27.8% higher than in 2010), then with industrial designs the decline is observed (a 17.2% decrease for the same period).

The system risks and threats objectively impede the investment and innovative activity of the Ukrainian economy subjects, affecting mainly the motivation of managers of enterprises to participate in such an activity. However, we need to give more attention to another group of risks and threats that impede directly the organization and implementation of the investment and innovative activity. They are so-called process risks and threats that affect all stages of its business processes, i.e. making decisions regarding investment and innovations, planning such measures, determining their scope and funding sources, the organization of cooperation with the subjects of investment, scientific and research and innovative sectors, protection and defence of the results of the investment and innovative activity, their commercialization, using and obtaining economic benefits.

According to this classification feature of threats, first of all, let us pay attention to resource and psychological preconditions of the investment and innovative activity. Thus, at the present stage of the national economy development there is quite significant human and institutional potential of educational, scientific and research activities, which is positive because the entities of the real sector initiate measures to create and introduce innovations. However, significant negative aspects of this stage of the business process are known. We believe, that these aspects include uneven allocation of capital, investment structures, research and innovative organizations, their intellectual and personnel potential in terms of the territory; the reduction in the number of organizations carrying out scientific and research works and their human potential (especially in the business sector); a small proportion of scientific and research institutions fulfilling orders for the subjects of separate kinds of economic activity with significant added value (industry, transport and communications, construction), etc.

As we can see from the data presented in the table 3, the activity of Ukrainian industrial enterprises concerning the implementation of the innovative activity and carrying out scientific researches, remains not too high. Therefore, as of 2015, only 3.2% of the total number of the industrial enterprises carried out internal scientific researches and 1.5% - foreign scientific researches.

With regard to 2007, the analyzed indicators have slightly increased: the share of enterprises that had internal scientific researches in the total number of industrial enterprises has increased by 0.4 p.p. and the businesses with external scientific researches – by 0.1 p.p. Nevertheless, their values remained low. Therefore, we see a steady trend towards decreasing the activation of the scientific and research and innovative activity that is initiated by the domestic industrial enterprises. Certainly, this is a menacing trend in the planning and organization of the business process of the investment and innovative activity of the subjects belonging to the Ukrainian economy.

Table 3. The shares of innovation-active industrial enterprises of Ukraine according to the innovative activity types in 2007, 2009-2012, 2014-2015

(%)

Directions of innovative activity	Years							Absolute variations,%	
	2007	2009	2010	2011	2012	2014	2015	2015 compared to 2007	2015 compared to 2014
Innovation-active enterprises	14,2	12,8	13,8	16,2	17,4	16,1	17,3	+3,1	+1,2
Internal SRW	2,8	2,2	2,1	2,4	2,1	1,9	3,2	+0,4	+1,3
External SRW	1,4	1,2	1,2	1,3	1,3	0,9	1,5	+0,1	+0,6
The acquisition of machinery, equipment and software	8,7	7,0	7,9	10,3	10,9	9,9	9,8	+1,1	-0,1
Other external knowledge	1,2	0,8	0,9	1,0	0,9	0,8	0,7	-0,5	-0,1
Education and training of personnel	…	2,4	2,1	2,9	3,2	3,2	3,0	…	+0,2
Market introduction of innovations	…	1,1	1,0	1,3	1,0	0,8	0,7	…	-0,1
Other	4,2	1,8	1,8	2,2	2,0	1,4	4,4	+0,2	+3,0

Source: compiled on the basis of [15], p. 141; [16], p. 167-172

Similar negative trends are noticed in relation to the acquisition of other external knowledge (the reduction in the proportion of enterprises that had acquired this knowledge for 2007-2015 was 0.5 p.p.), market introduction and other types of innovations. In 2009-2015, there was an increase in the share of enterprises, which focused their efforts on education and training of personnel for researches and developments. However, obviously, this is not enough and we need to continue

[15] Scientific and innovative activity in Ukraine in 2015: Statistical compendium. – K.: State statistics service of Ukraine, 2016. – 258 p.
[16] Scientific and innovative activity in Ukraine in 2012: Statistical yearbook / State statistics service of Ukraine. – K.: Avgust Trade, 2013. – 288 p

augmenting human resource capacity of the investment and innovation activity. After all, this is an important prerequisite for reducing the risks of the expenses capacity growth, the loss of commercial information, the dependence on market conditions and involved consultants and specialists, etc.

The central stage of the innovative business-process is the introduction of innovations in economic practices and transforming them into the results of management or the positive economic effect. Nevertheless, as it was shown above, the share of innovation-active enterprises in the domestic economy, the share and volumes of innovative products in our state remain small, moreover, they are decreasing. It is a negative phenomenon and suggests the existence of a factor (risk) of obstacles to using the results of the investment and innovative activity of the domestic enterprises.

There are reasons to state that in Ukraine, subjective risks of the investment and innovative activity are aggravating. They comprise the threats from government agencies due to frequent changes of the legislation on investment and innovative spheres, the presence of bureaucratic and corrupt elements in the relationship with business representatives when going through licensing, conciliation and registration procedures, the lack of development of the network of state institutions that support and promote the investment and innovation activity, etc.

The subjective threats also include the lack of real support for the investment and innovative activity by venture capital and investment funds, so-called platforms or clusters of investment and innovative cooperation, the network of the financial and credit sector subjects, first of all, due to the limited available investment resources, their complicated accessibility and high cost of servicing, the need for too high mortgage security and going through numerous conciliation procedures. The subjective threats are connected with underdevelopment of the institutional environment of the intellectual and creative activity, innovative and investment processes, the innovative and venture business.

The problems of providing resources for the domestic enterprises consitute a separate layer of threats. Here we mean not only the absence of investment, but also the lack of funding for the current innovation activity, the lack of sufficient intellectual and personnel potential, intangible assets, information resources, the material and technical base. This is confirmed by the fact that in the structure of the sources to finance research works according to the basic types of economic activities the budget funding is dominating (table 4).

Table 4.The structure of the sources to finance scientific, scientific and technical works in Ukraine in 2005 and 2014

(%)

Types of economic activity	Budget funds		Special-purpose funds		Own funds		Funds of customers:				Other sources	
							enterprises and organizations of Ukraine		Foreign countries			
	2005	2014	2005	2014	2005	2014	2005	2014	2005	2014	2005	2014
Overall in the economy	33,67	39,6	0,48	0,2	6,56	18,7	32,56	20,9	24,38	19,8	2,35	0,9
Agriculture, hunting, forestry	70,54	71,7	4,34	98,7	11,67	15,9	9,57	11,6	0,70	0,3	3,17	0,5
Industry	14,43	4,8	0,15	0,01	9,79	20,6	42,06	24,8	30,15	50,7	3,42	0,9
Construction	9,59	15,3	0,08	-	0,24	-	83,05	66,5	6,47	16,3	0,48	1,9
Activity of transport and communication	27,22	6,7	-	-	-	19,5	60,25	67,2	5,99	6,5	6,53	-

Source: compiled on the basis of [17], p. 96; [18], p. 93

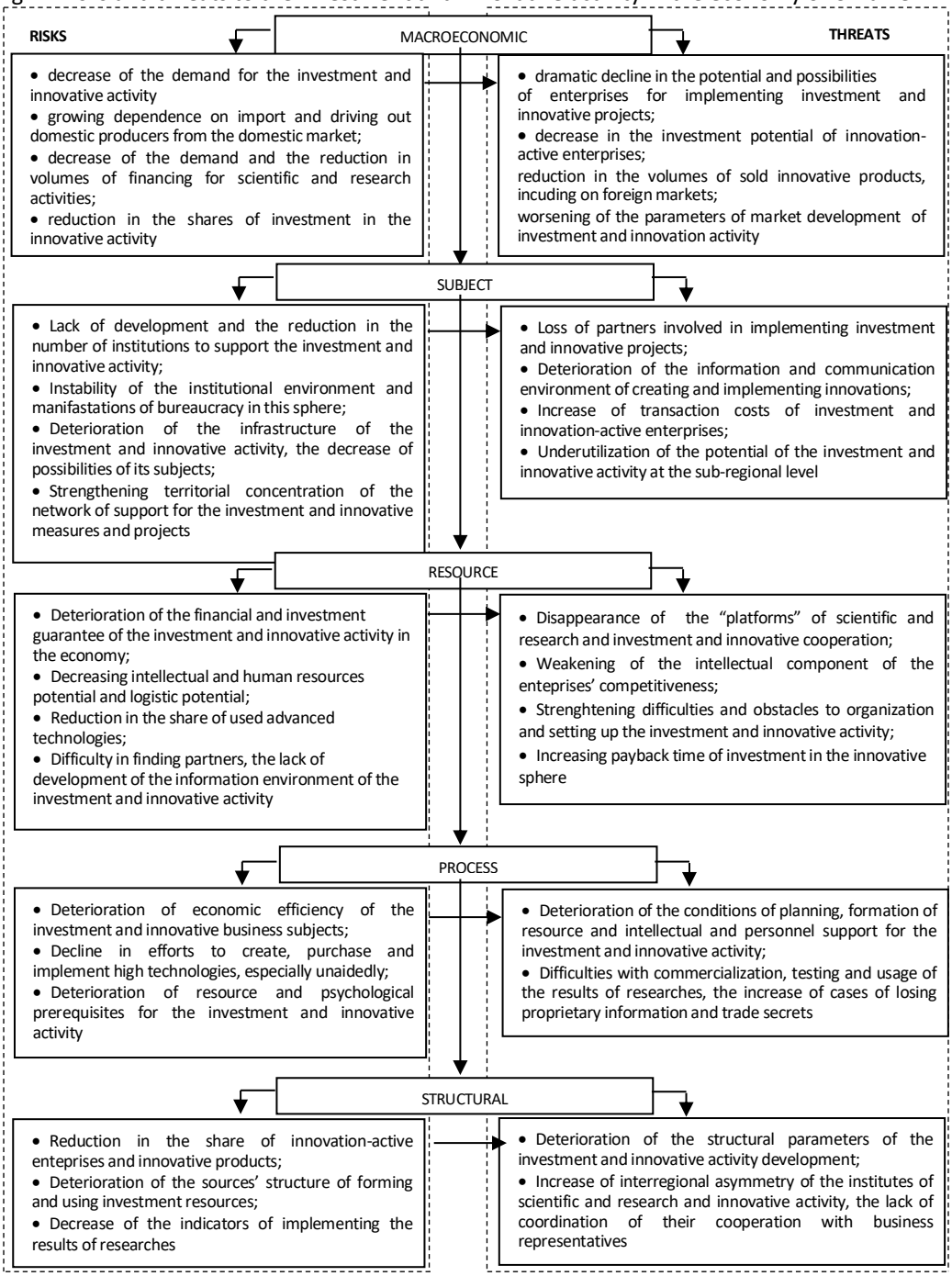
Thus, in 2014, 39.6% of these costs were financed from the budget in the economy in general, particularly 71.7% – in agriculture. Much lower costs accounted for funds belonging to organizations and for money of other customers. Moreover, in comparison with 2005, the share of state expenditure has increased.

It is possible to consider the situation in the domestic industry to be more or less rational; in 2014, at the expense of enterprises' own funds 20.6% of scientific, scientific and technical works were financed; for the funds of the domestic customers – 24.8% of works were financed and for the funds of external clients – 50.7%.

In other types of economic activity of the real sector of the economy, one should seek to improve the situation. It is because investment in innovations is more effective, when it is initiated directly by the customers, who are aware of the need for targeting investment and the outcome of the investment and innovation activity.

[17] Scientific and innovative activity in Ukraine in 2010: Statistical yearbook / State statistics service of Ukraine. – K.: Avgust Trade, 2011. – 282 p.
[18] Scientific and innovative activity in Ukraine in 2014: Statistical yearbook / State statistics service of Ukraine. – K.: Avgust Trade, 2015. – 255 p.

Fig. 4. Risks and threats to the investment and innovative activity in the economy of Ukraine



Source: compiled by the authors

Consequently, let us generalize about the obtained results of analyzing the risks and threats to the investment and innovative activity in the Ukrainian economy in Fig. 4. We want to note that the identification of risks and threats occupies quite an important place in the system of ecosestate's measures. If the risks, to a greater extent, concern dangers, then the threats include any circumstances or events occurring in the external environment, which may cause violation of a proper flow of functional business-processes, damages to the socio-economic system "enterprise", the possibility of making system errors in the investment and innovative sphere as one of the most important areas of economic entities' functioning. Early detection and neutralization of certain risks allows strengthening the stability of state policy on managing the development and ensuring the competitiveness of economic entities and, through it, the national economy as a whole. At the same time, combating the threats is the key to prevent losses in the process of the investment and innovative activity, and, hence, it is possible to increase the degree of its predictability, economic efficiency and effectiveness, motivation of the subjects of implementation.

Otherwise, there are risks of very urgent recoupment of expenses, low efficiency and productivity of investments, differences between the results of the innovation activity and the enterprises' orders or market requirements.

According to the analysis of the state and trends of the investment and innovative activity development in the domestic economy, there are grounds for speaking about the presence of structural risks and threats in this area. Particularly, we are talking about the lack of balance between the production of traditional products and goods that have features of innovativeness; between the number of industries that recognize the need and perform the innovative activity and enterprises that are passive in terms of taking innovative measures and introducing progressive changes; between the industries of basic kinds of economic activity, where the need for obtaining and implementing the results of the investment and innovative activity (particularly, manufacturing, construction, communication, etc.) is objectively higher (but not high enough for today actual activity) and vice versa – somewhat less justified; between the volumes of the investment and innovative activity in cities and other areas of the state, particularly in less socially and economically developed.

Conclusions. Thus, one can trace quite a close connection between the weakening of the risk of managing the investment and innovative activity of the business entities in the basic types of economic activity and a real increase in the demand for long-term financing in the innovation field. We want to add that drawing the attention of the state, including through financial and resource and institutional support, to the promotion of investment and innovation-active enterprises is a factor in minimizing threats and enhancing the level of economic security of such activities.

It is important for the representatives of authorities and the local self-government to direct their actions at the most problematic aspects and areas of work on financing, creation and introduction of innovations in the economic practice. In addition, this requires analyzing the structural components of the investment and innovative guarantee of economic security of the state, which is the subject of the following unit of our research.

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STRUCTURAL RISKS OF THE UKRAINIAN ECONOMY DEVELOPMENT IN TERMS OF EUROPEAN INTEGRATION AND THE MAIN WAYS OF THEIR OVERCOMING

Abstract. *The article justifies the scientific and theoretical basis for the formation of structural risks. The basic trends of development of world and national markets, affecting the level of structural risks of national economies are considered. The global FDI flows in developed economies, developing economies and transition economies are analyzed. Derivative risks are considered. The structure and dynamics of the global exchange and OTC derivatives markets are analyzed. The tendency towards volatility of the economic environment is proven. This leads to a significant increase in financial risks, causes both the professional participants of world financial markets, and institutional investors to be in dire need of new types of derivatives that would hedge effectively the reduction of losses from unfavorable development trends of global markets and receiving additional income from speculative transactions. The structure and dynamics of world markets of interest rates and currency derivatives are studied. The main trends and prospects of development of the modern international derivatives market are analyzed. The main groups of crisis causes in Ukraine are distinguished. The basic directions of structural risks minimization of the national economy development of Ukraine in terms of European integration are outlined.*

JEL Classification System: F170, F210, F290, F300, F330, F370.
Key words: Ukrainian economy, structural risks**,** investment risks, derivative risks, European integration.

Introduction. A systematic source of the periodic financial and economic crisis in Ukraine is deep structural imbalances, which have been formed in the country over the past decade as a result of destructive processes that with reverse causality reinforce each other and form a vicious circle.

As a result of the unresolved systemic institutional and structural problems, Ukraine, which is a large country in central Europe with a high level of public education and intellectual capital, has been immersing more deeply in the "poverty trap" and the state of technologically backward country of the third world, which is

unacceptable. Global competitiveness rating of Ukraine in 2015 is extremely low - it took the 79th place according to the GCI – the Global Competitiveness Index 2015 [19].

The economic crisis, devaluation of the national currency, systemic banking crisis occurring in Ukraine, are a source of further instability and deceleration in the economy development, unemployment rising, poverty deepening and worsening social and political risks. In terms of external military aggression, such a situation can have critical consequences for the state. Therefore, the analysis of structural risks of the national economy of Ukraine and the development of the main directions of their solution is one of the most important tasks in ensuring sustainable economic development of Ukraine.

Theoretical aspects of structural risks formation. National risks is a complex system consisting of a number of closely interrelated risks, which, in their turn, have an internal structure. In the system of the national risks, we identify four main blocks-components: economic risks; financial - credit risks; institutional risks; the risks of a superstructure. Each risk indicated in the scheme under certain circumstances can "explode" and become topical for Ukraine (Table 1).

Table 1. The system of the national risks.

No	The block of national risks	The components of the block of national risks
1.	Economic risks	
		Risks of the commodity markets
		Price risks
		Structural risks
		Sectoral and branch risks
		The risks of market liquidity
		The risks of energy dependence
		Investment risks
		Technological risks
		Risks of the business environment
		Risks of the labor market
2.	Financial - credit risks	
		Budgetary risks

[19]Strategy of development of the banking system 2016-2020 (project): "Synergy of banks and industrialization of the economy". (2016). Kyiv, retrieved from: http://kneu.edu.ua/userfiles/Credit_Economics_Department/afedra+bankspravi/proekt_strategi.pdf.

		Currency risks
		Monetary risks
		Banking risks
		Debt risks
		Action (stock) risks
3.	Institutional risks	
		Risks of the management system
		Risks of the administration and control
		Risks of the market institutions
		Risks of the clan-corporate structures
		Risks of monopolization
		Risks of deformations (markets, social structure of society etc.)
4.	The risks of a superstructure	
		Political risks
		Military risks
		Legal risks
		Risks of civil society
		Risks of emergencies

Source: compiled by the author based on the source [20]

A key role in the national risks system belongs to the first two blocks - the economic and financial, as they differ from other risks in the complication of prediction, bigger probability, simultaneity and frequency of occurrence, interconnection and difficulties of overcoming. It should be noted that until recently the world science has analyzed economic and financial risks separately, attributing them to different classes. Recently, however, they have been combined into one class and the term "financial and economic risks" appeared to be used. This, in our view, is absolutely justified, as both appearance and elimination of any economic risks are associated with financial capabilities and interests, as well as certain (depending on the extent of risk) cash proportions violation and the budget balance at the state level and areas (this is especially topical for Ukraine, where the correspondent accounts of all local budgets are concentrated in the State Treasury).

[20] Soskin O. (2009). Financial and economic risks of the development of Ukraine in terms of the current crisis. "Economics and Management": electronic specialized edition*, 4,* retrieved from: http://soskin.info/news/2895.html.

However, financial and economic risks under current conditions cannot be considered in isolation from the institutional risks and risks, which have a major influence on the financial and economic block of the national risks. On this basis, in classifications and methodologies of financial risks, which are used by Western rating or consulting agencies, these risks are only partly financial. For example, in a very popular and used standard classification of financial risks, developed by Coopers & Lybrand Company, in addition to the list of purely financial risks there are market and operational risks as well as risks of events, which include political, legal and force majeure risks.

Investment risks have an important place in the system of economic risks. Taking part in the investment activity, the investor does not have full confidence in obtaining the result, which he or she expects to achieve. Investors should be aware of the presence of risk factors associated with possible reduction or inability to get amounts of expected investment income, as well as partial or total loss of the capital invested. Researching into investment risks, identifing the factors that cause them, and calculating potential losses are important issues that are needed to be taken into account by the modern investor, making decisions on investment in any investment project. Therefore, the ability to assess investment risks and develop a system of measures that minimize their negative financial impact is an integral feature of a modern investment manager [21].

An uncertainty factor and, as a result, a risk are objective characteristic features of economy as a complex system. The person, while making decisions constantly faces a risk. For example – people agree to risk in exchange for an additional fee. It is one of the defining principles of the financial theory. What determines the choice of an investor who faces the risk? That is the main question, which provides a basis for further consideration of the problems of modern finance.

In economic theory, it is assumed that the so-called homo economicus, i.e. a person, who is able to make rational decisions according to the principle of the greatest benefit, always has an idea of the degree of riskiness of an alternative based on various considerations. These ideas are the result of the individual degree of confidence (subjective probability) in occurrence of the various consequences of decisions [22].

In dictionaries of different nations, the word «risk» exists in similar forms and definitions of content, for example, in English "risk", in French "risque", in Italian

21 Motorniuk U.I., Stasyuk N.R. (2014). Methods of evaluating investment risks, Bulletin of Lviv Polytechnic National University “Problems of Economics and Management”, 799, 75-81, Lviv: LPNU Publishing house.
22 Mertens A.V. (1997). Investments: Lectures on Modern Financial Theory. Kyiv: Kyiv Investment Agency.

"rischio", in German "risiko", in Spanish "riesgo" etc. According to linguists, they originated from the Latin term "resecum", which meant "rock" or "danger" and was used by ancient navigators to denote danger of collision with coastal cliffs. Therefore, etymologically, the word "risk" is always associated, primarily, with the advent of danger or uncertainty in various fields of economic activity and socio-economic life. For instance, Adam Smith and other English-speaking scholars when referring to risky actions often practiced the word "hazard" (danger). During a long period of time, the notion of risk was not only associated with some negative situations in life, but also was often used as their synonym.

In modern risk theory two opposing views on the interpretation of this category are clearly distinguished, namely classical, represented by J. Miles and J. Senior, and neoclassical, offered by L. Marshall, Pigou, L., J. Keynes. The fundamental oposition comes from different perceptions of the nature of the relation between uncertainty and risk (Table 2) [23].

Table 2. The comparative analysis of classical and neoclassical views on the nature of the category of "risk"

Component of risk theory	Classical Risk Theory	Neoclassical Risk Theory
The etymological source of risk	Uncertainty	Danger
The ontological essence of risk	The probability of losses and expenses due to the decision and business strategy	The probability of a deviation from the intended targets
Correlation of concepts of "risk" and "uncertainty"	Are identical	Differentiated

Source: compiled by the author based on the source[5].

While comparing classical and neoclassical approaches, it should be noted that the views of Neoclassicists are only a logical development of the classical views. Thus, the neoclassical theory predicts that the genetic roots of a risk apear primarily in indefiniteness, which is the objective condition that eventually causes the subjective perception of a risk i.e. uncertainty. This approach allows us to understand the etymology of a risk as an economic historical and logical category, in which uncertainty and ignorance cause the appearance of objective uncertainty perceived

[23] Boyarko I.M., Gritsenko L.L. (2012). Investment Analysis: Textbook. Kyiv: Centre textbooks.

by the subjects of activity as insecurity. Hence, this subjectively perceived hazard is a risk.

The prerequisite for risk appearance is the availability of alternative scenarios, which lead to different results: in a situation, where there is only one possible outcome, whether it is about the loss or revenue, the risk does not exist, because there is no alternative.

The formation of the profitability level of investment operations of an enterprise mostly depends on an investment risk (the higher the risk, the greater must be the return on investment). The review of literature on investment reveals differences in the interpretation of the term "investment risk". The investment risk is the probability of unpredictable financial losses in terms of uncertainty of investments [24].

The risk in investing is quantitatively calculated, from the point of view of a particular entity of investment activity, uncertainty, which is connected with the possibility of occurrence in the implementation of the project of adverse events and their effects in the form of certain financial losses (a loss of income, increased costs, a loss of profits, etc.). Thus, the key elements of the nature of the investment risk as an economic category are the following: the uncertainty of market factors in the present and in the future; the existence of several alternative scenarios; the possibility of adverse events, the probability of assets loss, the failure to obtain the expected profit or other deviations from the planned, predictable performance; an objective need for management measures to reduce the potential negative or adverse effects and subjective perception of events.

The aim of analyzing the impact of a risk on investment performance is to develop possible measures to prevent the occurrence of the expected financial losses. Achieving this goal depends greatly on the quality of the investment risk identification, namely the combination of the adverse factors that can lead to a decline in revenues, an increase in capital investment requirements and the corresponding decrease in investment income. In connection with this, the investment analysis involves compiling an exhaustive list of risks for each project and evaluate an appropriate structure of expected financial losses. The efficiency of this process is primarily based on a clear classification of risks, their grouping and aggregating a potential impact on the investment performance.

The investment risks are mainly classified according to three criteria:

[24] Dokiyenko L.M., Klymenko V.V., Akimova L.M. (2011). Investment Management: Textbook. Kyiv: Akademvydav

- The areas of manifestations: political risks; economic risks; social risks; environmental risks.
- The forms of investment: risks of real investment; risks of financial investment.
- The sources of formation and the opportunity of elimination: systematic (market) risks; unsystematic (specific) risks associated with the implementation of the terms of these investments only. The systematic risks accounts for about 25-50% of risks of any investment project.

According to their nature, the risks are divided into simple and complex. A complex risk is a combination of simple risks characterized by a common negative consequence of their formation. Simple risks are determined by the action of a set of independent events, and the consequences of their occurrence are evaluated individually. Traditionally, the investment analysis distinguishes such aggregated risk types as:

- Political, legal and general economic risks, which, as opposed to other forms of risks, belong to the external conditions of investments realization; a technical risk caused by flaws and errors in the technical analysis of project decisions;
- A financial risk associated with the fact that certain parameters of the developed financial plan of the project are not achieved;
- A marketing risk arises from errors in assessing the market conditions of the project, namely the capacity of market opportunities and resource markets as to implementation of the project supplies, organization of advertising and marketing network, the time of entrance to the market, the chosen pricing policy, etc.;
- An environmental risk associated with the lack of development of issues concerning the impact on the environment;
- A risk of project participants related to possible adverse events in the management and financial condition of the project participants.

Since the implementation of investment projects goes through several stages of the project cycle, the risk analysis should be carried out in the context of the corresponding phases. Thus, the analysis of a risk for each stage of the investment project is carried out, and then the total risk of the project and the total amount of possible financial losses are determined.

The types of the investment risk are differentiated by its subjects and by types of financial and investment decisions that are made.

On the stock market and in the banking sector of economically developed countries, the compliance risk management is widely used. A compliance-risk is the risk of sanctions application by legal or regulatory authorities, a significant financial loss or a loss of reputation of the company because of its failure to comply with laws, regulations, rules, standards, self-regulatory organizations, or codes of conduct.

Consequently, the investment risk is an integral part of investment activity. Typically, the higher the profit expected from the investment project, the greater the risk associated with its implementation. Therefore, an investment manager should be able to evaluate them objectively.

A wide range of techniques and approaches that allow analyzing the risks of the project is used at present. Own risks in the investment management can be analyzed using qualitative (informal) and quantitative (formal) techniques that complement each other.

Qualitative analysis methods are relatively simple, their main tasks is to identify potential spheres and the risk factors as well as stages and areas of the project, on which they occur. Quantitative analysis methods include the determination of specific risks and the risks of the project in general. Qualitative methods of evaluating the investment risks include methods of a peer review, analogy, feasibility costs and others. Their common feature is that they are based on practical experience, accumulated knowledge, and often on the intuition of experts in relevant fields. Thus, the obtained evaluations are subjective. However, the involvement in the evaluation of experienced professionals makes it possible to take into account different aspects of an issue, identify the most important factors and possible solutions, prepare information for its further formalization and construction of a mathematical model.

The application of qualitative methods in the investment analysis is conditioned by the following reasons: the subjectivity of the studied phenomena or characteristics; the absence or lack of the necessary information; the impossibility of analyzing by objective and acceptable methods; the absence of the object of study (which should be established during the implementation of the project).

The expert risk analysis is usually used at the initial stages of the project (in the pre-investment phase), when the amount of the initial information is insufficient for quantitative evaluation. The advantages of the expert risk analysis is the optionality of accurate initial data and specialized software tools to assess the possibility to calculate the efficiency of the project and the relative simplicity of calculation. The main disadvantages are difficulties in engaging independent experts and the subjectivity of estimation.

In developed countries, the information published by insurance companies is used for accounting a potential risk, including regular comments on trends in the key areas of risk (the changes in demand for specific products, the prices of raw materials, fuel and land, the rating of reliability of project, contract, investment and other companies).

While using analogues, one applies databases and knowledge of risk factors. These bases are compiled on the basis of literature, conducted studies, and by

interviewing experts (project managers) and others. One processes the obtained data, using the appropriate mathematical tools, identifies interdependencies, causal relationships in order to take into account the potential risks involved in new projects.

The analysis of feasibility of expenditures is focused on identifying potential areas of risk and is based on the assumption that the cost overruns can be caused by: 1) the initial undervaluation of the project as a whole or its individual phases and components; 2) the change in the boundaries of projecting due to the unpredicted circumstances; 3) differences in the performance of machines and mechanisms from the performance planned in the project; 4)the increase of project costs compared to the original value due to the inflation or changes in tax laws. These factors can be regarded closer.

In each case, a list of the possible increase of costs under each option for the project or its elements is made. The process of allocation is divided into stages that should be associated with the phases of the project. Then the further information about costs becomes available. The phased funding allows investors, when there the first signs of the investment risk either to stop funding a project or to start looking for measures to decrease costs.

The quantitative methods of evaluating investment risks include the methods of the probability theory and mathematical statistics, and economic and statistical methods.

According to the methods of the probability theory and mathematical statistics, the following characteristics can be calculated: dispersion, which characterizes the degree of fluctuation of the studied parameters (the expected return on the investment operations) compared to the average; standard deviation, which characterizes the degree of fluctuations in the expected income from various investments and used in the evaluation of an individual investment risk; the coefficient of variation, which makes it possible to determine the level of risk if the average expected income from investment transactions are different; the sensitivity coefficient (beta coefficient), which assesses an individual or portfolio systematic investment risk relative to the risk level of the investment market in general. This parameter is usually used to assess the risks of investing in certain securities (compared to the systematic risk of the stock market). Along with the increasing value of beta coefficient, the level of a systematic risk investments rises.

As any smart investor can eliminate a diversified risk, securing a diversification portfolio of securities, the only risk that is worth taking into account is a non-diversified risk.

The studies have shown that carefully selected 8-15 securities for the portfolio of assets can eliminate or nearly eliminate the diversified risk. The non-diversified risk

similar to the market one is inevitable. Each security level has its own non-diversified risk, which can be changed by a "beta" factor [25]. The "beta" factor is also called a market one because its rate of return is calculated using the so-called market portfolio. The "beta" factor shows the influence of the market on some securities: the more responsive the rate of securities to market changes, the higher the "beta" factor for this security. The "beta" factor is calculated using the relationship of the actual yield of securities and the actual market profitability. The market profitability is usually measured as the average indicator of profitability of all (or a large sample of stocks).

According to economic and statistical methods, the level of the investment risk is determined as follows (equation 1):

$$P_{ip} = \alpha \times B_{fin}, \quad (1)$$

where P_{ip} is the level of the investment risk;

α is the likelihood of a risk (the coefficient of variation, the beta coefficient, etc.);

$Bfin$ is possible financial losses during the implementation of the project.

The evaluation of risks for individual investment projects allows determining quantitatively their level. The criteria of evaluating the probability of an event (equation 2) is applied in this case:

$$1{,}0 = P_1 + P_2, \quad (2)$$

where $1{,}0$ is the total probability of an event;

P_1 is the likelihood of a favorable outcome;

P_2 is the likelihood of an unfavorable outcome.

In case of a substantiated approach to the evaluation of the event, investors are hoping for a better result and perform their activities on the basis of a favorable prognosis, trying to avoid occasionality and to risk as little as possible. Therefore, in practice, of greater interest is an alternative - the probability of an adverse event. The minimum and low risks (0.25) are considered as acceptable for investment. The medium and high risks (0,26-0,55) are permissible for small and medium capital investments. An extremely high risk (0,56-0,70) is characterized as critical or warning

[25] Hridasov V.M., Krivchenkov S.V., Isaev O.Ye. (2004). Investing: Textbook. Kyiv: Centre of Educational Literature

to investors concerning possible financial losses. A maximum risk (0.71 -1.00) leads to losses and makes investors closer to a financial disaster.

Absolute and relative performance indexes are used to assess the possible amount of financial losses from investment activities. The absolute size of a financial loss is the sum of damage caused to the investor for the onset of adverse conditions, typical of this risk. The relative size of a financial loss is the ratio of the resulting damage to the amount of capital invested.

Financial losses from the risks are compared to the total amount of capital and according to the level, they are regarded as: small (at a ratio of <5%); significant (at a ratio of 6 + 10%); high enough (at a ratio of 11 + 20%); extremely high (at a ratio of> 20%).

According to the degree of the capital investment risk, there are:

- risk-free investments (short-term government bonds, deposits in the Savings Bank);
- investment with an acceptable level of risk (when there may be the possibility of losing profits for this investment project);
- investment with a critical level of risk(when there may be the possibility of losing not only income, but also the estimated gross income for this investment project);
- investment with a level of catastrophic risk (when thare may be the possibility of losing all the assets of the investor as a result of bankruptcy).

In order to evaluate the stability and effectiveness of the project in the case of uncertainty, it is recommended to use the following methods of evaluating investment risks (in the sequence of accurate evaluations): the enlarged stability assessment; calculating the break-even levels; variation of parameters; assessment of the expected effect of the project on the basis of quantitative characteristics of uncertainty.

All the methods except the first one, predict the development of scenarios of the project in the most likely and most dangerous conditions for any participant and the evaluation of financial consequences of such scenarios. This makes it possible to provide, if necessary, draft measures to prevent or redistribute occurring losses. The approximate measure of risk is the payback period. However, the focus in assessing the uncertainty of projects only on the pay back period often leads to the selection of short-term projects with high incomes, while ignoring the more cost-effective, but long-term projects.

The method of an interest rate with an adjustment for risk, due to an increase in interest rates on the value of a premium for risk, allows taking into account the risk factors in the calculation of the of project efficiency.

The method of a cash flow change uses reduction factors that are actually analyzed the probability of a cash inflow. The project, in which the revised cash flow has the highest NPV, is considered the least risky.

The method of critical values (the method of parameters variation) is based on finding such variables or parameters of the project that bring the value of corresponding efficiency criterion to its critical value. Other methods are also used, such as the sensitivity analysis, a break-even analysis, the analysis of the project development scenarios etc. The combined method consists in a combination of several methods or their elements.

The following methods of evaluating investment risks are distinguished in the research: a method of determining the likelihood of results; a modeling method; the sensitivity analysis; the theory of games [26].

Some authors [27] justify the principle of combining intuitive and analytical (quantitative) methods in the investment risks evaluation. The experience of successful intuition is known to many people, the only question is how to manage it. The first step in this direction is to determine the main factors of the situation, which may have different origins. The problem of the analytical approach is complete and accurate consideration of the determined factors. The flair defines a fundamentally different approach - a direct experience of the current situation, and intuition is that we begin to perceive the study process more subtle, as objects with the field nature. Researchers and practitioners from different approaches offer their concepts of a field: the semantic field of Menehhetti; collective unconscious and the archetypes of Jung; the knowing field of Hellenher; morphogenetic fields of Weiss and Sheldrake; Vernadskyi's biosphere; Nalimov's field of consciousness; mystics' egregors; the world of ideas from Plato and others. Here, it is important to neutralize personal factors that distort the quality of prediction.

The differentiation of methodological tools for evaluating the investment risk reflects the systematization of tasks regarding its consideration in the capital management [28]:

1. Methodological tools of assessing the financial risk level, which cover economic and statistical, expert and analog methods of evaluating investment risks.
2. Methodological tools of forming the desired level of profitability of financial operations, taking into account the risk factor, which are based on determining the

[26] Northcott D. (1997). Taking Investment Decisions. Translated from English under the Editorship of A.N. Shohyn, Moscow: Banks and Exchanges Unity

[27] O. Chomiak (2014). Special Strategies for the Same Situations (How to Save Efficiency in terms of instability and uncertainty). Companion, No 17-20, 35-38

[28] I.A. Blanc (2004). Capital Management: The Training Course. Kyiv: Elga, Nick Center

required size of the premium for risk and the overall profitability level of financial transactions.

3. Methodological instruments of evaluating the cost of funds with regard to risk factors.

The most famous are the following methods of reducing the investment risks: insurance (the system of compensation by insurers in case of an accident from special sources of insurance funds generated by insurance premiums); surety; collateral; risk sharing; funds reserving and others.

On the basis of analyzing domestic and foreign sources according to the problems of investment decision-making under conditions of uncertainty, it is offered to generalize approaches to the investment risks classification of the Ukrainian economy development and to analyze methods of their evaluation.

A risk is an objective reality, which is connected with the existence in a human life not only the factors of certainty and determination, but also those, which are random or uncertain. The investment activity is a sphere, where a risk factor is the most noticeable. The risk arises when the results of any decision cannot be predicted in advance. In economy, the result of a decision is often evaluated in terms of value. From this perspective, a risk can be seen as a random possibility of winning or losing the value, because of certain economic decisions.

The risk factor is very important on the capital markets. In fact, under conditions of the risk absence, the capital market, as well as financial markets in all their diversity, will be reduced to the market of some homotypic liability with a single interest rate.

The risks that accompany the investment activity are an objective, permanent factor in the functioning of any enterprise and therefore they require serious attention of investment managers.

The analysis of the risk theory in retrospective suggests that there are two approaches to the interpretation of the category of "risk". If the representatives of the classical political economy school identify the concept of "risk" with "uncertainty", then their followers belonging to the neoclassical school, differentiate them on the basis of different perceptions of these concepts.

Thus, from the perspective of different subjects of investment activity, one and the same situation may have very different risk assessments, which are determined, primarily, by their individual attitude to risk. The subjective perception of risk is reflected in the change of marginal utility growth of anticipated investment incomes.

Development and application of methods of the investment risks evaluation are based on the construction of quality classifications that may help identify different types of risks. Despite the lack of a unified approach to this issue, most authors divide

the investment risks by sources of origin and the possibility of eliminating into two major groups: systematic (market) risks; unsystematic (specific) risks associated with the implementation conditions of these investments only.

The diversity of the investment risks types leads to a wide range of methods of their assessment. All presently known methods of the investment risks evaluation can be divided into qualitative (formalized) and quantitative (informalized) that are largely complementary.

The choice of methods of analyzing are influenced by various factors. The main ones are the type of an investment risk; the degree of completeness and reliability of the available information; the ability to attract skilled experts; qualification of developers and project managers; the availability and the ability to use modern information technologies, etc. There is no universal method of the investment risk evaluation. Therefore, the choice of an adequate method and the effectiveness of its implementation depend largely on the characteristics of specific investment projects and expertise of specialists.

The current investment market is characterized by the increase of variability and uncertainty that strengthen the role of intuitive methods in making important investment decisions.

Reviewing the literature on the subject of development and application of methods of the investment risks evaluation suggests the lack of a single approach to the classification of these methods, the uncertain character of their division into quantitative (formalized) and qualitative (non-formalized) and neglecting, in the proposed methods, the factor of risk liability and specific features of the investment project. None of the known methods of the investment risks evaluation gives accurate results because they do not take into account the accumulated experience and intuition of an investment manager.

In further researches, one should focus on the ways of combining quantitative and qualitative methods of evaluation and management of an investment risk, and the development of measures to minimize their negative financial consequences. It would be advisable to analyze the methods of the investment risks evaluation of innovative projects.

Global and national trends affecting the state of structural risks of the Ukrainian economy. According to [29], in 2015, the global flows of foreign direct investment rose by about 40 per cent, to 1.8 trillion dollars, the highest level since the

[29] World Investment Report 2016 (2016), Investor Nationality: Policy Challenges, UNCTAD, United Nations. Geneva, retrieved from: http://unctad.org/en/PublicationsLibrary/wir2016_ en.pdf.

global economic and financial crisis had began in 2008. However, this growth did not mean the expansion of productive capacities in all countries. This is a negative result in light of the investment needs, associated with the newly adopted sustainable development goals and the ambitious directions of activity, envisaged in the Paris Agreement on climate change. In general, there is a significant decline in investment in the countries of transitive economy. Thus, in 2013 FDI totaled $ 85 billions, in 2014 - $ 56 billions, in 2015 - $ 35 billions.

In 2015, the FDI flows in the countries of a transition economy fell by 38 per cent to $35 billion. The FDI performance of the transition subgroups differed: in South-East Europe, the FDI inflow increased by 6 per cent to $4.8 billion, as well the macroeconomic situation in general and the process of entering the EU continues to improve investors' perception of a risk. By contrast, FDI flows to the CIS and Georgia declined by 42 per cent to $30 billion. The Russian Federation and Kazakhstan saw that their FDI flows had declined by more than half from their 2014 level, while flows to Belarus declined slightly. The FDI to Ukraine, on the contrary, increased more than by seven times, to $3 billion.

FDI flows to Ukraine increased from $410 million in 2014 to $3 billion in 2015, owing mainly to large recapitalization needs in the banking sector and the privatization of the 3G mobile network through licence sales (Table 3, Figure 1).

Table 3. Foreign direct investment: Inward flows, annual, 2010-2015 (in millions USD)

	2010	2011	2012	2013	2014	2015
Ukraine	6495	7207	8401	4499	410	2961
Transition Economies	63601	79275	64786	84500	56463	34988

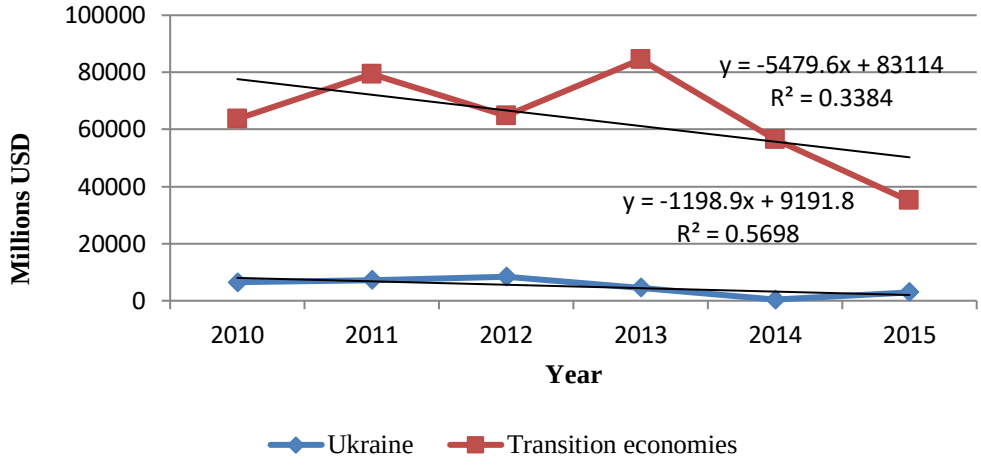
Source: compiled by the author based on the source [30]

According to [31] global FDI flows fell by 13% in 2016, reaching, according to estimates, $1.52 trillion, while the global economic growth remained weak and the world trade volumes experienced a decline in profits. This decline was not equal across regions, reflecting the heterogeneous impact of the current economic environment on the countries worldwide.

[30] Foreign direct investment: Inward and outward flows and stock, annual, 1970-2015 (2016), retrieved from: http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx

[31] Global Investment Trend Monitor, (2017), 25, (1 February 2017), retrieved from: http://unctad.org/en/PublicationsLibrary/webdiaeia2017d1_en.pdf.

Figure 1. Foreign direct investment: Inward flows, annual, 2010-2015 (in millions USD).



Source: Compiled by the author based on the source 30

A drop in FDI flows in developed economies (from -9% to about $872 billion) masks significant variations among countries. FDI flows to Europe fell by 29% to an estimated $385 billion, with a number of countries experiencing strong volatility of their inflows. This decline was restrained by moderate growth in investment flows in North America (6%) and a significant increase in investment in other developed economies, principally Australia and Japan.

The slowed down rates of economic growth and a fall in commodities prices exerted pressure on FDI flows in developing economies. The investment flow in these economies fell by 20% (to an estimated $600 trillion), due to their significant decreases in developing countries of Asia and Latin America and the Caribbean. Nevertheless, developing economies continue to comprise half of the 10 recipient countries. During a year, there was a widespread downturn in cross-border mergers and acquisitions in developing subregions, which fell by 44% in terms of value.

FDI flows to transition economies rose by 38% to an estimated $52 billion. This is largely connected with a great increase in inflows in Kazakhstan as well as a significant investment flow to the Russian Federation.

The wave of cross-border mergers shows signs of ebbing. The 13% increase in the value of net sales, which rose to $831 billion, is insignificant, in comparison with the 67% and 68% increases registered in 2014 and 2015.

The FDI in the construction of new enteprises (Greenfield-projects) rose by 5%, due to several very big projects in some countries. In the vast majority of countries, in

contrast to this, declines were registered. A decrease in the value of manufacturing projects was of particular concern.

Thus, global FDI flows fell by 13% in 2016, reaching about $1.52 trillion, in the context of weak global economic growth and a small increase in the volume of the world trade. Equity investments at the global level were boosted by 13% by increasing the value of cross-border mergers and acquisitions, which rose to their highest level since 2007, reaching $831 billion.

The value of announced greenfield projects reached, according to estimates, $810 billion –a 5% rise compared to the previous year, although this was largely due to a number of very large projects announced in some countries.

Economic predictions indicate a potential increase in FDI flows in 2017 by around 10%, but they are insufficiently substantiated.

The acceleration of global economic growth as well as global trade volumes is predicted. Economic activity in developed countries and among commodities-exporters with the market that is emerging and developing economies should bolster investment activity. However, significant uncertainties about the shape of further development of an economic policy could hamper the FDI in the short-term.

The FDI recovery is performed along a bumpy road. Particularly, the sharp drop-off in requests for manufactured investment projects arise concern, because they play such an important role in generating much needed productivity improvements in developing economies.

In recent years, global derivatives markets have revealed major changes in their trends and gradual transformation of the structure.

The international derivatives market is very dynamic and it has quickly developed into the most important segment of the financial market. Competing for business, both derivatives exchanges and OTC providers, which by far account for the largest part of the market, have improved growth by an existing product and technology innovations. The competitive landscape has been especially dynamic in Europe, which has seen numerous concluded market transactions in the last decades. In the process, strong European players have emerged that today account for around 44 percent of the global market in terms of notional amount outstanding [32]. From the point of view of globalized world financial markets, under conditions of volatility of a global financial system and increased competition, the necessity to analyze market trends of derivatives increases.

[32] Motorniuk U., Terebukh M. and Kharchuk V. (2016). Development trends of the international derivatives market, Econtechmod: an international quarterly journal on economics in technology, new technologies and modelling processes. – Lublin-Rzeszow, Vol. 5, No. 1, P. 63-72. ISSN 2084-5715.

The derivatives market has recently attracted more attention against a backgroung of the financial crisis, cases of fraud and refusal of some market participants. Although the financial crisis has primarily been caused by structured credit-linked securities that are not derivatives, policy makers and regulators have started to think about strengthening regulation in order to increase transparency and safety for both derivatives and other financial instruments.

According to [3334], in recent years, the global derivatives market has revealed major changes in its trends and witnessed the gradual transformation of its structure. During the last quarter of the twentieth century, the volatility of the economic environment was significantly improved, leading to a significant increase in financial risks and causing both the professional market participants and institutional investors to be in dire need of new types of derivatives that would enable to effectively hedge losses in case of unfavorable market changes and receive additional incomes from speculative transactions on the market. The derivatives of the international market - futures, options, forwards, swaps - by name and content coincide with instruments that are traded on national markets, but their production and circulation are regulated by agreements, regulations and deals that exist on the international market. The volume of OTC transactions on the international derivatives market exceeded greatly the amounts of stock trading, but in recent decades, the share of the OTC market increased from 60% to 90%. The market volume has increased by 133 times in absolute terms during that period. The volume of the stock market rose by 30 times, OTC - by 200 on the world's largest derivatives market in North America (54%), and then was quite close in terms of European (38.71%). After the global financial crisis in 2008, the stock market experienced a significant drop in trade, further stabilization and a gradual increase to 70% of the pre-crisis turnover in 2013. At the same time, the global OTC derivatives market almost did not responded to the crisis in 2008.

Open interest positions by instruments on the stock market according to the nominal value in 2013 amounted to 94%, including on OTC markets - 81%. This is an important instrument in hedging a risk of changes in interest rate, and significant amounts of loans and investments that need to be insured against the risk of financial intermediaries, corporations and institutional investors. In the number of contracts, trading on the stock market, the instruments connected with shares dominate and make up more than 50% of all exchange derivatives. While the interest rate

[33] V. Shelydko, V. Virchenko (2014). Modern trends of development of the international derivatives market. Bulletin of Taras Shevchenko National University of Kyiv. Economics, 10(163): 81-87.
[34] Borynets S., Delas V. (2012). Modern trends of the foreign exchange market. Bulletin of Taras Shevchenko National University of Kyiv. Economics, 138: 18-21.

derivatives market in US dollars and euros play almost the same role on the market exchange - the first place in terms of contracts consistently is occupied by the US dollar, the second and third place respectively are occupied by the euro and the Japanese yen. The volume of transactions in the OTC credit derivatives is in third position after interest paying in a foreign currency and commodity derivatives account for only 1%. According to the study [35], one can conclude that the trends that are taking place both on global and national derivatives markets indicate the objective necessity for the domestic market activation. The increase in the current level of uncertainty, in which there are domestic entities, including banks, indicates the need for creating effective mechanisms to hedge economic risks.

Derivatives appeared in response to some fundamental changes in the global financial system. They, if properly handled, should help to improve the resilience of the system and bring economic benefits to the users. In this context, they are expected to grow together with financial globalisation. However, past credit events with credit derivatives exposed many weaknesses in the organisation of derivatives trading. The aim is to minimise the risks associated with such trade agreements, using the benefits they bring to the financial system. An important challenge is to work out new rules and regulations in order to mitigate risks and promote transparency by improving the quality and quantity of statistic data on derivatives markets.

The analysis of recent researches and publications of the global derivatives market allows distinguishing the following trends in this segment of the global finance, such as:

1. Despite the decline in transactions with derivatives, the derivatives market is an essential component of the global financial system;
2. Banks continue to exert a significant influence on the derivatives market development;
3. The increase in the share of interest and currency derivatives combined with a reduction in the volume of transactions with credit derivatives, indicate the derivatives market recovery for its primary function - hedging financial and commercial risks.

In terms of dynamism and volatility of global financial markets, the aim of our research is to analyze the derivatives market trends and outline the ways of their development.

Derivative is an instrument, the value of which depends on some underlying

[35] Shmuratko Ya. A. (2015). Trends of development of the global and national derivatives market. Global and national economic problems: electronic specialized edition, 8, 1075-1079, retrieved from http://global-national.in.ua/archive/8-2015/225.pdf. ISSN (Online): 2413-3965.

financial asset, commodity or predefined variable [36]. Originally, derivatives were used to hedge risks on agricultural commodities. Since the 1970's, there has been a surge in the growth of derivative markets. There is a number of events, which have led to the growth of the derivatives market as stated by Michael Chiu [37].

One such event is the collapse of the Bretton Woods System in 1971. This led to the creation of the derivatives market for currency exchange rates. Another reason was the adoption of the aim to increase money supply of the US Federal reserve system in 1979. This created the demand for interest rate derivatives. Many financial crises in the countries with developing markets in the 1990's and connected with them corporate bankruptcies, resulted in the derivatives market growth in order to serve as a hedge instrument against a credit risk. The development of the theory of finance and advances in computer technology in the 1990's and the appearance of innovation and new products stimulated the popularity and growth of the derivatives market.

Derivatives are an important class of financial instruments that are central to today's financial and trade markets. They offer various types of risk protection and allow innovative investment strategies. Around 25 years ago, the derivatives market was small and domestic. Since then it has grown impressively – around 24 percent per year in the last decade – into a sizeable and truly global market with about €457 trillion of notional amount outstanding. No other class of financial instruments has experienced as much innovation. Product and technology innovation together with competition have fuelled the impressive growth that has created many new jobs both at exchanges and intermediaries as well as at related service providers. The derivatives market is predominantly a professional wholesale market with banks, investment firms, insurance companies and corporates as its main participants [38].

Unless derivatives contracts are collateralised or guaranteed, the ultimate value of a derivative depends on the credit worthiness of the counterparties. The counterparty risk can also be reduced by better collateralisation of credit exposures though bilateral credit support agreements [39]. Another problem about derivatives is that they can exacerbate trouble that a company has run into for completely unrelated reasons.

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36 The economic encyclopedia: Ed. Mocherny S.V. (2000),. Volume 1, Kyiv: Publishing Center "Academy".
37 Michael Chui (2012). Derivatives markets, products and participants: an overview, IFC Bulletin, 35, retrieved from: http:// www.bis.org/ifc/publ/ifcb35.htm.
38 The Global Derivatives Market. - An Introduction, (2008). Frankfurd/Main: Deutsche Börse AG, retrieved from: https://www.math.nyu.edu/faculty/avellane/global_derivatives_market. pdf.
39 Cosmina, Amariei, Deigo Valiante (2014). The OTC Derivatives Markets after Financial Reforms' ECMI Commentary, 3 of May 2014.

Derivatives make future risks tradable, which gives rise to two main uses for them. The first is to eliminate uncertainty by exchanging market risks, commonly known as hedging. Corporates and financial institutions, for example, use derivatives to protect themselves against changes in raw material prices, exchange rates, interest rates etc., as shown in the box below. They serve as insurance against unwanted price movements and reduce the volatility of companies' cash flows, which in turn results in more reliable forecasting, lower capital requirements, and higher capital productivity. These benefits have led to the widespread use of derivatives: 92 percent of the world's 500 largest companies manage their price risks using derivatives. The second use of derivatives is as an investment. Derivatives are an alternative to investing directly in assets without buying and holding the asset itself. They also allow investments into underlyings and risks that cannot be purchased directly. Examples include credit derivatives that provide compensation payments if a creditor defaults on its bonds, or weather derivatives offering compensation if temperatures at a specifi ed location exceed or fall below a predefi nedreference temperature.

Benefits of derivatives make them indispensable to the global financial system and the economy: derivatives provide risk protection with minimal upfront investment and capital consumption; allow investors to trade on future price expectations; have very low total transaction costs compared to investing directly in the underlying asset; allow fast product innovation, because new contracts can be introduced rapidly;can be tailored to the specific needs of any user.

There are two competing segments on the derivatives market: the off-exchange or over-the-counter (OTC) segment and the on-exchange segment. Only around 16 percent of the notional amount outstanding is traded on exchanges. From a customer perspective, on-exchange trading is approximately eight times less expensive than OTC trading. The OTC derivatives market is very much greater in size when compared to the exchange traded derivatives market. It is not possible to have all OTC derivatives traded on an exchange because OTC derivatives are not all standard. They are tailor-made to suit requirements of the market. The flexibility of OTC derivatives makes them more suited to meet special requirements and lack a high order flow.

The Bank for International Settlements (BIS) publishes information regarding the total outstanding value of over-the-counter (OTC) and exchange-traded derivatives positions on a semi-annual basis. The notional value outstanding for the global exchange-traded derivatives industry, e.g., organized futures exchanges, including futures and option markets, declined to $64.6 trillion in December 2013 from $69.1 trillion in June 2013, representing a 6.5% decline advance over the six-month period. The exchange-traded derivatives industry remains some 22.1% below a

peak of $82.9 trillion achieved in June 2011 and 32.1% below the all-time high of $95.1 trillion established in June 2007 (Table 4, Figure 2) [40].

Table 4. Derivative financial instruments traded on organised exchanges

Date	Interest rate		Currency		Equity index		Total	
	In billions of USD	In per cent	In billions of USD	In per cent	In billions of USD	In per cent	In billions of USD	In per cent
II-2009	67062	91,71	293	0,40	5770	7,89	73125	100
I-2010	69557	92,22	349	0,46	5521	7,32	75427	100
II-2010	61948	91,18	316	0,47	5676	8,35	67940	100
I-2011	76041	91,74	390	0,47	6457	7,79	82888	100
II-2011	53299	91,37	312	0,53	4720	8,09	58331	100
I-2012	55581	90,36	328	0,53	5601	9,11	61510	100
II-2012	48546	89,70	336	0,62	5240	9,68	54122	100
I-2013	62178	89,95	344	0,50	6602	9,55	69124	100
II-2013	57007	88,21	384	0,59	7237	11,20	64628	100
I-2014	65620	89,34	375	0,51	7457	10,15	73452	100
II-2014	57222	88,25	377	0,58	7244	11,17	64843	100
I-2015	61823	88,04	388	0,55	8012	11,41	70224	100
II-2015	63202	99,42	366	0,58	…**	-	63568	100
I-2016	67324	99,45	375	0,55	…	-	67699	100

* At half-year end (end-June and end-December). Amounts denominated in currencies other than the US dollar are converted to US dollars at the exchange rate prevailing on the reference date. No data found.
Source: Compiled by the author based on the Source: [41]

The World Federation of Exchanges ("WFE"), which represents more than 200 market infrastructure providers including exchanges and CCPs, published its 2016 Market Highlights[42].

Perhaps highlighting the somewhat exceptional nature of 2015, markets were more subdued in 2016, with most regions showing only modest increases on 2015 figures across the major primary and secondary market indicators, coupled with a number of more significant decreases:

- Global market capitalisation was up 4.4%.
- The value of share trading and the number of trades declined by 26.9% and 15.5%.

40 Derivatives Market Surveys (2016) [Online], World Federation of Exchanges & International Options Market Association: [webpage]. Retrieved from: http://www.world-exchanges.org/files/statistics.
41Exchange-traded derivatives statistics (2016). Retrieved from: http://www.bis.org/statistics/extderiv.htm.
42 World Federation of Exchanges publishes 2016 Market Highlights (2016), retrieved from: https://www.world-exchanges.org/home/index.php/news/world-exchange-news/world-federation-of-exchanges-publishes-2016-market-highlights

- The number of newly listed companies and investment flows through IPOs were down 35.8% and 36.8% respectively.
- Exchange Traded Derivatives (ETD) volumes ended the year 2% down in 2015, driven by the drop in volumes of equity derivatives and stock index derivatives traded.

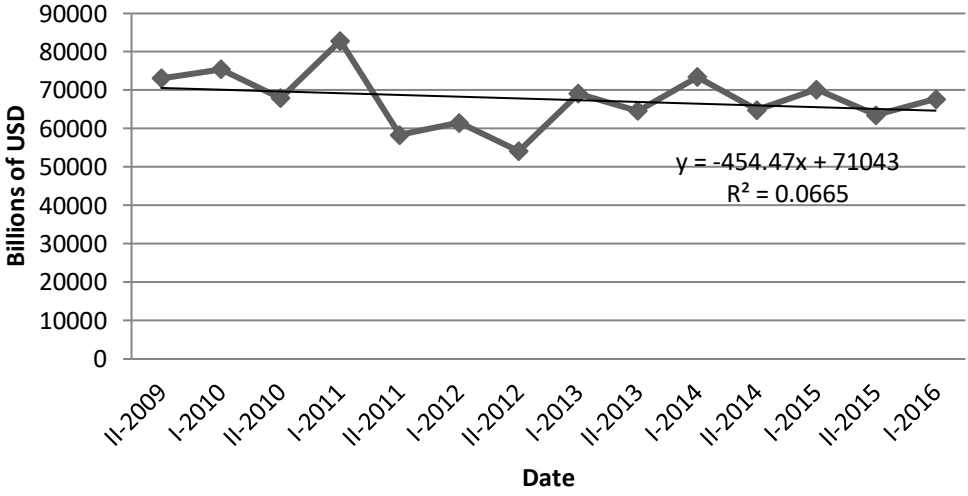
According to the WFE's full-year statistics, the key trends of 2016 were as follows:

- Global market capitalisation was up 4.4% in 2015, driven by the 10.8% and 0.9% rise in the Americas and EMEA regions respectively. Asia-Pacific ended the year down 0.5% versus the end of 2015. Global market capitalisation in H2 2016 increased relative to H1 2016 by 5.7% overall.
- Globally the value of share trading and the number of trades declined by 26.9% and 15.5% in 2015, driven primarily by the 47.2% and 26.1% drop in these figures in the Asia-Pacific region.
- The fall in the value and volume traded most likely reflects the influence of key events in the Asia-Pacific region, such as the sharp sell-off and trading halt on Chinese exchanges in early January 2016; concerns over the likelihood of an interest rate increase in the USA; uncertainty over the future of trade policy with the Americas; and other political and economic events across the Asia-Pacific region.
- In the Americas and EMEA regions, the number of trades increased by 5.2% and 4.7% respectively but the value of share trading was down 4.6% and 15.3% in 2015. Overall in H2 2016, the value traded and volume traded were down 23.3% and 7.7% in H1 2016, thus driving the global slowdown in turnover and trades.
- The number of newly listed companies, investment flows through IPOs and non-IPO investment flows were all down (35.8%, 36.8% and 24.7% respectively) in 2015.
- All regions experienced a decline in investment flows, but this was particularly pronounced in the Americas (down 46.2%). The main driver of this trend was the US, in an election year and with uncertainty over the regime change and consequential shifts in policy.
- The EMEA region experienced the largest percentage drop in non-IPO investment flows. In Europe, which accounted for 93.4% of all investment flows in the region, the 18% drop in investment flows took place against a backdrop of sluggish economic momentum; concerns over the health of the banking system; and uncertainty in the region post Brexit.
- Exchange Traded Derivatives (ETD) volumes (as represented by the number of contracts traded) ended the year 2% down in 2015, driven by a drop in the volumes of equity derivatives and stock index derivatives. The full year saw a reversal of the trend observed in H1 2016, when the growth in the volumes of commodity and currency derivatives saw ETD volumes up by 1.4% in H1 2015.

The use of exchanges for trading of OTC derivatives, where possible is to be

mandated. The US commenced trading of OTC derivatives on Swap Exchange Facilities (SEF's) and Designated Contract Markets moving away from dealer networks from February 2014. SEF's are trading platforms similar to traditional exchanges. The EU is expected to mandate exchange trading for OTC derivatives once the task of central clearing of OTC derivative trades is accomplished. Exchange trading promotes transparency, price discovery and liquidity.

Figure 2. Trends of the exchange-traded international derivatives markets.



Source: Compiled by the author based on the source 41

Activity in global OTC derivatives markets fell in the first half of 2015. The notional amount of outstanding OTC derivatives contracts, which determines contractual payments and is one indicator of positions, fell by 12% between end-December 2014 and end-June 2015, from $629 trillion to $553 trillion. Over this period, exchange rate movements exaggerated the contraction of positions denominated in currencies other than the US dollar. Yet, even after adjustment for this effect, notional amounts at end-June 2015 were still about 10% lower than at end-December 2014 (Table 5).

Table 5. Outstanding Notional Value of Global OTC Derivatives Markets*.

Date	Open interest (Notional principal, in trillions of USD)													
	Interest rate		FX		Equity		Commodities		CDS		Unallocated		Total	
	In trillions of USD	In per cent	In trillions of USD	In per cent	In trillions of USD	In per cent	In trillions of USD	In per cent	In trillions of USD	In per cent	In trillions of USD	In per cent	In trillions of USD	In per cent
II-2007	393,1	67,09	56,2	9,59	8,5	1,45	8,5	1,45	58,2	9,93	61,4	10,48	585,9	100
I-2008	458,3	68,14	63,0	9,37	10,2	1,52	13,2	1,96	57,4	8,53	70,5	10,48	672,6	100
II-2008	432,7	72,33	50,0	8,36	6,5	1,09	4,4	0,74	41,9	7,00	62,7	10,48	598,2	100
I-2009	437,2	73,54	48,7	8,19	6,6	1,11	3,6	0,61	36,1	6,07	62,3	10,48	594,5	100
II-2009	449,9	74,50	49,2	8,15	5,9	0,98	2,9	0,48	32,7	5,41	63,3	10,48	603,9	100
I-2010	451,8	77,52	53,2	9,13	6,3	1,08	2,9	0,50	30,3	5,20	38,3	6,57	582,8	100
II-2010	465,3	77,42	57,8	9,62	5,6	0,93	2,9	0,48	29,9	4,98	39,5	6,57	601	100
I-2011	553,2	78,27	64,7	9,15	6,8	0,96	3,2	0,45	32,4	4,58	46,5	6,58	706,8	100
II-2011	504,1	77,82	63,4	9,79	6,0	0,93	3,1	0,48	28,6	4,41	42,6	6,58	647,8	100
I-2012	496,2	77,37	66,7	10,40	6,3	0,98	3,0	0,47	26,9	4,19	42,2	6,58	641,3	100
II-2012	492,6	77,48	67,4	10,60	6,3	0,99	2,6	0,41	25,1	3,95	41,8	6,57	635,8	100
I-2013	564,7	81,09	73,1	10,50	6,8	0,98	2,5	0,36	24,3	3,49	25,0	3,59	696,4	100
II-2013	584,8	82,29	70,6	9,93	6,6	0,93	2,2	0,31	21,0	2,95	25,5	3,59	710,7	100
I-2014	563,3	81,44	74,8	10,81	7,1	1,03	2,2	0,32	19,5	2,82	24,8	3,59	691,7	100
II-2014	505,5	80,33	75,9	12,06	7,0	1,11	1,9	0,30	16,4	2,61	22,6	3,59	629,3	100
I-2015	434,7	78,64	74,5	13,48	7,5	1,36	1,7	0,31	14,6	2,64	19,8	3,58	552,8	100
II-2015	384,0	77,94	70,4	14,29	7,1	1,44	1,3	0,26	12,4	2,52	17,5	3,55	492,7	100
I-2016	418,1	76,8	74,0	13,6	6,6	1,21	1,4	0,26	12,1	2,22	31,9	5,86	544,1	100

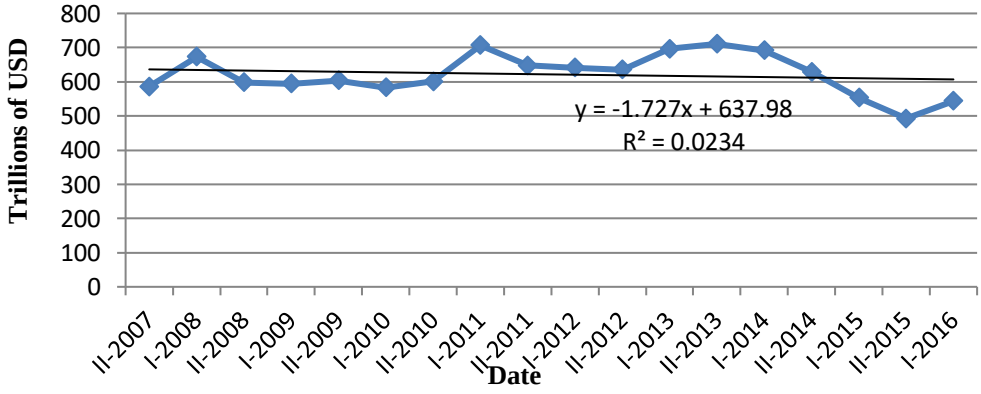
* At half-year end (end-June and end-December). Amounts denominated in currencies other than the US dollar are converted to US dollars at the exchange rate prevailing on the reference date.

Source: compiled by the author based on the source [43].

[43] Triennial and semiannual surveys: OTC derivatives statistics (2016) [Online] // Bank for International Settlements: [webpage], retrieved from: http:// www.bis.org/publ/ otc_hy1511.htm.

The interest rate segment accounts for the majority of OTC derivatives activity. At end-June 2015, the notional amount of outstanding interest rate derivatives contracts totalled $435 trillion, which represented 79% of the global OTC derivatives market (Table 5). At $320 trillion, swaps account for by far the largest share of this market segment. Notional amounts fell sharply in the first half of 2015, driven by a contraction in euro denominated interest rate contracts. The notional value of euro contracts declined from $167 trillion to $126 trillion between end-December 2014 and end-June 2015 (or, equivalently, from €138 trillion to €113 trillion). Trade compression to eliminate redundant contracts was the major driver of the decline. The overall volume of compressions continued to grow in the first half of 2015, mainly affecting interest rate swaps cleared through central counterparties (CCPs).

Figure 3. Trends of the OTC international derivatives market.



Source: compiled by the author based on the source 43

The notional value of interest rate contracts in other currencies also declined in the first half of 2015. US dollar contracts decreased from $173 trillion to $160 trillion between end-December 2014 and end-June 2015. Yen, sterling and Swiss franc contracts also decreased, after adjustment for the impact of exchange rate movements on the reported US dollar positions of interest rate derivatives denominated in those currencies.

The overall decline in notional amounts was not accompanied by a significant change in the maturity distribution of interest rate derivatives. As a share of all maturities outstanding, short-term contracts (with maturities of under one year) rose slightly, from 40% to 42%, between end-December 2014 and end-June 2015, while the percentage of medium-term contracts (with maturities between one and five

years) dropped marginally, from 37% to 35%. In the meantime, the share of long-term contracts (with maturities of over five years) was unchanged, at 24%.

The distribution of interest rate derivatives by counterparty points to a continued shift in activity towards financial institutions other than dealers, including CCPs. The notional amount of interest rate contracts between derivatives dealers, which had been falling more or less steadily since reaching a peak of $189 trillion at end-June 2008, declined further during the first half of 2015 – from $70 trillion at end-December 2014 to $61 trillion at end-June 2015. Contracts between dealers and other financial institutions, including CCPs, stood at $360 trillion at end-June 2015, down from $421 trillion at end-December 2014. One potential explanation for the large size of the latter decline is that trades were moved to CCPs, which facilitated the compression process. Notwithstanding this absolute decline in notional amounts, contracts with other financial institutions continued to account for the majority (83%) of interest rate derivatives contracts as of end-June 2015.

Turning to the concentration of derivatives activity among reporting dealers, as of end-June 2015 in many segments the concentration of dealers' positions had fallen to levels close to or below those reported prior to 2008. Herfindahl indices for the yen interest rate swap (IRS) market had fallen back to 2006 levels and for the US dollar and euro markets to 2004 levels. However, on the sterling and Swiss franc IRS markets, concentration remained well above 2007 levels.

Central clearing, a key element in global regulators' agenda for reforming OTC derivatives markets to reduce systemic risks, made further inroads. In line with the overall trend in OTC derivatives markets, notional amounts cleared through CCPs declined in absolute terms between end-December 2014 and end-June 2015, from $4.8 trillion to $4.5 trillion. The share of outstanding contracts cleared through CCPs rose from less than 10% in 2010 (when data for CCPs were first reported separately) to 26% at end-2013 and 31% in the first half of 2015 [44].

The latest data indicate that the trend towards netting may have stalled. Until recently, the post-crisis shift towards central clearing had contributed to an increased use of legally enforceable bilateral netting agreements. As a consequence, net market values as a percentage of gross market values had fallen from 26% at end-2011 to 21% at end-2013. Nevertheless, this trend has been reversed over the past couple of years, with the above ratio rising back to 26% by end-June 2015. The prevalence of netting is greatest for CDS contracts with other dealers and CCPs, where it reduced net market values as a percentage of gross values to 20% and 21%, respectively, at

[44] Sabrina I. Pacifici, OTC derivatives statistics at end-June 2015 (2015), by on Nov 5, retrieved from: http: // www.bespacific.com/otc-derivatives-statistics-at-end-june-2015/.

end-June 2015. Netting is least prevalent for contracts with insurance companies (79%) and non-financial customers (72%).

The distribution of underlying reference entities indicates that the relative presence of contracts referencing sovereigns has increased steadily since the global financial crisis. The share of such contracts in the total notional amount of credit derivatives outstanding rose from 4% at end-2008 to 16% at mid-2015. In absolute terms, the notional amount of sovereign CDS contracts grew from $1.7 trillion at end-2008 to $3.0 trillion at end-2011. Thereafter, it declined back to $2.3 trillion as of mid-2015. Nevertheless, sovereign CDS contracts' share has continued to increase due to the fact that, as discussed above, the overall notional amount of credit derivatives outstanding has shrunk at an even faster pace.

The distribution of outstanding CDS by location of the counterparty showed little change at end-June 2015. The CDS market continues to be very international. CDS with counterparties from the country in which the dealer is headquartered accounted for only 24% of outstanding contracts at end-June 2015, or $3.5 trillion. Most of the foreign counterparties were from Europe, followed by the United States.

The notional amount of OTC derivatives linked to equities totalled $7.5 trillion at end-June 2015 and the gross market value - $0.6 trillion. The two largest geographical segments of the market appear to be headed in opposite directions. Derivatives linked to European equities, which had stabilised at around $3 trillion for a few years after the sharp reduction they saw during the 2007–09 crisis, are back on a downward trajectory. They recorded a sharp drop in the second half of 2014, which brought their outstanding notional amount down to $2.4 trillion at end-December 2014. That was only partially offset by the latest semi-annual increase, which took them to $2.7 trillion at end-June 2015. By contrast, derivatives linked to US equities have grown steadily over the past few years and have doubled, from $1.6 trillion at end-2010 to $3.2 trillion at mid-2015.

For OTC derivatives linked to commodity contracts, the latest data show no sign of a rebound from the sharp correction that occurred after the 2007–09 crisis. The notional amount of outstanding OTC commodity derivatives contracts declined from a peak of $13 trillion at end-June 2008 to $3 trillion at end-2009 and less than $2 trillion at mid-2015. The gross market value of OTC commodity contracts stood at $0.2 trillion at end-June 2015, down from the mid-2008 peak of $2.2 trillion.

In contrast to the traditional argument for the systemic benefit of risk sharing, the paper [45] argues that the complex design of financial derivatives – characterized

[45] Koehler, Christian, The Relationship between the Complexity of Financial Derivatives and Systemic Risk (2011), May 31, retrieved from SSRN: http://ssrn.com/abstract=2511541 or http://dx.doi.org/10.2139/ssrn.2511541

by multiple derivation of pooling-based derivatives – increases the potential for a systemic crisis substantially.

The argumentation for this relationship between the complexity of financial derivatives and systemic risk starts with an analysis of the decision behavior under uncertainty. In particular, the difference in the perception of (determinable) risk on the one hand, and ambiguity on the other hand build the foundation of the following argumentation. The next step points out the relevant contractual mechanisms of financial derivatives and their economic consequences: The pooling of risk sets a strong incentive for the issuer to communicate only a part of the valuation-relevant information to third parties (the information destruction effect). The structuring of risk by the principle of subordination causes the relevance of influencing factors on the overall risk structure of the derivative to shift materially. If, finally, these derivatives are once again pooled and structured, the economic effects of estimation errors on the identified value of the derivative of 2nd degree are systematically enforced. The paper concludes, that there will be simply too little information available from a certain (a priori undetectable) level of derivation on, to provide a reliable risk assessment in the light of the material impact of estimation errors. Thus, the multiple derivation of pooling-based derivatives goes hand in hand with enormous operational risk and model risk.

The truth is that the danger that we face from derivatives is so great that Warren Buffet has called them “financial weapons of mass destruction”. Unfortunately, he is not exaggerating. It would be hard to understate the financial devastation that we could potentially be facing. A number of years back, French President Jacques Chirac referred to derivatives as “financial AIDS”. The reality is that when this bubble pops there will not be enough money in the entire world to fix it. However, ignorance is bliss, and most people simply do not understand these complex financial instruments enough to be worried about them. Unfortunately, just because most of us do not understand the danger does not mean that the danger has been eliminated.

OTC derivative contracts pose a systemic risk if they continue to be unregulated. Hence the need for regulation. Exchange traded derivatives pose less of a danger because counterparty risk is mitigated. Derivative contracts are of great economic benefit to users to manage risk. This fact is supported by the growth of the derivatives market in recent times [46].

[46] Rohan Fernando LLM FCMA ACMA CGMA Are derivatives financial weapons of mass destruction? (2014), published 15 December. Retrieved from: https:// www.linkedin.com/pulse/derivatives-financial-weapons-rohan-fernando

The challenge faced by regulators is to design a regulatory framework, which prevents excessive risk taking by players on the derivatives market. In September 2009, at the Pittsburgh G20 Summit many decisions were taken to achieve this objective. These decisions are known as the G20 commitments. Most G20 commitments have been incorporated into the Title V11 of the Dodd Frank Wall Street Reform and Consumer Protection Act in the US and into the European Market Infrastructure Regulations (EMIR) in the EU. The Markets in Financial Instruments Directive (MiFID) in the EU is also being reviewed as regards provisions relating to derivative trading.

It delivers a total strategy for risk control, which is integrated with the organizations wider systems, strategies and culture; focused on managing the future and not merely auditing the past; and designed to move risk management from a dead weight cost to a driver of value.

So many risks and so little real information. After a very dull spring and early summer when the Chicago Board Options Exchange Volatility Index (VIX), often referred to as the Market's Fear Gauge, stayed below 16% except for a handful of days, we saw a spike to over 40% for a day in late August. Since then, however, it has been falling steadily, receding to 14%–16% as of early November. The market plainly seems not too fearful these days [47].

Objectively, considering the size and variety of uncertainties that we currently face, we should probably be terrified. Once again, this situation illustrates the difference between volatility as it is estimated from returns data and volatility that leads to a major change in the level of stock prices over the relatively short lifetime of an option. If an asset's price follows a logarithmic random walk with constant instantaneous volatility, the two manifestations of "volatility" amount to the same thing: Over a period of any length T, the standard deviation of the return is volatility per period multiplied by the square root of T. However, even with constant volatility along a random walk path, the realized final asset price and option payoff can end up anywhere within a broad range. Thus, it is not inconsistent to expect low volatility over the immediate short run, because new information becomes available slowly, while anticipating that the total price change over a longer holding period may be very large. This distinction plays out in terms of a potentially vast difference between how an investor might think of volatility over an option's life in terms of the effect on its payoff at maturity, versus how day-to-day volatility affects the hedging cost for a market maker, who takes the opposite side of the investor's trade. The investor wants a big price move and does not care which path the stock takes to get there, whereas the market maker wants smooth price paths without large changes of direction that

[47] Journal of Derivatives, Research and Markets, (2016), published in March, retrieved from: http:// www.researchandmarkets.com/reports/1286181/journal_of_derivatives

would whipsaw his or her hedge. It does not matter much to the market maker where the stock price ultimately goes. Sharp price jumps are fine for the investor (in the right direction), but they are terrible (in either direction) for the market maker's delta hedge.

OTC derivatives can move dynamically within volatile markets, creating the potential for pre-defined risk limits to be breached following sizeable market movements. To address this, active management of counterparty risk may be necessary by [48]:

1. Re-couponing/resetting the mark-to-market of the derivative.
2. Unwinding positions based on certain market movements.
3. Transfer of positions from over-threshold names to third parties ('novation'), where risk limits are being under-utilised.
4. Hedging the exposure using credit derivatives with a third party.
5. Incorporating a credit support annex (CSA) with daily settlements, thresholds, minimum transfer amounts, independent amounts given the bilateral nature of derivatives contracts in many of the cases above, consent from the over-threshold counterparty may be required to effect these actions.

According to the 2016 Triennial Survey [49], turnover in global FX markets averaged $5.1 trillion per day in 2016. This is down from $5.4 trillion in April 2013, a month which had seen heightened activity in Japanese yen against the background of monetary policy developments at that time. In addition, exchange rate movements influence comparisons with previous surveys. In particular, the appreciation of the US dollar between 2013 and 2016 reduced the US dollar value of turnover in currencies other than the US dollar. When valued at constant (April 2016) exchange rates, turnover increased slightly, by about 4% between April 2016 and April 2013 (Table 1). Nevertheless, the latest developments contrast with the strong growth in turnover observed between Triennial Surveys since 2001.

Activity on global OTC derivatives markets fell in the first half of 2015. The notional amount of outstanding contracts declined from $629 trillion at end-December 2014 to $553 trillion at end-June 2015. Even after adjustment for the effect of exchange rate movements on positions denominated in currencies other than the US dollar, notional amounts were still down by about 10%. Trade compression to eliminate redundant contracts was the major driver of the decline.

The gross market value of outstanding derivatives contracts - which provides a more meaningful measure of amounts at risk than notional amounts - declined even more sharply in the first half of 2015. Market values decreased from $20.9 trillion to $15.5 trillion between end-December 2014 and end-June 2015. The fall is likely to

[48] Morgan J.P. (2013). Derivatives and Risk Management made simple. London: The National Association of Pension Funds Limited

[49] Triennial Central Bank Survey (2016). Bank for International Settlements, retrieved from: http://www.bis.org/

have been driven by the reduction in notional amounts outstanding as well as increases in long-term interest rates, which took yields back closer to those on outstanding swaps.

Central clearing, a key element in global regulators' agenda for reforming OTC derivatives markets to reduce systemic risks, made further inroads. On credit default swap markets, the share of outstanding contracts cleared through central counterparties rose from 29% to 31% in the first half of 2015. On interest rate derivatives markets too, central clearing is becoming increasingly important.

The top vendors on derivatives market are focusing on the supervision of the financial systems and identifying cross-border systemic risks so that there can be transparency in the system to bring in potential investors to invest in the market over the forecast period. The market research analysts predict a market growth rate of over 14% over the next four years. Innovative products like volatility index derivatives are gaining a lot of importance in the Europe and the US. The markets like equity, commodity, and currency would be bullish during the forecast period due to an increase in the number of trade volumes. Due to long-term interest rate options and single stock derivatives the revenue generation is expected to be more on the currency and commodity derivatives market during the forecast period.

The foreign exchange turnover was around USD 6 trillion at the end of 2014, which is an all-time high. Many investors have tried to diversify their portfolio into riskier assets like international equities and local currency emerging market bonds. Therefore, as investors are more focused on rebalancing their portfolios more frequently, it has led to the increasing need to trade in foreign exchange in large quantities. This trend is likely to boom the global derivatives market through 2019 [50].

The market share of dealers that participate in the semiannual survey varies across risk categories. It is highest in the credit, equity and interest rate segments (99%, 98% and 96%, respectively, at end-June 2016) and lowest in the commodity and foreign exchange segments (79% and 86%). Overall, the results of the Triennial Survey indicate that the semiannual survey captured about 94% of global OTC derivatives positions at end-June 2016 [51].

At present, development trends of the market derivatives are determined by the following key factors:

- increased globalization and interconnection of national and regional markets, as a result of which changes in one of the centers of world trade directly affect the general state of the derivatives international market
- increase in the volatility level of financial markets that increase global instability of the derivatives world market

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50 Global Derivatives Market 2015-2019. Research and Markets (2015) Infiniti Research Limited, November (IRTNTR7815), retrieved from: http: // www.reportsnreports.com/ reports/443014-global-derivatives-market-2015-2019.html.

51 Statistical release OTC derivatives statistics at end-June 2016, (2016), published in November, retrieved from: http://www.bis.org/publ/otc_hy1611.pdf

- technology standardization of currency transactions performing in the context of globalization of economic processes and the increase in the carried out transactions
- transparency of the market, that is connected with the virtually unlimited access to information on the formation of derivatives markets conjuncture
- liberalization of market participants derivatives
- increase of the risks level at the derivatives market.

The above mentioned trends reflect the increased sensitivity of derivatives market transactions to environmental changes and enhance the predictability of its members activities. Too liberal terms of the derivatives market can be a factor of macroeconomic and financial currency instability in the conditions of the low level of development of market institutions in transitional economies.

This year, the results of Ukraine's foreign trade although have not reached those trends yet, which we expected to see, but compared to previous years we have observed some positive developments. This gives us hope for a transition of this area of the economy in the short-term perspective on a slightly different level.

Thus, following the results of 8 months of 2016, the exports of goods compared to the same period in 2015 decreased by 9% to $22.7 billion, while the volume of goods import compared to the previous year decreased by 0.9% (or 226, 9 million dollars) and amounted to $24.2 billion [52].

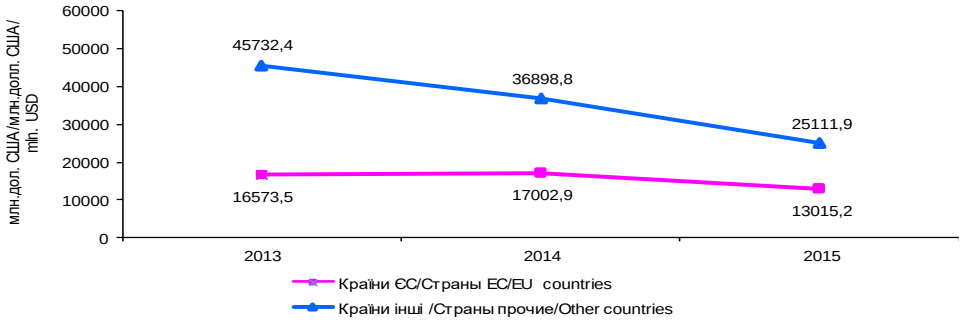
For 2015, exports of goods to EU countries amounted to $13015, 2 million and decreased, compared to 2014, by 23.5% (to $3,987.7 million) (Figures 4,5), import amounted to $15330,2 million respectively and decreased by 27.2% (to $ 5,739.0 mln). The negative balance amounted to $2315.0 million [53].

In the total share of the EU countries compared to 2014, the share of Ukraine in export increased and amounted to 34.1%, in imports - 40.9% (in 2014, respectively 31.5% and 38.7%).

The formation of the negative balance was affected by some product groups: mineral fuel, oil and refining products ($3043.9 mln.), mechanical equipment ($1206,8 mln.), plastics, polymers ($1008.4 million).

[52]Ukraine's foreign trade in goods and services in 2015. (2016), Kyiv: State Statistics Service of Ukraine, retrieved from: https://ukrstat.org/uk/druk/publicat/kat_u/publ10_u.htm
[53] Cooperation between Ukraine and the EU in 2015. (2016), – Kyiv: State Statistics Service of Ukraine, retrieved from: https://ukrstat.org/uk/druk/publicat/kat_u/publ10_u.htm

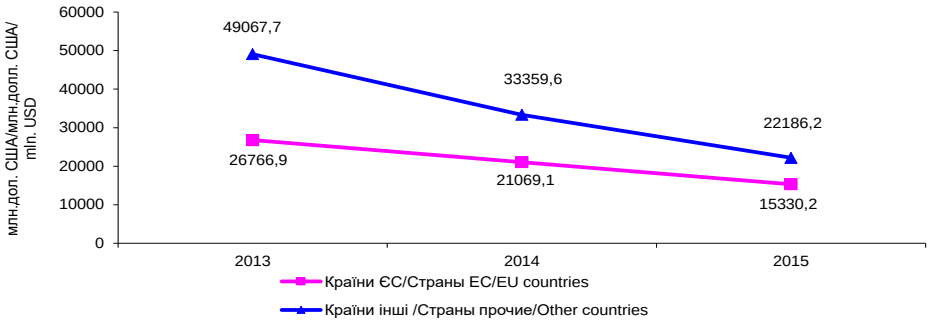
Figure 4. Dynamics of goods export from Ukraine to the EU countries for the period 2013-2015



Source: compiled by the author based on the source 53.

The largest volume of exports to the EU countries accounted the production of an agricultural complex and food industry - 31.2% of total exports, ferrous metals - 20.2%, electrical and mechanical machinery -13.8%, mineral products - 11.4%.

Figure 5. Dynamics of goods import from Ukraine to the EU countries for the period 2013-2015.

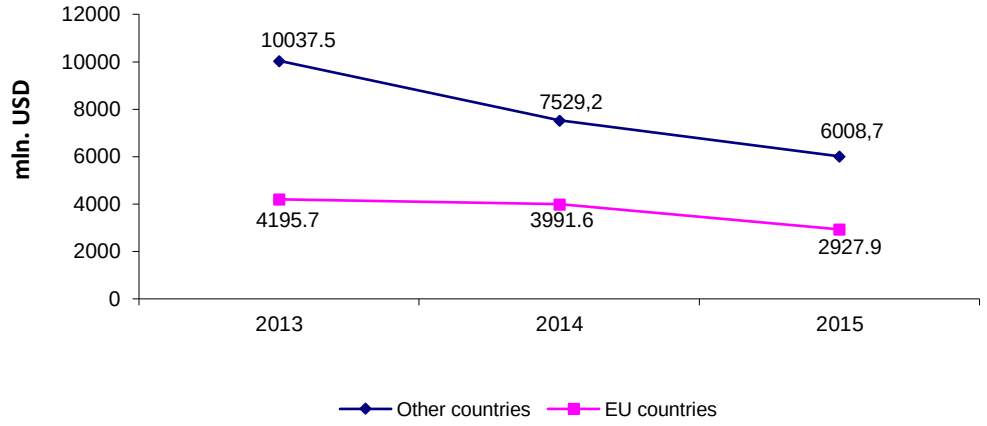


Source: compiled by the author based on the source 53

In 2015, exports and imports of services to EU countries amounted to $2927.9 million and $2750.1 million and decreased relatively to 2014, by 26.6% and 12.7% respectively (Figures 6,7). The surplus was $177.8 million (in 2014, also positive $842.8 mln.).

The positive balance was mostly affected by a certain types of services: processing of material resources (surplus of $608.7 mln.), transport ($432.8 million), in the sphere of telecommunications, computer and information ($279,1 mln.).

Figure 6. Dynamics of services export from Ukraine to the EU countries for the period 2013-2015.



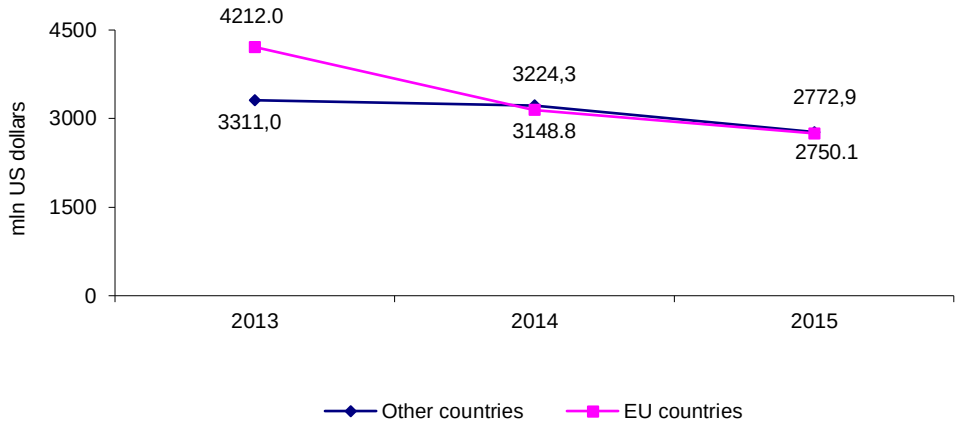
Source: compiled by the author based on the source 53

The coverage ratio of import by export was 1.06 (in 2014 - 1.27). The share of services export to the EU countries in total was 30.1%, import- 49.8% (in 2014, respectively 34.6% and 49.4%).

The Ukrainian export in recent years has been experiencing difficult times. We lost some markets and production capacities for traditional exports; the world market conjuncture was also unfavorable. Eventually, this led to a significant reduction in domestic export. The multidirectional situation was typical for the current year. On the one hand, some negative trends from last year have survived, including:

- an unstable political and economic situation in some regions of Donetsk and Lugansk regions, continued military aggression from Russia;
- a significant raw material orientation of domestic export;
- the lack of access to credit resources, systemic problems of foreign economic activity (VAT refund, currency, customs and tax regulation).

Figure 7. Dynamics of services import from Ukraine to the EU countries for the period 2013-2015.



Source: compiled by the author based on the source 53

In 2016, these trends were supplemented by the introduction of embargo on the Ukrainian food by the Russian Federation, the use of MFN to the domestic export and limited as well as complicated transit through the territory of Russia, and from July 1, the Russian Federation has strengthened them additionallly.

Taking into consideration the above mentioned trends of export-import operations of Ukraine, namely, the reduction of goods export by 9.0% and import by 0.9%, according to the results of eight months of this year, export surplus in foreign trade was negative in the amount of $1,5 billion (compared to positive in January-August 2015 - $0.5 billion) [54]. Taking into account the official statistics of State Statistics and DFS operational data for September of the current year, we expect that in the first 9 months of 2016, the reduction of export will be at the level of 8.7%.

As for major world trends in the development of the agricultural sector, they are reduced to a significant increase in demand for agricultural products and foodstuffs with increasing volatility in prices for them. The provided facts, on the one hand, lead to an increase in revenues of the national agents of land interests, and on the other hand - (concerning the effect of exports) the growth of domestic prices for agricultural products and foodstuffs to the level of world prices. The limited range of

[54]The results of Ukraine's foreign trade for 8 months of 2016, (2016). Kyiv: Ministry of Economic Development and Trade of Ukraine (Official Website) retrieved from: http://me.gov.ua/News/Detail?lang=uk-UA&id=0596e42e-293b-4c36-87fc-8d0f2bf780de&title=PidsumkiZovnishnoiTorgivliUkrainiZa8-Misiatsiv2016-Roku.

exports is a negative factor for Ukraine; its agribusiness subjects perceive volatility of world prices at the level of financial losses. The way out of this situation could be to increase the range of agricultural products and food, expand the areas for sales and the circle of partner-countries. The rate of the agricultural raw materials production outpaces the growth rate of its processing and storage, because of this, the national agents of land interests receive less added value, as the global competition is more significant at the market of finished products and warehouse logistics.

Against a background of the global problem of food production, besides the increasing demand for it, the load on the land also increases due to the switch to biofuels. Among the most significant global trends, we should highlight the formation of a free trade zone between the US and the European Union (TTIR), which also will influence greatly the agricultural market conjuncture, and consequently, according to the number of globalization impacts on the development of the Ukrainian agricultural complex, the relationship between the number of land interests agents will be transformed from competing to complementary.

The above-mentioned trends will generally have positive consequences for Ukraine under conditions of development of national preventive and administrative adapters, including the agricultural insurance system, harmonization of the national standardization system and certification with the world ones.

In the global context, these problems should be resolved, including with the help of the international community, because according to the anticipated estimates on the agricultural sector in Ukraine (according to the US Department of Agriculture (USDA), Food and Agriculture Organization (FAO) and the Organization of economic cooperation and development (OECD), in view of the tense situation with the prices on agricultural products and food on world markets, soon Ukraine will, to some extent, affect the world prices. Thus, the Strategy to develop agriculture and rural areas in Ukraine for 2015-2020, which was developed with the support of the European Union, the European Bank for Reconstruction and Development, USAID (United States Agency for International Development), the World Bank and FAO (global agents) has the key position to increase grain production to 100 million tons per year. During the implementation of this strategy, one should take into account the proposed methodological principles of the formation of economic, social and environmental effectiveness of land resources administration, as this gross collection can be provided either by an extensive way or intensive one, on the condition of a significant increase in anthropogenic pressure on land resources, or changes in the structure of sown areas with monoculture strenthening and deterioration of humus balance in the soil.

The main ways of overcoming the structural risks of the Ukrainian economy development in terms of European integration. The first group of problems, namely structural economic imbalances include: a destructive raw pattern of the economy development and deindustrialization that generate vulnerability of the payment balance and high currency risks; the clan and oligarchic system, monopolization or olihopolization of markets and systemic corruption at the level of state governance, which preserves a raw type of economic development; transformation of state agencies into an inefficient and corrupt manager; permanent problems with property rights that block the motivation of business for the long-term investments.

The second group of the crisis causes includes systemic problems of the banking system: the system shortage of long-term resources that deprives the banking system of the investment lending opportunities; focus on ongoing operations and the failure to perform the principal lender's functions for the strategic structural reconstruction of the economy; disproportion in terms of bank balances concerning the maturation of assets and liabilities (maturity mismatch) and currencies (currency mismatch), which creates systemic vulnerability of the banking sector and its clients to the currency shocks.

The third group of causes of a systemic banking crisis, which has exacerbated and actualized the first two ones, includes shocks from the actions of the monetary regulator as a result of its fundamental system errors in the sphere of monetary, currency and communication policy, as well as not properly chosen conception of measures in the field of banking regulation.

If there are no economic disturbances, the tendency for an insignificant reduction of deposit rates in Ukraine will continue in 2016. The main reasons for the increase in deposits volumes and decrease in deposit rates is the reduction of the inflation level, the decline from January 1, 2016 of the tax rate on income from deposits from 20% to 18%, the stabilization of the exchange rate, lifting the restrictions on the return of currency deposits [1].

Compliance with fundamental principles of deposit operations and providing an effective monitoring of banks activity results will ensure the increase of efficiency of deposit services providing. The measures concerning systemic risks monitoring in the process of attracting deposits, leveling structural imbalances in assets and liabilities of commercial banks will improve the financial performance of banks in Ukraine and further stabilization of the banking sector.

Global financial instability is manifested in increasing the transactions risks on international financial markets, reducing correlation of factors and parameters of the main markets segments, volatility in exchange rates and financial indicators, periodic

changing of market trends. The impact of instability and financial risks at times takes the form of financial shocks.

The external financial shocks comprise unexpected changes in the basic parameters of international financial markets, which affect the state of national financial markets significantly. In particular, during the global financial crisis, the impact of external shocks and financial risks on the economy of Ukraine manifested as dislocation of internal and external balance on the commodity and financial markets, a major change in terms of trade, competitiveness, the investment climate.

These risks have an impact on the scale and directions of capital export, its movement into the countries with more promising macroeconomic trends and stable growth. However, due to the deterioration of capital investment conditions, the financing of the real economy, the growth of speculative financial transactions on global markets and capital flows to the countries with developed economies are limited. In particular, the increased volatility of global financial markets and the current Eurozone crisis cause the reduction of inflow and outflow growth of financial and banking capital from Ukraine.

It is important to develop the financial sector of Ukraine in the new investment-dependent model of economic growth that should be formed in the period 2017-2020's: without the financial sector, the desired model will not function. In particular, in institutional terms, it is planned to overcome not only the existing crisis of toxic assets, liquidity and a high degree of distrust in the banking sector, but also reach the relevant market operation conditions. Calculations of indicators concentration of the banking system of Ukraine in 2014-2015 (Herfindahl-Hirschman Index, IHH) showed that the Ukrainian banking system has a low level of concentration [1]. However, the analysis of the market part of major banks gives reasons to talk about the signs of the oligopoly formation on the banking services market. Under conditions, when the Ukrainian banking sector occupies over 90% of the financial market assets, it can limit overcoming the quasi-market both at the financial market and in the economy of Ukraine in general.

The calculations also suggested an average level of concentration on the insurance market and a high level - on the stock one. In particular, we have already mentioned the deformation of this market due to the behavior of state with internal governmental bonds. However, the quasi-market is inherent to other sectors of this market. To overcome it, it is necessary to restart the stock market, overcoming its undeveloped infrastructure; a low level of investor’s rights protection; limited financial instruments that are traded on stock exchanges; the lack of long-term resources (neither insurance, investment nor private pension companies do not work properly at the market); low transparency and vagueness of the game rules; the

absence of a clear regulatory system (at the market of financial services regulation, besides the NBU, there are two regulators - SSMNC and Natsfinposluh), bringing it in line with European standards and norms, making the listing requirements for securities traded on stock exchanges more flexible, increasing the transparency of the stock market (removing the barriers to entry of foreign securities to the domestic market and, vice versa, the possibility of trading domestic securities on foreign stock exchanges) and strongly pushing out its corrupt and manipulative component.

Economic measures are urgent measures in order to activate the investment activity in the medium term perspective. Such measures are the reduction of interest rates, increasing monetization of the economy and state funding of infrastructure projects, development of the state investment strategy.

Under conditions of the integration processes intensification in the national economy, the study of its interaction with banks becomes objectively necessary, because, despite the significant investment activity of banks in Ukraine on the whole, in recent decades, in the context of recent events of political and social-economic nature there are macroeconomic imbalances that led to crisis phenomena, including in the banking system. It is known that the stability of the national currency, the development of the real economy sector, macro-financial stability of the state in general depend on the banking system efficiency in the country.

The introduction in 2016 of a new exchange rate of the order of the national monetary unit of Ukraine is considered in [55] and its relationship with monetary safety is substantiated. It is maintained that in the near future the exchange rate is to become an auxiliary tool of monetary policy of the National Bank of Ukraine, the main instrument of which is the interest rate. Registration of interbank agreements and carrying out foreign exchange intervention on the currency market of Ukraine are performed with the help of functional trade information system „Bloomberg L. P." and „Thomson Reuters".

The main problems in the development of the investment activities of transnational corporations (TNCs) in Ukraine are: non-balance of law framework, substantial tax burden of the tax authorities, a large degree of bureaucracy and corruption of the responsible representatives, low purchasing power of the population of Ukraine, low transparency of the privatization process, not effective judiciary, underdevelopment of insurance stock market and so on. The plans of the TNC's activity development in future on the territory of Ukraine are closely connected with the process of the Ukrainian economy growth and prospects for Ukraine to

[55] Lapinskyyi, I.E., Demchenko M.U. (2016). Exchange rate of the Ukrainian national currency change in the context of state safety. Bulletin of the Polissya, 4 (8), Vol. 2, 303-309

implement efficient macroeconomic reforms in the country. Actually, the international image of Ukraine depends on its ability to implement macroeconomic reforms. The international image, in its turn, is a significant argument to promote the activities of TNCs in Ukraine. The program of the government activity should include developed and fixed regulatory mechanisms, which have to contain a system of incentives to attract foreign TNC and a system, which prevents possible negative effects of transnationalization.

Simultaneous ratification of the Association Agreement between Ukraine and the European Union (EU) was held on September 16, 2014 and from November 1, 2014 the provisional application of this Agreement was introduced, except the Section IV «Trade and trade related issues" that includes provisions for creating a deep and comprehensive free trade zone between Ukraine and the EU, which came into force on January 1, 2016. A considerable part of the Agreement provisions, is directly or indirectly related to the customs sector, particularly, the promotion of trade and cooperation in the customs sphere, mutual assistance in fighting against customs offenses, unification of rules of goods origin defining, harmonization of customs procedures, customs and tariff regulation in the context of the gradual reduction of tariff rates etc. The implementation of the Agreement between Ukraine and the EU is carried out according to the action plan for 2014-2017, approved by the Cabinet of Ministers of Ukraine "On the implementation of the Association Agreement between Ukraine, of the one part, and the European Union, the European Atomic Energy Community and their Member States, of the other part» № 847-P from 09.17.2014. The above mentioned action plan presupposes implementation of 488 tasks of short - and medium-term nature in all sections of the Agreement, particularly in the field of customs. The transition of national customs authorities to the European principles of work is aimed primarily at enhancing international business development and trade between Ukraine and the EU, speeding passengers and cargo flow, preventing smuggling and illegal migration, creating civilized conditions of the customs border crossing with the EU countries (the length of the border with Poland is 542 39 km, Slovakia - 97.852 km, Hungary - 136.7 km, Romania - 613.8 km). Many activities in the customs area in the context of the Association Agreement implementation between Ukraine and the EU are already realized. Thus, the customs authorities have functions to issue and verify goods origin certificates of the "EUR.1" form, administrate and calculate automatic tariff quotas, giving enterprises the status of the authorized (approved) exporter etc. However, there is a need for qualitative reforming the customs policy of Ukraine taking into consideration basic principles and

values of the EU, harmonization of the legal framework, creation of the conditions for providing customs cooperation between Ukraine and the EU [56].

In modern conditions of European integration of Ukraine, the requirements for the customs authorities functioning have been transforming fundamentally, which involves building a logical and quality system of customs management, facilitation of customs clearance and control on the basis of information technology application, ensuring the effective prevention of smuggling and customs violations based on the expansion of international cooperation, establishment of joint border control with neighboring countries of the EU etc.

Conclusions. Global financial instability is manifested in increasing the transactions risks on international financial markets, reducing the correlation of factors and parameters of the main markets segments, volatility in exchange rates and financial indicators, periodic changing of market trends. The impact of instability and financial risks at times takes the form of financial shocks.

It is predicted, that global economic growth will accelerate, as well as global trade volumes. Economic activity in developed countries and among commodities exporters from emerging markets and developing economies should bolster investment activity. However, significant uncertainties about the shape of further development of economic policy could hamper FDI flow in the short-term.

Ukraine needs to increase foreign capital attraction to the financial system and real economy for the modernization recovery and efficient growth. Solving this problem cannot be limited to specific regulatory incentives. Profound structural reforms, a considerable improvement of conditions for conducting business, the stimulation of competitiveness and productivity growth are required. Macroeconomic and fiscal balance achievement should be the basis for strengthening the economic stability and its ability to withstand external shocks and financial risks. In terms of European integration, Ukraine took numerous responsibilities relating to substantial reforming of the customs policy, according to which the nature and priority of customs authorities' functions are changing, resulting in the need to systematize and develop a set of measures in this area. The association of Ukraine with the European Union with the prospect of future membership will turn the borders with the EU into conventional borders, but there are new challenges of infrastructure development of northern and eastern borders of Ukraine, which would become external to the EU.

[56] Kuzmin O.E., Todoshchuk A.V. and Melnyk O.H. (2016). Customs policy reformation in Ukraine under European integration. Actual Problems of Economics: The Journal, 11(185). 53-60. ISSN 1933-6788

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THE PARADIGM OF DEVELOPMENT OF INDUSTRIAL ENTERPRISES' INVESTMENT POLICY

Abstract. *In the article, the absence of effective institutional measures was revealed on the basis of the research of investment theory concepts. The need for the development and implementation of fundamental scientific approaches and methodological basis of formation and implementation of the industrial enterprises' investment policy was proved. It foresees the use of the driving mechanisms for investment activity stimulating based on the expanded reproduction of industrial and economic systems. Consequently, the industrial activities directed at the development by adjusting the weight of the factors of external and internal innovation processes intensification influence the rate of general economic acceleration. The results of the scientific analysis of investment activity definitions revealed a primary basis for determining the economic nature of the enterprises' investment policy. The trend of understanding the investment policy nature from the positions of institutional and information economic theory was established. The article offers interpretation of the essence of the "enterprise's investment policy". It is defined as a realization of investment ideology and economic policy of industrial and economic system form in the context of the most important aspects of investment at various stages of its existence.*

JEL Classification System: B400, E220, L510, L600
Keywords: investment policy, industrial development, investment, innovation process, investment theory.

Introduction. The need to review the paradigm of development and implementation of the investment policy of industrial enterprises' is caused by insufficient development of theoretical approaches to the investment policy formation as well as neglecting the importance of investment activity regulatory mechanisms under conditions of the transformation economy and inconsistency of traditional management approaches and requirements of a modern economic system. This requires a change in approaches to the research methodology of an investment process with the focus on the reproductive structure of an investment and innovative model of economic development.

In domestic economic studies, the issues of the industrial enterprises' investment policy in accordance with the professional specialization were investigated by such scientists as: B.M. Danylyshyn[57], V. M. Geyecz[58], T. T Kovalchuk[59], O. M. Alimov[60], V. V. Mykytenko, V. I. Muntiyan[61], V. G. Fedorenko, G. K. Yalovoy and others [1-5].

The aim of the paper is to develop fundamental scientific approaches and methodological basis of formation and implementation of the investment policy of industrial, productive and economic systems in the course of their development.

Based on an empirical conclusion, according to the theory of institutional and information economy, under conditions of the unstable market environment and with the aim of expanded reproduction, the modern productive-economic system is supposed to be independent in making management decisions regarding the development and implementation of the strategy and tactics of business and economic activity in general, and its investment maintenance in particular. Therefore, studying the hypothesis of equilibration of regulatory, programme and financial mechanisms within the methodology of development and implementation of the industrial enterprises' investment policy in terms of resource limitations acquires certain scientific and practical significance.

The investigation of the development and implementation of the industrial enterprises' investment policy focuses on the process of real investment due to crucial necessity for the renewal of fixed assets of domestic industrial enterprises.

The methodological principles of the investment policy forming and implementation regarding scientific and theoretical achievements include the theoretical basis, an organizational structure and the types of institutional resources.

First, we justify the theoretical basis of the development and implementation of the industrial enterprises' investment policy.

The development and implementation of the investment policy and postulates of the theoretical bases are advisable to classify according to the type of impact on the efficiency of investment as negative, neutral and positive (table 1).

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[57] Danylyshyn, B.M. (2008) Phenomenological alternatives of economic growth of Ukraine: 2 vol. Kyiv: Council for the study of productive forces of Ukraine NAS of Ukraine; Nichlava.

[58] Geyecz, V.M. (2000) Instability and Economic Growth. Kyiv: NAS of Ukraine. In–t of econ. forecasting.

[59] Kovalchuk T.T. (2004) Economic security and politics: professional analyst's experience. Kyiv: Znannya Press.

[60] Alimov O.M., Veklych O.O, Venher V.V., Honcharova N.P. (2005). The economic development of Ukraine: institutional and resource support: monograph. Kyiv: NAS of Ukraine

[61] Muntiyan, V.I. (2004) Fundamentals of the theory of an information-genic economic model: monograph. Kyiv: NAS of Ukraine, Inter. scient.–educ. centre YuNESKO inform. technol. and systems.

Table 1.The postulates of the methodology to form and develop the investment policy of industrial enterprises

The negative impact postulates	**The neutral impact postulates**	**The positive impact postulates**
1. Prejudice that the investment strategy precedes the investment policy	1. Quick payback period is the key to efficiency of the investment project implementation	1. Stable tax legislation and simplified procedure of the tax administering
2. Indicators of evaluating the investment projects efficiency (Net Present Value of investments, internal return rate etc.) are the main benchmarks in making decisions regarding the advisability of investments	2. Investment is less risky than lending	2.The enterprise's assets restructuring
3.Tax incentives contribute to investment in the real economy	3.The presence of convergence on the investment market	3.Implementation of procedures controlling investment activities
4.Investments in the financial market instruments	4.Venture Investment	4.Stable political situation
5. The level of company's investment attractiveness (the integral index of investment attractiveness)	5.Depreciation policy of an enterprise	5.The level of innovation and investment potential
6.Risks and obstacles to the investment policy implementation	6.Institutional guarantee of the investment processes in the economy	

Source: developed by the author

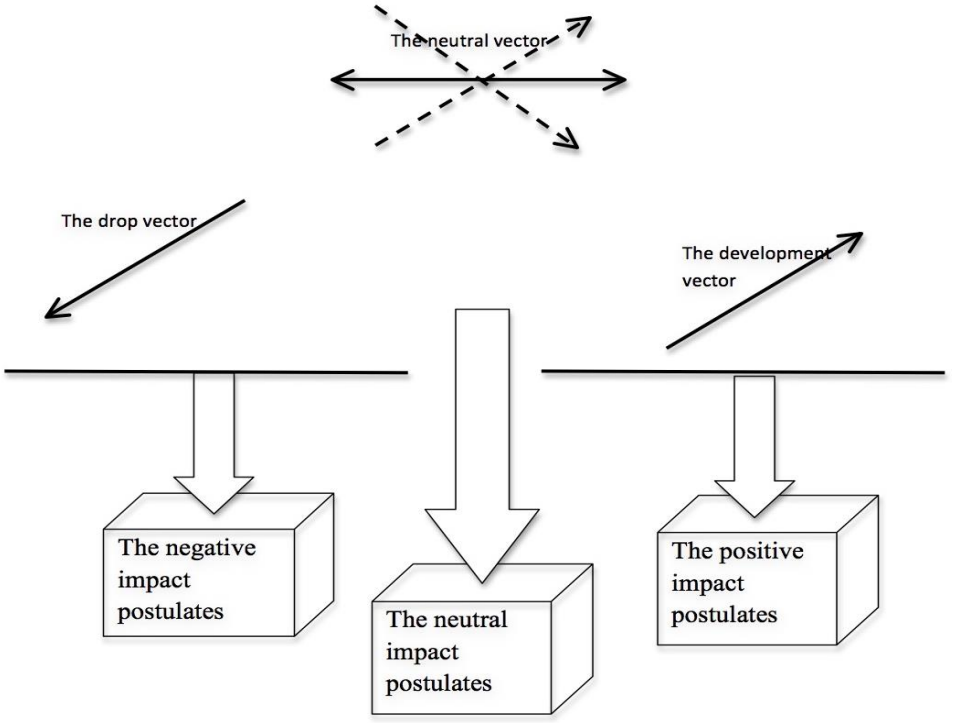
Thus, let us study negative, positive and neutral impacts of postulates on the methodology of forming and implementation of the industrial enterprises' investment policy (fig. 1).

It should be noted that according to the postulates, the negative and positive impacts during the company's investment policy implementation can be considered conditionally defined, which lead towards a particular direction.

However, the most risky things happen, based on the neutral impact postulates, which by their nature tend to dynamic fluctuations, influenced by convergent and adaptation conditions and latent adjustment and may change the vector of influence towards two basic directions. In our opinion, the prejudice that the investment strategy precedes the investment policy has a negative impact on

effectiveness of the enterprise's innovation activity. We believe that the investment strategy is a component of the company's investment policy.

Figure 1. The vectors of the postulates' impact on development of the investment policy of an industrial, productive-economic system



Source: developed by the author

Such indicators of evaluating investment projects, as the Net Present Value of investments and the internal return rate are widely used in practice of making investment decisions and become actually the key benchmarks in determining the effectiveness and feasibility of investments. However, in our view, the mentioned indicators for assessing the effectiveness of investments do not meet the current economic conditions; they require further study and cannot act as main criteria, when making investment decisions, since they do not take into account the impact of logistics options.

We believe that the tax relief is not an instrument to stimulate the inflow of foreign investment in Ukraine. The results of expert surveys of potential investors

show that the main priority, when deciding on the feasibility of investing in a particular country are not so the tax breaks, but rather the stability of the tax system and the clarity of the tax administering procedure for investors.

Other negative impact postulates are investments in the financial market instruments. The investment in the financial market instruments does not create added value. Most experts in the area of investment emphasize the need for determining the level of enterprise's investment attractiveness (the integral index of investment attractiveness), which unfortunately does not consider the investment potential of a company and, in our opinion, should not be the main criterion when deciding on the feasibility of investing in a particular enterprise.

Risks and obstacles to the investment policy implementation a priori negatively affect the investment process.

The neutral postulates are: a quick payback period is the key to efficiency of the investment project implementation; the idea that investment is less risky than lending; the presence of convergence on the investment market; venture investment; depreciation policy of an enterprise; institutional guarantee of investment processes in the economy.

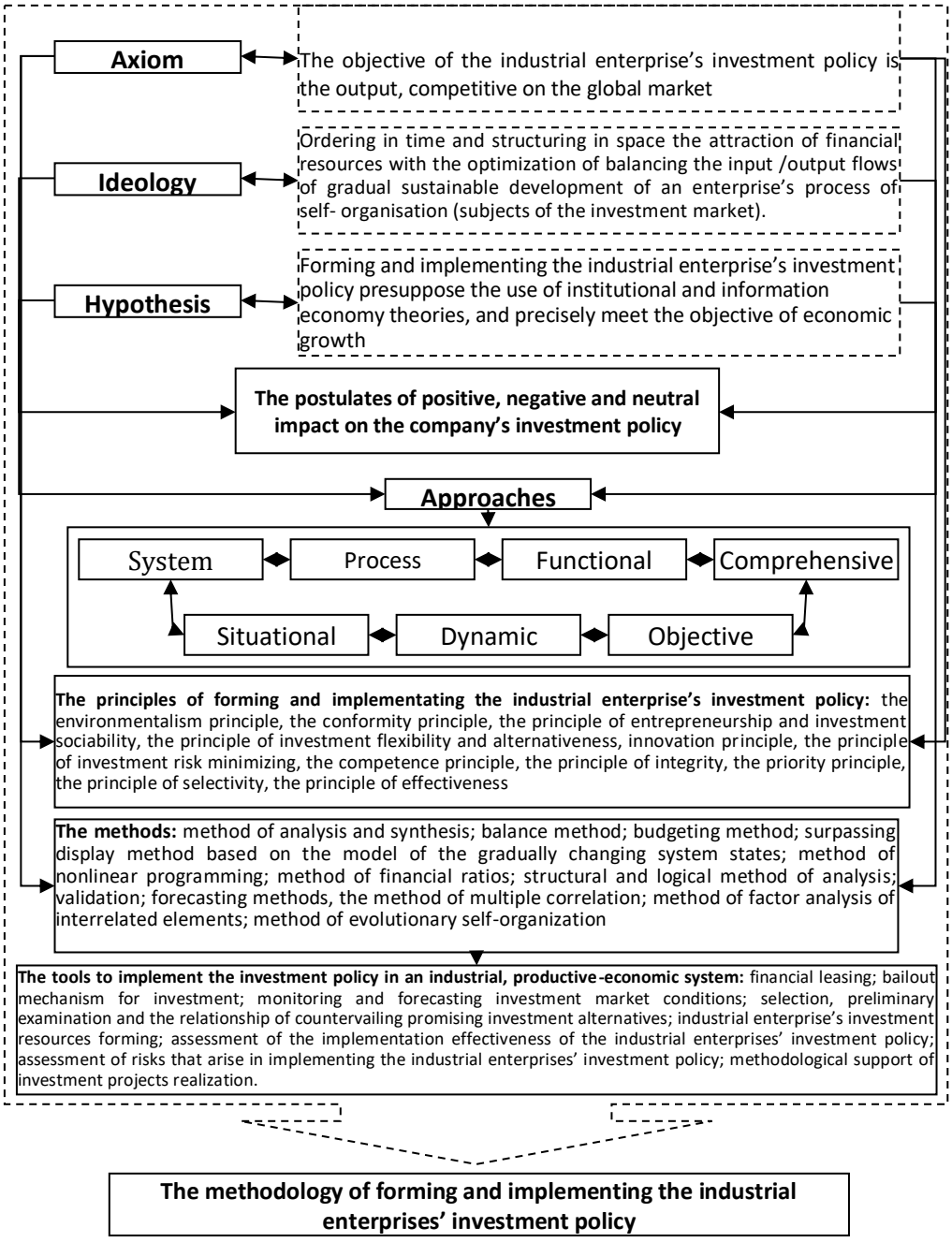
The positive impact postulates include: stable tax legislation and a simplified procedure of the tax administering; enterprise's assets restructuring; the implementation of procedures controlling investment activities; a stable political situation; the level of innovation and investment potential.

The algorithm for solving the scientific problem implies the development of conceptual provisions of the methodology for implementing the investment policy of a productive-economic system.

The ideology of the research consists in ordering in time and structuring in space the attraction of financial resources with the optimization of balancing the input / output flows for the gradual sustainable development of an enterprise's process of self-organisation (the subjects of the investment market).

The development and implementation of the industrial enterprises' investment policy is based on the following approaches (Fig. 2):

Figure 2. Methodological principles of forming and implementating the industrial enterprises' investment policy



Source: developed by the author

The system approach. It views the research of an enterprise as a system of interacting dynamic processes affecting the efficiency of its investment policy. The system approach requires coordination of all aspects of the company's activity, which leads to linking the problems, arising within the investment policy, with a mission of the productive-economic system, its vision, enterprise's general economic policy and its strategic objectives. The system includes such components as: the structure, inputs, outputs, the law of system behaviour, purpose and limitations, also it has to be divided, be relative and holistic.

1. The process approach. Using the process approach when forming and implementing the investment policy of the company means considering the entire enterprise's activity as a network of interacting investment processes, performing within the organizational structure of an enterprise and implementing its objectives.
2. The functional approach. Consistent implementation of general management functions through the specific ones lies at the core of the functional approach to the formation and implementation of the industrial enterprise's investment policy in the course of its development. The development of the industrial enterprise's investment policy based on this approach presupposes formulating and drawing the enterprise's development plans, prognostication; creating the necessary services and departments, establishing the relations between them and other management levels of a company; incentives for the personnel; ensuring the verification of the results obtained due to the implemented changes; eliminating the deviations and defects in investment activities; corrective actions execution.
3. The comprehensive approach. It is conditioned by the need to investigate all the aspects of the investment activity of an enterprise. The methodology of comprehensiveness of forming and implementing the industrial enterprises' investment policy is the unity of purpose, objectives, contents, methods and forms of an investment process, its impact and interaction. The comprehensive approach to the investment policy contributes to the development of the productive-economic system, aims at achieving strategic objectives of the enterprise's economic policy, contributes to the enterprise investment performance and raises its overall effectiveness.
4. The situational approach. Selection and application of certain investment management methods depending on the company's situation lay a basis for the situational approach. The situational approach in the development management implies that you cannot apply the universal theories to a company, as each system is unique and is aimed at the selection of the investment management methods for specific investment objectives in order to achieve the most effective goal.

5. The dynamic approach. The industrial enterprise's investment policy in the course of its development based on the dynamic approach is carried out gradually and involves consideration of all works according to the timeframe of their implementation.
6. The objective approach. The objective approach defines the management objects directly related to investment activities (marketing, finance, foreign, etc.). The implementation of the investment policy takes place in stages, following the duration of meeting the goal and based on focusing on a particular object of management respectively.

The core of developing the investment policy of an industrial enterprise is the principles of a new management paradigm – strategic management system. The main of those principles, which provide the preparation and investment decisions approval in drafting the industrial enterprise's investment policy in the course of its development are:

1. The environmentalism principle. This principle suggests that when developing the investment policy the organization is seen as a certain system, completely open for active interaction with the external investment environment. Transparency of an enterprise as a socio-economic system and its ability to self-organization allow providing a qualitatively new level of its investment policy forming. As opposed to the environmentalism, the constitutionalism means a closed organization, the activity of which does not involve investment and other relations with the external environment.
2. The conformity principle. As part of the overall economic development policy of the productive-economic system, the investment policy is subordinate to it. Therefore, it should be consistent with the strategic objectives and operating areas of an enterprise. The investment policy at the same time is regarded as one of the primary factors ensuring the effective development of a company according to the selected general economic policy.

   In addition, the developed investment policy should provide a combination of prospective, current and operational management of the investment activity.
3. The principle of entrepreneurship and investment sociability. This principle serves as an active search for effective investment links in all directions and forms of investment, as well as different stages of the investment process. The investment behaviour of this kind is associated with permanent transformation of the directions, forms and methods of the investment activity implementation all the way to achieving the strategic goals taking into account the unstable external investment environment.

4. The principle of investment flexibility and alternativeness. The investment policy has to be developed taking into account the adaptability to changes in the factors of the external investment environment. Moreover, the active search of alternative directions, forms and methods of the investment activity, the selection of the best possible choices, formulating on this basis the overall investment strategy and the formation of effective mechanisms for their implementation should form the basis for strategic investment decisions.
5. The innovation principle. When devising an investment strategy one should bear in mind that the investment activity is the main mechanism for implementing technological innovations that ensure the growth of the company's competitive position on the market. Therefore, the implementation of overall objectives of strategic development of the productive-economic system depends largely on how its investment policy reflects the results achieved during the technological progress and how it is adapted to fast use of its results.
6. The principle of investment risk minimizing. Almost all major investment decisions are made in the process of investment policy forming, and, to some extent, change the level of an investment risk. Primarily it is related to the choice of directions and forms of the investment activity, investment resources formation, the implementation of new organizational structures of managing the investment activity. The level of an investment risk rises especially rapidly during the periods of the inflation increase. Because of different mentality of investment behaviour in relation to the level of an acceptable investment risk in every enterprise while developing the investment policy, this parameter should be set differentially.
7. The competence principle. Whether the experts are involved or not in the development of individual parameters of the enterprise's investment policy, its implementation should be provided by trained professionals - financial managers.
8. The principle of integrity improves the enterprise's efficiency and at the same time enhances the investment activity.
9. The priority principle. Intensification of the innovation and investment activity should be justified in terms of promising development priorities.
10. The principle of selectivity involves the selection of innovative projects that bring positive economic, social and other effects, and include them in the investment programme.
11. The principle of effectiveness presupposes the possibility of the state financial support for innovative projects that will significantly increase the investment projects effectiveness.

The methods of forming and implementing the industrial enterprises' investment policy are: the method of analysis and synthesis; the balance method; the

budgeting method; the surpassing display method based on the model of gradually changing system states; the method of nonlinear programming; the method of financial ratios; the structural and logical method of analysis; validation; forecasting methods, the method of multiple correlation; the method of factor analysis of interrelated elements; the method of evolutionary self-organization, etc.

The axiom of the proposed research methodology. The objective of the investment policy of industrial enterprises is the output (works, services), which is globally competitive. At the same time, the resulting problems are solved: economic problems - economic growth, social ones - improving the quality of life.

The methodology of forming and implementating organizational and structural support of the investment policy is hierarchical. The complex management system has controls that affect the investment policy efficiency of the industrial productive-economic system. In order to balance the organizational structure of the system, it is necessary to set the function of each item and set the inverse relationship (to create a regulator). The tools of implementing the investment policy of the industrial, productive-economic system should include: financial leasing; a bailout mechanism for investment; monitoring and forecasting of investment market conditions; selection, preliminary examination and the relationship of countervailing promising investment alternatives; forming investment resources of industrial enterprises; assessment of the implementation effectiveness of the industrial enterprises' investment policy; assessment of the risks that arise in implementing the industrial enterprises' investment policy; methodological support of investment projects realization.

Conclusions. Thus, the investment policy is a form of the investment policy ideology of the productive-economic system in the context of the most important aspects of investment activity at certain stages of its existence.

We substantiated theoretically the methodological principles of forming the industrial enterprises' investment policy and improved the basic tenets of the theory of investment, which: a) provide an accumulative-relevant basis for expanded reproduction of productive-economic systems; b) direct the trajectory of its development by adjusting the weight of the influence of external and internal factors of innovation processes on the rate of overall economic acceleration; c) determine conceptuality analogies according to the principle of the golden-section and negate old economic paradigms that are not combined with economic realities and are unable to function symbiotically.

We believe that the concept of an economic model of forming and implementing the company's investment policy should consider: 1) institutional

features of the economic sector caused by insufficient capitalization, preferred dominance of commercial banking, the lack of reliable financial instruments; 2) destructivism of the monetary policy that undermines the investment industry development; 3) the evolution of institutional support of the investment activity of a multilevel productive-economic system; 4) the creation of means and stock methods to improve financing. It is advisable to build this model on the basis of a combination of the theory of basic German, Japanese and American models of investment market functioning, allowing effectively importing the experience of these patterns with a gradual assimilation into the practice of the investment activity in Ukraine.

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STRATEGIC MANAGEMENT AS A PREREQUISITE TO ENSURE TECHNOLOGICAL COMPETITIVENESS OF INDUSTRIAL ENTERPRISES

Abstract. *The necessity for a strategic approach to the management of technological competitiveness is justified. A functional graphical model of controling technological competitiveness is developed. An algorithm of technological competitiveness strategy is defined. A two-level tree of objectives of technological competitiveness is determined. The concept of strategic management of technological competitiveness of an enterprise is formulated.*

JEL Classification System: L230, M110, O100, O140.
Keywords: technological competitiveness of enterprises, strategic management, innovation development, technology mission, tree of objectives, competitive technological advantage, competitive position.

Introduction. Competitiveness of the country is formed as a combination of competitive products, companies and regions. Therefore, an important objective of industrial enterprises in Ukraine is to increase its competitiveness - especially technological, according to the chosen strategy of innovative development of Ukraine for 2010-2020 in terms of globalization challenges. The importance of increasing technological competitiveness is due to the fact that the current accelerated pace of the process of technological changes, the essence of which is based on the replacement of old technologies (the possibilities of improvement and development are limited) with modern, which are able to bring revolutionary changes in the economy and in society in general. Through these conditions, the need for strategic management of a company increased and in the course of strategic management, competitiveness and the ways and means for its improving should be evaluated. This strategic approach will facilitate the activation of competitive struggle through the development of effective management, organizational and economic mechanisms, which respond to the changing marketing environment, the needs of the internal and external market and innovative trends.

In this scientific area, scientists focus on the research of the problems of enterprises competitiveness. The contribution to the development of theoretical aspects in recent years has been made by I. Dolzhanskiy[62], T. Zagorodnya, N. Kovalenko[63], N. Tarnavska[64]. Special attention was paid to the aspects of technological competitiveness by G. Geyer[65], S. Matviichuk[66], L. Piddubna[67], G. Rachynska[68], L. Fedulova[69]. It can be noted that at this stage, the special importance was attached to scientific research in the field of competitiveness of enterprises. In this direction L. Balabanov[70], A. Voronkov[71], A. Dragan[72], I. Otenko, E. Poltavska[73], T. Reshetnikova[74], R. Fatkhutdinov[75], M. Jankowski[76] worked. However, the review of scientific publications revealed that the problems of strategic management of technological competitiveness, which cause the necessity of the further development of theoretical and practical management provisions in this sphere, were not considered comprehensively.

Development and description of methodical positions and practical recommendations for strategic management of technological competitiveness of industrial enterprises in terms of innovative economic development are the aim of the study.

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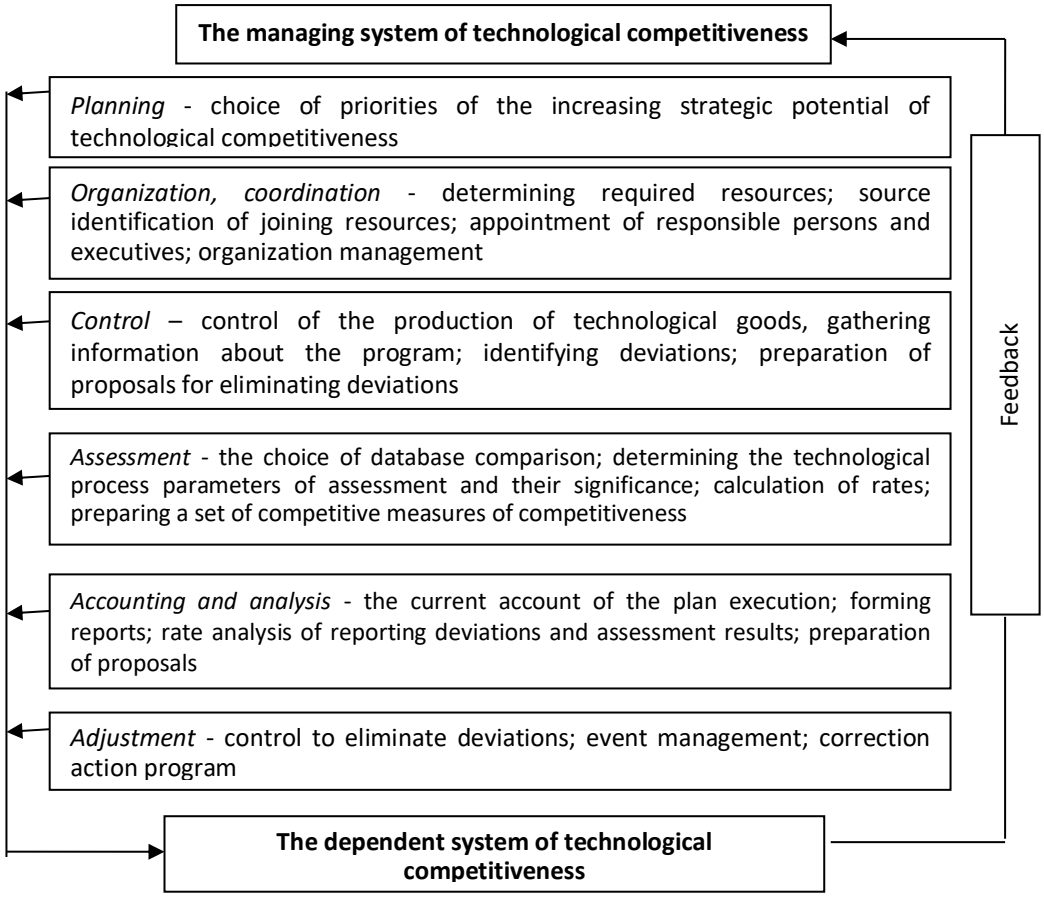
Resolving the problem of the low technological competitiveness of industrial enterprises in Ukraine actualizes the question of constructing the system of strategic management that is comprehensively and purposefully intended to improve the real situation. In general, the enterprise's competitiveness management is seen as a process of influence on factors of competitiveness for its improvement. Management of technological competitiveness is the process of targeting the level that can be represented graphically in a form (Fig. 1):

Figure 1. A functional graphic model of technological competitiveness



Source: adapted by the authors.

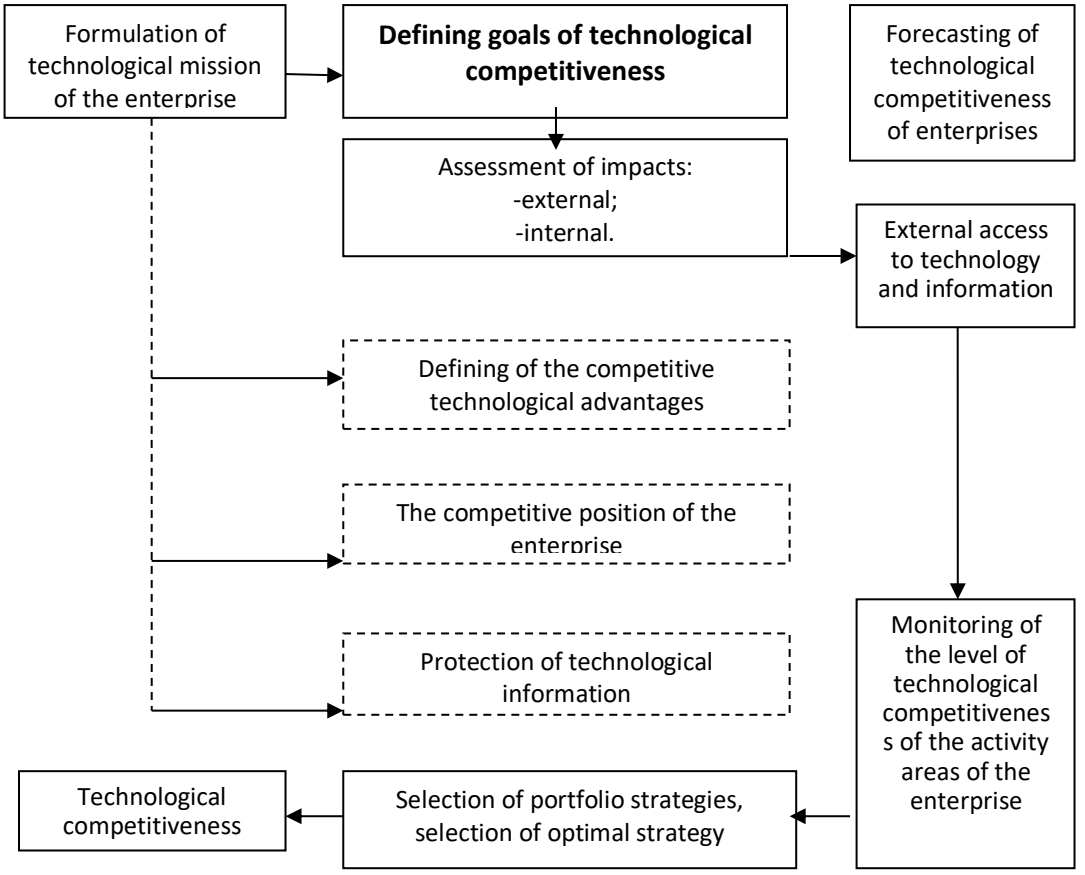
The main features of technological competitiveness of enterprises are:

1) the operational and strategic planning for improving the competitiveness of products;

2) organization and coordination of management;
3) control for ensuring the increase of technological competitiveness;
4) assessment of the competitive level of products and other clusters.

The strategy of technological competitiveness of enterprises is a common long-term measure that should be implemented in order to obtain superiority on the market using technological innovations. Considering these conditions are essential for the strategy development of technological competitiveness of industrial enterprises (Fig. 2).

Figure 2. The process of developing the strategy of technological competitiveness of enterprises.

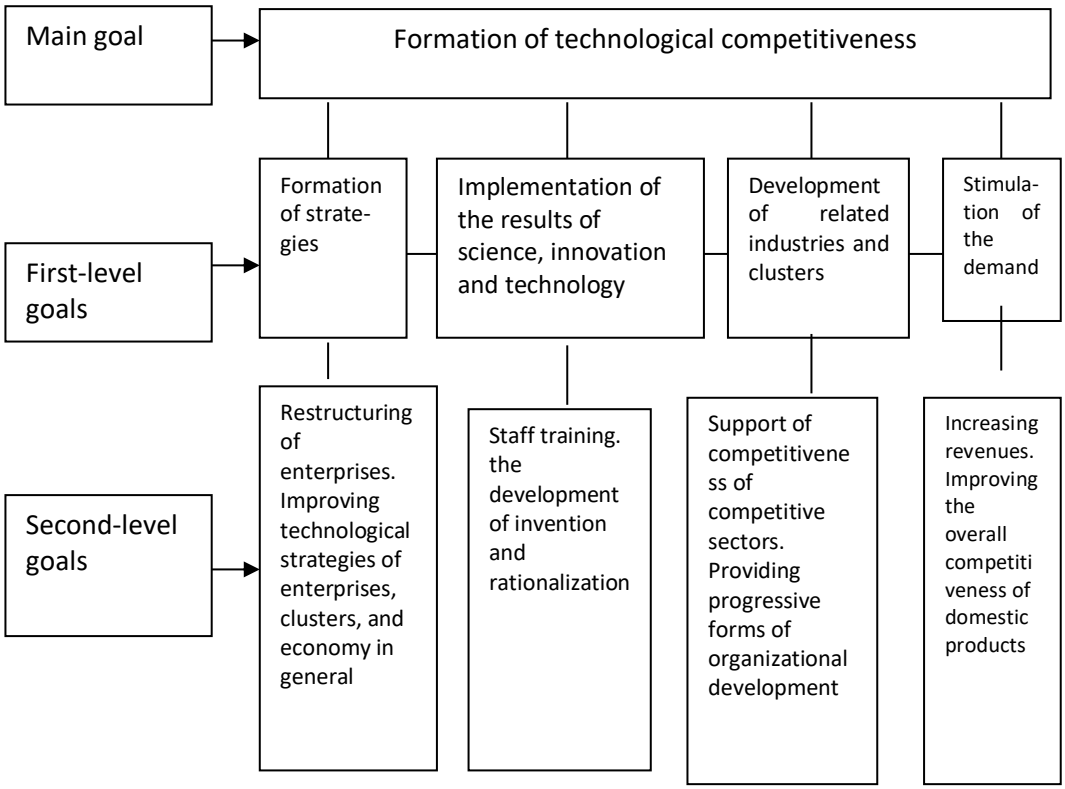


Source: adapted by the authors.

The development of the strategy of technological competitiveness is a process that consists of several consecutive processes and starts with the formulation of the technological mission of an enterprise: the main idea and philosophy of an enterprise concerning the technology component in ensuring its competitiveness, which sets

goals. It was proposed to structure these goals by the most important problem of the formation of technological competitiveness and for that purpose a "tree of objectives" with two levels is developed (Fig. 3).

Figure 3. The two-level tree of objectives of the technological competitiveness



Source: adapted by the author

It uses a special-purpose programme, according to which a“tree of objectives” is defined and the hierarchical distribution of purposes of each particular company considering its specificity is carried out. For solving management problems, the formation of goals in quantitative and temporal terms should be required. Assessing the significance of determinants of developing factors and their impact on the level of country’s competitiveness requires elaboration, on the basis of a tree of objectives, of two matrices: a first-level matrix of evaluation purposes and second-level matrix of evaluation purposes.

Based on the formulation of the technological mission of an enterprise one can also define:

- Competitive technological advantage - the level of technological development of an enterprise; equipment; modernity, progress, flexibility of technological processes in it; the use of achievements of scientific and technological progress; scientific and human resources, knowledge-based production etc .;

- Competitive position - positioning of the company in relation to competitors on the basis of its competitive technological advantage.

The next stage in developing the strategy of technological competitiveness of enterprises is the assessment and analysis of impact factors. This stage determines the necessity of investigating external and internal factors. Among the external factors, special attention should be paid to priorities in the strategy of the economic system, the state of the economy, demands of internal and external customers, and the intensity of competition in the technological component. Among the internal factors, one most often takes into account the following ones: the stage of the life cycle; marketability technologies; technological level.

The evaluation influences the need for forecasting technological competitiveness. The purposes of forecasting technological competitiveness of industrial enterprises are considered in:

1) research of potential technological opportunities for investment in the creation of competitive technological advantages (particularly it determines basic prospects for enterprise technologies);
2) redirection of the research system and innovation activity (if it was concluded that the research, development and innovation system did not meet the strategic objectives of technological competitiveness);
3) creation of a communication platform – leading active participants in a strategic discussion of business representatives, science, public and social groups (using forecast as a tool for engaging members to the formation of research and innovation policy);
4) creation of new networks and connections between technological industries, sectors and markets in and around specific issues.

The process of developing the strategy of technological competitiveness of enterprises also includes identifying needs for information about technologies and sources of its receiving, which can give an opportunity to analyze and compare the level of technological competitiveness of an enterprise with a competitive enterprise, to identify the ways of improvement, to define areas for further technology of the enterprise.

A special attention in developing the strategy of competitiveness is given to monitoring technological competitiveness areas of an enterprise, which gives an

opportunity to track the dynamics and trends of technological changes and, therefore, at the right time to correct the competitive strategy.

The next stage of developing the strategy of technological competitiveness is to develop portfolio strategies. This approach is based on the principles of diversification, alternativeness and variability that will minimize the risks of implementing the chosen management strategy. The optimal strategy is selected on the basis of evaluation of impacts and forecasting technological competitiveness according to the formulated technological mission and goals of an enterprise.

The given approach to the formation of the technological competitiveness strategy of enterprises determines the most significant trends and technological objectives of competitiveness and justifies the choice of an alternative strategy.

Managing the technological competitiveness of industrial enterprises should be completely direct to its legal, financial, informational and motivational support. Therefore, for expanding the existing theoretical approaches, it is advisable to offer such a concept of strategic management of technological competitiveness of industrial enterprises, which justifies the links in the "capacity-development-competitiveness" system and can effectively choose the objects and methods of an administrative influence on the competitiveness of an enterprise in order to ensure its sustainable focused development.

Special attention in the concept of strategic management of technological competitiveness of enterprises should be given to the diagnostics of its level. Diagnosing is defined as administrative activity that aims to establish the level of technological competitiveness, identify problems and weaknesses of its formation and development, the development of effective ways for solving problems. Some researchers [14] proposed to use as a diagnostic tool the technological audit, the result of which should be the assessment of the ability to formulate a strategic plan for technological development. The task of the auditing process is to evaluate the efficiency of the enterprise's technology as a means of technological competitiveness. This audit involves participation of the higher managerial level and staff, which are related to the technological state of an enterprise. This process must include the development of mechanisms for assessing the level of technological development of an enterprise and identify technological needs. The result of the audit process is an assessment of the real level of technological competitiveness of an enterprise, reflecting its ability to use its technological potential as means for achieving strategic goals.

Conclusions. Technological competitiveness of industrial enterprises is able to achieve a high level only if an efficient management system is formed and it functions. The construction of such a system is impossible without the use of the

principles of strategic management. The strategy of technological competitiveness is a common long-term plan of actions, which are realized with the aim of gaining superiority on the market using technological innovations. The process of developing the competitiveness strategy is a sequential change of stages, qualitatively new forms of its manifestation, where each stage is important in the management of technological competitiveness. Usage and implementation of these proposals in practice of industrial enterprises of Ukraine are able to provide the level of efficiency of the technological competitiveness management. Improving the process of determining technological competitiveness will help to achieve positive results in predicting technological development, choosing strategic priorities for innovation activity, to facilitate the development of effective models of technological cooperation with enterprises using the most advanced forms and activities.

To sum up, in the research, the concept of strategic management of technological competitiveness of an enterprise was proved, strategic goals of its management were formulated. The urgent problems of the development of management technologies in production and innovative cooperation among enterprises, the research of mechanisms to influence the level of technological competitiveness of the members of such cooperation are still not solved.

Part 2

SOCIO-ECONOMIC MODELS OF THE REPRODUCTION OF THE NATIONAL ECONOMY

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THEORETICAL FOUNDATIONS OF THE FUNCTIONING OF AN ECONOMIC SYSTEM OF WATER USE

Abstract. *To create an effective mechanism of water use it is necessary to view the market of natural resources as an economic system. The rules of goods distribution existing on the market are not effective when consuming public goods. Therefore, it is reasonable to create institutions that should reduce the negative effects of bounded rationality of human behavior in the consumption of natural resources. Furthemore, to support social and economic policy, it is fundamentally important to adequately compare the actual demand and actual supply of goods. Water resources, as public goods, have their properties and characteristics. The choice of mechanisms and tools of water use management depends on putting water resources into one or another category of public goods. It is doubtless that the state will take part in the functioning of the economic system of water use. The solution to the problems of size and components of water use fees is closely linked to the notion of environmental policy efficiency. In setting fees for water, it is important to take into account the experience of European countries.*

JEL Classification System: O11, 013, Q 20
Key words: public goods, market, environmental, water resources

Introduction. For Ukraine, an effective and efficient organizational and economic mechanism of natural resources management is crucial. A considerable amount of works of modern domestic scientists is devoted to this problem; the importance of using economic environment-friendly instruments in the implementation of the national environmental policy is declared at the highest level. Today, many of the basic elements of the organizational and economic mechanism have been already developed and put into practice. However, the analysis of the efficiency of their implementation does not give positive results. To identify the root cause of this situation, we will view theoretical foundations of nature resources management as an economic system.

What guides individual consumers of natural resources in their activity? Obviously, an individual member of society (legal or natural person) always tries, first of all, to get his or her own maximum short-term effect. In most cases, the magnitude

of the effect and distribution of resources are determined by the market. However, environmental issues cannot be fully regulated by the market. The environment is a public (collective) good; all members of society can use it. In such a case, as we know, there is a disruption of the market. The economic problems associated with the existence of public goods were explained in the 18th century by a Scottish social scientist David Hume and the problems are as follows:

- short-term benefit is a determining factor for an individual member of society in decision-making;
- short-term maximization of benefits of an individual consumer is in conflict with his or her long-term benefits;
- short-term targets of an individual consumer may not be consistent with long-term interests of other members of society

To regulate the consumption of public goods effectively, one needs to know their basic properties and characteristics. Therefore, it is advisable to explore the economic and theoretical model of the public goods market.

The methodological basis of our research concerning the provision of public goods is a new institutional theory, which was formed in the USA and the countries of Western Europe, and now it is widely used by Ukrainian and Russian researchers to analyze economic, social and political processes. This theory is an analysis of economic relations as phenomena, which are formed by institutions (customs, traditions, religious, moral and ethnic values, laws, etc.).

The new institutional approach is aimed at the study of economic entities as a special set of social roles and relations, determined by the institutional environment. At the same time, one focuses on informal factors of the interaction of institutions, structures and individuals that are also regarded as intangible resources of society. The central problem is the organization and control in the economy as a whole, and not within a given system. New institutionalists, unlike neoclassical economists, consider a broader set of variables or use a longer line of reasoning. They argue that the economy is not limited to the market and an operating mechanism of resources allocation does not coincide with the market mechanism as such, but represents the institutions that form the real market and function through it.

To explain different behavioral forms of a social organization, there is a principle of “methodological individualism” which recognizes not only groups and organizations as members of the social process, but also individuals, whose behavior affects the relationships inside the organization as well as between organizations. According to Oliver E. Williamson and R. Coase, “modern institutional economics should study man as he is, acting within the constraints imposed by real institutions”

[77]. In their opinion, this methodological orientation concerns not only an "economic man", but also a "working man", "political man". Regardless of the scope of an activity, a person is a "contractual man". Motivated behavior of a contractual man can be explained by the notions of bounded rationality (his decisions are rational only within certain limits) and opportunistic behavior (behavior that deviates from accepted norms and rules). According to neo-institutionalists, taking into consideration these factors is necessary for creating institutions that should reduce negative effects of bounded rationality and opportunistic behavior of people.

The basic human need is goods. Thus, the development of social relations is based on demand and supply of a variety of goods. We will explore the main principles used by us for theoretical and practical justification of the system of water use management. We will examine water resources as goods.

The existence of the individualistic economy creates one of the conditions for the transformation of a thing into a "good" [78]. There are other conditions: the presence of properties or characteristics due to which a potential good can meet specific needs; man's awareness of these characteristics or peculiarities; possessing the thing that allows people to use it to meet their needs [79]. That is, based on their physical properties, useful things may be suitable for meeting needs, but only the knowledge of these characteristics and needs and possessing the thing can turn it into an economic good.

The existence of the product does not mean the existence of its value. It is not an objectively inherent (independent of the consciousness of individuals) property. The value, as a real phenomenon, is a definite economic relation between buyers and sellers, which occurs in striking a deal. This statement, however, is not defined. It is necessary to clarify what (what factors) determine it and what is the value? The value is determined by the expenditure on the production of goods or by their usefulness, in other words, the value – is it a utility or expenses?

According to the consumption theory, the value of a product is determined by its usefulness. In fact, for a consumer any product "becomes" valuable only if a consumer treats it as a means to meet some need. Moreover, the value varies depending on the change of needs. It is a judgment, an individual's idea of usefulness

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(and its extent) of goods in terms of possibility to meet needs. Therefore, the value does not exist independently of the individual. Thus, we can assume that the value is a consumer's assessment of goods relative usefulness.

However, when speaking about values, one cannot ignore the producer's attitude to the goods. The possibility of consuming is determined by the production capabilities, which, under otherwise equal conditions, depend on the available amount of resources and their value. The exploitation of resources provides not only a useful effect in the form of goods, but also expenses. Hence, solving this problem requires taking into consideration not only usefulness, but also expenses as factors of the value formation of both consumer goods and resources.

Social marginal utility underlies demand. In relation to the number of the given product, every consumer determines his or her price of the demand, or an individual demand curve. The sum of this set of curves – is the curve of a potential demand of buyers' community. Therefore, every certain number corresponds to the social marginal utility and the demand price (monetary assessment of the value), dependent on the marginal utility. The basis of supply are production expenses. Each number of a product corresponds to a special supply price. The supply curve expresses the relations between the desired prices for sellers and corresponding to them possible amounts of the supply. It is known, that buyers and sellers cannot determine the value of any product or resource independently. This means that the value is not determined only by utility or production expenses. Only having the conditions of both the demand (utility) and supply (expenses), we can determine the value of goods and resources, their socially necessary quantity. This is what constitutes the market – a community of buyers and sellers.

Consequently, the value is a special economic relation. The prerequisites for the value occur in the sphere of production and consumption. Nevertheless, it becomes a real economic phenomenon only in the exchange sphere. In the process of exchanging, usefulness and expenses are the equivalent factors; their interaction determines the value of goods and resources: the value is determined in the equilibrium point of supply and demand on the market and takes the form of an equilibrium price. Adequate comparing of the actual demand and actual supply of goods is essential for justifying the socio-economic policy.

In the study of goods' nature, one must take into account their diversity. It is therefore advisable to conduct a classification of public goods that will allow determining the content and structure of every object of the research. Classification as a method of scientific research provides cogniscibility of the structure, allows improving understanding of the peculiarities of economic goods, the ability to identify them and find the best options for providing customers with them and analyze

opportunities to replace social goods with private ones. The classification is based on the main feature. The selected feature (or features) will make it possible to establish the peculiarities of management of that particular object.

While studying the nature of goods, one must take into account their diversity, which is described by the following classification. Dy the degree of limitedness, there are economic and non-economic goods; by the hierarchy of needs (depending on the provided utility for customers) – essentials and luxuries; by the degree of inherent durability, goods are divided into two groups of usage – long-term and short-term; by the degree of substitution of goods with each other in meeting needs – interchangeable and complementary; goods are also divided into direct (consumer) and indirect (for production purposes, that is, they meet the need as means of production). The basis of the mentioned division is meeting the needs of an individual. Through providing goods, economic relations begin to develop among people and such relations ensure consistency and the functioning of the economy [80].

Meeting the needs of an individual underlies the above-mentioned division. Providing goods helps to establish economic relations among people and these relations ensure consistency and the economy functioning. As the relations develop between the real economy and personal elements of the economy, they are grouped into three following types of connections and relations:

- those developing between the material elements of the economy according to the model “thing – thing”;
- those developing between people according to the model “man – thing”;
- those developing between people according to the model “man – man”.

The existence of the first type is conditioned by the fact that the basis of the material elements of the economy is the material of nature; these connections provide physical existence of the given elements, their participation in physical, chemical and other natural processes. Thanks to these connections technological processes take place, production and consumption are carried out.

The second type includes logistical connections. Through them, people set in motion things, using them as means of production or commodities. These connections are functionally directed, assuming that people are able to use things. Thanks to them, work is carried out as a purposeful activity.

80 Sedova A.V. Public goods in the modern system of market relations /A.V. Sedova: Dissert. ... candidate of Economics: 08.00.01 Samara, 2005. – 186 p.

However, neither the first nor the second type of relations can define economy as a social system that is significantly different from natural and technical systems. This distinction is provided by the third type of relations that are developing between people and are called business relations, which are subdivided into economic and institutional.

In the system of economic relations, the central place belongs to property. Property is presented as objective and subjective attitude. The objects of property are goods. Property as well as economic relations presupposes separation of its subject and object from other subjects and objects, which results in an independent subject's management of the object of its property. Thus, property relations generate a number of rights held by owners.

Depending on the form of ownership, one can single out two main types of goods – individual and public. Their socio-economic characteristics are presented in Table 1.

Table 1. Comparative characteristics of public and private goods*

Characteristics	Individual good	Public good
Divisibility	Divisible, that is, it exists in the form of comparatively small units, which are available for particular customers	Indivisible, because it consists of such major units that are impossible to provide for individuals
The effect of the exclusion principle	Is produced	Is not produced
Competition in consumption	Present	Absent
The type of consumption	The owner of the good is the one who is willing and able to pay for it	Good is used by all members of society without exception, regardless of the desire to consume
The possibility to be controlled by the private sector	Strong	Weak
Assessment of quality and quantity	It's relatively easy	It's relatively difficult
Free rider problem	Absent	Present
Regulation of production and consumption	Is carried out by the market	Is carried out by the state sector

Source: compiled by the author on the basis of 5,[81], [82]

[81] Konstantiuk N. Epistemological analysis of public and private goods in the theory of public finance / N. Konstantiuk // Socio-economic problems and the state. — 2014. — Vol. 1 (10). — P. 110-119.
[82] Samuelson P. The pure theory of public expenditure / P. Samuelson // Journal of Political Economy, 1954. – Vol. 56. – pp.

We want to note that in economics, categorizing goods as public ones is carried out according to different criteria. The basic one is the theory of public goods, developed by the Nobel laureate Paul Samuelson [7]. It is he who gave a classical definition of a public good as a good that has the following characteristics:

– Indivisibility – providing a public good to one consumer allows an unlimited increase in the number of recipients without changes in the price and quality of a product;
– nonexclusivity – the consumer cannot be excluded from the number of social goods recipients (e.g. for not paying for the used service);
– inability to stop consuming – if a public good is provided, then it is used by all members of society without exception, regardless of the desire to consume.

Richard Musgrave introduced the notion of merit goods – public goods that have a marked external effect. External effects can be combined with an exceptional good of joint consumption. This kind of goods often includes health and education [83].

Comparing the concept of "private" and "public" goods, I. Kaul points out that it is better to view public goods as goods in the public sphere, thereby emphasizing that public goods are not limited to those provided by the government, so even the market and public institutions themselves can be regarded as public goods[84].

Based on the public goods conception resulting from the conducted research, it is possible to identify a number of peculiarities of the public goods market:

– Public goods cannot be given to one member of the community, who consumes them, in a smaller amount than to another member, that is, the demand for public goods is equally satisfied; the supply of social goods is realized by the state and voluntary community organizations;
– Public goods can be produced in the private sector as well as in the public sector due to their ambiguity;
– Because of the production of public goods, there is a problem of free use, which is defined as follows: interest in social goods is connected with the avoidance of participation in collective actions, which are necessary to obtain these goods;
– When determining the amount of public goods one uses the principle, according to which society should increase production up to the point, where marginal costs for society equal a marginal public benefit from the expansion of production;

[83] Musgrave R. and Peacock A. (Eds.). Classics in the theory of public finance / R. Musgrave, A. Peacock. – London: Macmillan, 1958.
[84] Providing global public goods: managing globalization / I. Kaul, P. Conceicao, K. L. Goulven, R. U. Mendoza (Eds.). – Published for the United Nations Development Programme [by] Oxford University Press, 2003. – 672 c.

– The creation of public goods involves concerted collective actions, which are manifested either in direct participation in the production of public goods, or in co-financing their production;
– The state and municipalities are defined as active participants of an economic life, which use the budget and taxes as tools to ensure the satisfaction with social goods.

Among the existing researches, we would like to single out the following main features that ensure the market functioning and that are essential for determining public goods. First, this is the effect of the exclusion principle, which means leaving the ones, who cannot or will not pay for product's established price out of the product's consumption. Second, this is the existence of competition, which is manifested in the struggle for the right to use the product. The goods that have these characteristics, as mentioned above, - are individual or private. Their exchange is successfully regulated by the market.

When consuming public goods, the mentioned principles are not applied. Which means that, it is impossible to exclude an individual member of society from a range of users of public goods. Besides, in this case there is no competition: the consumption of goods by one individual does not impede the consumption of the same goods by other people.

It should be noted that there are cases, when access to certain public goods for some members of society is determined by several factors. It is, for example, a geographical location (living near parks allows going for a walk more often) or the need for some private goods (holidays near the lake outside the city require having a car, etc.). In addition, the absence of competition while using collective goods is possible only to a certain extent. When the number of customers goes up over certain possible limit, the quality of a product or service goes down. In this case, the effect of the competition principle can be observed.

Due to the existence of combinations of the effects of the exclusion principle and competition principle, one can single out some forms of economic goods that would be reasonable to use in improving the mechanism of water use (Table 2)

Table 2. Forms of economic goods

Exception	Competition	
	Present	Absent
Present	Private goods	Paid public goods
Absent	Generally available goods	Pure public goods

Source: compiled by the authors

If the principles of exclusion and rivalry are applied to a product, then it is, as already mentioned, individual (private) goods. When the use of a certain collective good is associated with competition, but no one can be excluded from the process, then we speak about generally available goods. If the consumption of goods can be limited in some way (there is the exclusion principle), but, at the same time rivalry conditions are absent – we observe paid public goods. Pure public goods are those to which the two principles are not applied. We want to mention that grouping a certain good or service into a particular category is not constant. A significant expansion of a consumers' range, an increase in the goods supply, the shift in government priorities, etc. can cause a change in the type of the good. The type of the public good determines the level of state intervention in the regulation of its consumption, and requires necessary for it organizational and economic mechanisms.

We think that, in the sphere of natural resource management, due to its diversity, there are all kinds of public goods. In addition, the influence of some economic subjects on others goes beyond voluntary market relations and cannot be regulated by the price mechanism. Therefore, state intervention in the interrelations "man-nature" is inevitable. There are different ways to regulate the use of natural resources: creating a system of payment for the usage and pollution of natural resources; granting exclusive rights to use natural resources in order to limit their consumption; introducing tax or incentive payments for the distribution of the weight of social expenditures; subsidizing the production with possible positive external effects, etc.

A special branch is water use, which serves as a basic element of not only economic activities but also, in general, of a physical life of people. Among natural resources, water occupies an exceptional place. No sphere of economy can function without it, as any manufacturing process involves the use of water resources. Water is indispensable in everyday life; it is used for transportation, recreation, energy production, and so on.

The notion "water resources" should not be confused with the total amount of water, because it is only part of its stock, which is technically accessible and economically feasible to meet the needs of society at a certain stage of socio-economic development. One differentiates between natural and operational resources, water supplies.

Given the aforementioned, what kind of goods are water resources? Theoretically, they should be classified as pure public goods, as in water usage the exclusion principle cannot function (providing water is a necessary condition of existence), and there should not be any competition. This thesis would be

unquestionable, if the amount of water was unlimited, and the water quality did not deteriorate as a result of the growth in the volumes of its exploitation and pollution. However, under existing conditions of water resources shortage, they cannot be infinitely accessible and free of charge.

At one time, the absence of payment for water resources in our country formed an extensive nature of their use. This led to the emergence of critical water-management and ecological situations in the basins of many rivers in Ukraine.

Nowadays, an economic mechanism of water use management created in Ukraine performs the basic functions with the help of appropriate tools (table 3)

Its implementation and continuous improvement have positive results, but several problems remain unsolved. Many researchers and practitioners discuss the directions of improving a water use mechanism. In our opinion, in this discussion one should pay attention to the peculiarity of water resources as a public good, since, as noted above, in regulating the consumption of such goods, market mechanisms are not always sufficiently effective, and the level of government regulation is determined by the specific nature of the good.

We want to stress that in scientific literature, one differentiates between the notions “water use” and “water consumption”, “special water use” and others. At this stage of the research, we are using a general notion of water use, without gradation of this process depending on utilization of special facilities, withdrawing water from the source, and so on.

Table 3. The tools of economic regulation of water use

Functional importance	Element	Tool
PLANNING, ORGANIZATION, CONTROL	RECORD OF WATER RESOURCES	- records of water use; - records of surface and groundwater; - water cadastre; - water management balance; - prediction of water content; - other
	ENVIRONMENTAL RESTRICTIONS	- operation of reservoirs; - designing water management facilities and systems, coordination and evaluation of projects; - construction of water management facilities and systems; - exploitation of water management systems (reservoirs, canals and other interconnected water facilities); - standardization in the sphere of use and protection of waters and reproduction of water

		resources and quality indicators of their condition - standards in the use and protection of waters and reproduction of water resources: - standards of environmental safety of water use; - state monitoring of water resources; - environmental assessment; - issuing permits for special use of water; - limit on water withdrawal, water use, discharge of pollutants; - other
MOTIVATION, CONTROL	PAYING FOR WATER USE	- Paying the rent for special use of water; - Fees for discharge of pollutants; - other.
	PROMOTION OF RATIONAL WATER USE AND PROTECTION OF WATER RESOURCES	- providing water users with tax, credit and other benefits in the case of the introduction of low-waste, non-waste, energy and resource saving technologies and other measures, which reduce the negative impact on water; - fines for damages to water facilities in the case of violation of the law.
	FINANCING WATER PROTECTION PROJECTS, PROGRAMS AND MEASURES	- the distribution of fees for special use of water; - development and implementation of national, target, international and regional programs of use and protection of waters and reproduction of water resources using the State Budget of Ukraine, the budget of the Autonomous Republic of Crimea and local budgets, money of enterprises, institutions and organizations, off-budget funds, voluntary contributions of organizations and citizens, other funds.
	ENVIRONMENTAL INSURANCE	- insurance against damage caused by water pollution; - insurance against the harmful effect of waters (flooding)

Source: compiled by the authors

If viewing water resources as a public good, it is necessary to take into consideration a priority ranking of water providing. First of all, the citizens' needs for potable water and sanitary requirements should be considered. That is because providing settlements with the necessary amount of water of a good quality is vital for socio-economic development. The second highest priority is water supply for agriculture, as a guarantor of state food security. Third place is occupied by industry, energy and transport. Water resources, taking part in various processes, contribute to providing the population with various commodities, and agriculture – with the means

of production, formation of state energy security, creation of the system of transportation, recreation and leisure, and so on.

Consequently, water resources should be viewed differently in each direction of water use. Because the choice of mechanisms and tools of water use management depends on putting water resources into this or that category of public goods.

What should the payment for water include? One can answer this question by singling out the following key components of the price of water:

- water in the source;
- the costs of water purifying;
- the costs of withdrawal and transportation of water.

Obviously, the reimbursement for water withdrawal, its purifying and transportation is obligatory. From a theoretical point of view, water, which is given to the consumer, has to transform into a private good. This means that services connected with water purifying, water supply and drainage shall be subject to the principles of exclusion and competition. An excellent example of this good is bottled water.

However, one must consider the peculiarities of creation, operating conditions and the state of the plumbing and sanitary system. These circumstances do not allow us to regard this water as a private good. We believe that water, given to the consumer, transforms into a paid public good: competition in its usage is absent, but there is a possibility of excluding a defaulter from the range of customers. The amount of payment will be determined by a number of technological, territorial and other factors. There is no doubt that the water use management in this case requires the utilization of both administrative and economic instruments.

The water that is in the source should be attributed to a pure public good. Maintaining an adequate supply of water, in this case, is a nationwide problem and it should be solved by concerted efforts. However, it is more reasonable to view the source water as a resource, and it has to transform from a pure public good into generally available one. This means that the principle of exclusion, usually does not work, but there is rivalry. Besides, competition concerns the amount of consumed water as well as the volume of the discharge of pollutants.

What are the components that would be reasonable to include in the charge for the use of water as a generally available social good? It is necessary to provide the owner of water resources – the state, with compensation for water use. This compensation includes both compensation for damage to water resources and some income from natural resources exploitation. Its value reflection is an assessment of

water resources in the source, as an integral part of the national wealth. Modern scientific methodological works give grounds for stating the need for using the rental approach in order to conduct this assessment.

By the absence in the price of a rent component or its symbolic value, the state can implement social protection of population or create favorable economic conditions in various industries. This does not mean that water resources do not need an objective and overall economic assessment, which should be used to determine the national wealth, social welfare planning and so on.

According to the given approach, the taxes on water, implemented by countries – the EU members, are divided into three categories: fees for water withdrawal; fees for water supply and drainage; fees for the pollution of water sources [85].Fees for water withdrawal are introduced in all European countries, but the size of charges for water use varies significantly. The size of fees also differs depending on the intended use of water resources.

Today in Ukraine, payers of the rent for special use of water are water users – business entities regardless of their form of ownership. The rates of the rent for special use of surface water are set according to the basin principle and underground water fees are set according to regions. It is typical to set a decreasing coefficient (0.3) for housing and municipal enterprises (article 255 of the Tax Code of Ukraine). Water users, who use water only to meet drinking and sanitation needs of the population (the people, who are on a particular area at any given time, regardless of the nature and duration of residence within their housing space and homestead) do not pay the rent for special use of water. Here also belong those, who use water exclusively to meet drinking and sanitary needs of legal entities and individuals – entrepreneurs and single tax payers.

In Europe, there is a different approach. Thus, the average sizes of payments for water withdrawal in communal services are quite high. For example, in the Netherlands, France and the UK they are much higher than rates of wages in the industry and agriculture. Moreover, the agriculture has easy terms of payment for water almost in all countries of the European community.

The level of water charges in France varies depending on the region, since the cost of connecting to the water supply network depends on many factors, not the least of which is the level of investment in water supply and sewerage systems.

[85] Task force for the implementation of the Environmental Action Programmer for Central and Eastern Europe (EAP). Centre for Cooperation with Non-Members Environment Directorate CCNM/ENV/EAP (2003)22, 2003, OECD.

Despite the relatively low rates of charges for water for households, this type of payment is unevenly distributed between different users. In addition, farmers pay about 4% of the price of the used water [86].

In Denmark, agricultural and industrial enterprises do not pay taxes on water withdrawal. In the Netherlands, agricultural enterprises are exempted from paying such fees. At one time, the introduction of the water withdrawal charge actually increased the cost of groundwater by more than 200%. However, the industrial consumption of groundwater decreased by 2 - 12% [87].

The experience of European countries in the fiscal regulation of use and protection of water resources indicates a high level of diversification of a set of tools and instruments of a fiscal impact on water users in terms of both water use and water discharge. A typical feature of the system of fiscal regulation of water use in many countries is linking accumulated taxes for water use with the financing of the objects of water management infrastructure that promotes a technical and technological level of water supply and drainage systems. There are cases of granting privileges to certain categories of water users that immediately creates unequal conditions and provides competitive advantages for a certain part of water management entities. This shows that the European format of fiscal regulation of water use presupposes a significant set of fiscal controls both in the sphere of usage and protection of water objects, which makes it possible to expand the actual base of collecting water-resource payments and to form financial funds of reproduction of water and resource potential and rehabilitation of the objects of water management and water protection infrastructure [88].

Conclusions. The solution to the problem of sizes and components of the payment for water use is closely connected with the concept of environmental policy efficiency, which should be aimed at achieving the social optimum. This refers to the coordination of economic, social and environmental needs of society. We know that there is a confrontation between two opposing groups of interests: those, who protect environment and those, who pollute it. To find the mechanisms of coordination of all interests is the most important task of environmental economics.

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86 French-Property: Real estate, Real living, Real France. Available at: http://www. french-property.com/guides/france/utilities/water.

87 10. Hall D., Lobina E. Water companies and trends in Europe. August 2012

88 Kotliarevskyi Ya. The transformation of fiscal regulation of water use: assessment of the feasibility of implementing the European experience / Kotliarevskyi Ya., I. Dovha // Economist. - 2015. - № 12. - p. 36-38

The analysis of water supply problems at both the global and local levels proves the necessity for the formation of such an attitude to water, which will combine viewing it as an economic good (an economic component), rights of a man to life-sustaining activity (a social component) and the resource that is being exhausted (an environmental component). This combination makes it impossible to regulate water use only by market tools. Therefore, using government mechanisms for effective water use in compliance with the requirements of the triad "economy-sociology-ecology" is inevitable.

The participation of the state in meeting the needs for pure social goods is the most reasonable. When creating these goods, the state is almost irreplaceable. However, this does not mean that it must necessarily be responsible for the direct production of goods. At the present level of development of productive forces, it is appropriate to talk about the participation in financing. If the state provides this participation (usually through tax collection), then the direct "manufacturing" of goods can be assigned to the private sector or an independent non-profit organization. The latter should receive state funds for their work.

The circle of pure public goods is relatively small, but many of them act as a kind of resources that is used in all spheres of economy. Thus, especially when it comes to natural resources, particularly water resources, there is a need for their monetary evaluation as a component of the national wealth.

When we speak about paid and generally available social goods, it will be reasonable to minimize state involvement in their creation and funding. If the quality of nonexclusivity in consumption is less distinct, it makes sense to analyze the prospects of using market mechanisms and entrepreneurial initiatives. If the limits of non-competition in consumption are relatively narrow, then the state responsibility for providing public goods should be mainly focused on local levels, and, where it is possible, the state should involve mechanisms of voluntary collective actions. Solving the latter problem usually is carried out through the intermediary of NGOs.

The participation of the state may also be limited by regulatory measures, such as establishing special taxes, privileges, licensing of an activity and more.

In general, the relevance of the state participation in the functioning of the economic system of water supply is obvious. The problems of determining the extent of such participation, implementation of appropriate mechanisms, improvement of the legal framework, etc remain unsolved..

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LABOR RESOURCES IN AGRICULTURAL ENTERPRISES

Abstract. *The analysis of the main scientific and methodological approaches to the determination of the concept of labor resources at agricultural enterprises is conducted in the article. The evolution of the determination of labor resources in the Soviet and Ukrainian science is highlighted. The basic causes of differences in the interpretation of labor resources in agriculture and definition of this category in general economic literature are presented. The specificity of use of labor resources in agriculture is determined. The authors analyzed the dynamics of the labor force in agriculture of Lviv region and identified the major reasons for their reduction. Clustering the enterprise of the AIC sector is implemented in the article in accordance with the load of agricultural land per worker and its optimal size is found. It is determined during the study that available labor resources are sufficient for providing the production of agricultural enterprises, but the dynamics of their reduction demonstrate the danger of deficiency of this type of resources during 4-5 years.*

JEL Classification System: D24, J21; Q12; C19.
Key words: Agricultural sector, labor resources, agricultural enterprises.

Introduction. The development of agriculture is a key factor of a state food security, because its products historically form the basis of the food system of the Ukrainian population. However, it has not yet overcome the crisis phenomena, which are connected with the lack of production capacity.

This problem can be solved by having a tool for rationalizing the resource management; it can be a methodical approach to evaluating the effectiveness of their comprehensive use and an economic mechanism for rationalizing their management.

One of the basic elements of the total resource potential in the agricultural sector of the economy in Ukraine we currently consider labor resources; the need to improve their management mechanism is especially important for the work of agricultural enterprises in the highly competitive and rapidly changing market environment.

The reform of the agricultural sector of the economy dramatically changed the ownership relationship of production means in agriculture, which resulted in the formation of efficiently new organizational and legal forms of management. However, all this exacerbated the problem of organization, distribution and economically efficient use of labor resources of agricultural enterprises in most regions of Ukraine. High-quality reproduction of labor resources, development and rational use of labor potential depend on the efficiency of labor resources management. Particularly, in agriculture, management of the use of labor resources is an important requirement for increasing competitiveness of an enterprise, balancing demand and supply of labor force, comprehensive settlement of labor issues (labor productivity, its payment and employment) and others.

The optimally planned development of labor resources of the state is a basic factor in accelerating scientific and technological progress, the growth of economic efficiency, improving production relations, reducing social tensions.

At the same time, the need to improve labor resources management of enterprises in modern conditions of the agricultural sector functioning requires the appropriate scientific and methodological support. This led to the theme choice, determined its orientation, structure and the topicality of the research.

The formation of conceptual and categorical apparatus of labor resources and methodological base of determining the research effectiveness have a significant history of research both in Ukraine and abroad.

The following famous scientists, including M. Marshal[89], S.H. Strumilin[90], P.T. Sabluk[91], D.P. Bohynia[92] and a number of other researchers devoted their works to this issues. The results of their work are determining the role and ways of the efficient use of human resources both in terms of command and planned, and market economy.

However, unfortunately, the modern understanding of the term “human resources” in Ukrainian science is somewhat “vague” and is often identified with the concepts of “human capital” and “labor resources”, which is quite controversial, and therefore, it forms the prerequisites for further research in this area.

The authors usually unify concepts and ways for using labor for the majority of the economy sectors, avoiding the specifics of their use in agriculture.

The objectives of our study are:

[89]Marshall, M. (1993). The principles of economic science, *vol. 1,* Moscow: Economics, 124.
[90]Strumilin, S. H. (1982). Problems of labor economics, Moscow: Nauka, 472.
[91]Sabluk, P. T. & Orlatyi, M. K. (2002). Population and labor resources of the village, tutorial, Institute of Agrarian Policy of UAAS, Kyiv, 277.
[92]Bohynia, D. P. (2001). Fundamentals of Labour Economics, Kyiv: Znannia-Pres, 211.

1) analysis of the most common approaches to the interpretation of the concept of labor resources of agricultural enterprises in the scientific literature to formulate the best definition of this category;
2) determination of the specific use of labor resources in agriculture;
3) analysis of labor resources in agriculture of Lviv region and key tendencies of their changes.

The term "labor resources" was first introduced in the scientific literature by the Soviet scientist S.H. Strumilin in the 1920s as an accounting and statistical category. The academician viewed the term "labor force" as labor force of the country at the age of 16-49 years [2]. That is the categorical definition of the concept "human resources" included only the quantitative expression of the working population, not taking into account its quality characteristics. Such interpretation of the concept "human resources" corresponded to the extensive development of the Soviet economy, where quantitative estimates of resources had priority [93].

The investigation of the economic essence of the concept of "human resources" indicates that there is not unambiguous interpretation of this category among the domestic and foreign scientists. Some scientists do not recognize the status of scientific economic categories according to the human resources. They put forward largely statistical, but not economic nature and content of the concept "human resources" with the help of the arguments in support of their position.Thus, E.R. Saruhanov believed in his works that the "... Economic category is workforce, and human resources are only its qualitative expression" [94].

Other scientists, on the contrary, substantiate social and economic nature of this category, arguing that "human resources" have a historical certainty, represent the concept of a social class and are not a formal set of statistics [95].

In general, the "Soviet stage" of the study of labor resources is characterized by the actual identification of the notion "labour resources" in all economic sectors, practically without considering branch specificity of agriculture.

In fact, a thorough study of labor resources in agriculture as a separate category began with the development of the market economy in the Ukrainian agriculture. Despite the similarity of visions of the foundations of the category, the authors demonstrate equal views on their qualitative and quantitative composition. In

[93]Pokynchereda, V. V. (2012). Labor resources of enterprises: accounting aspect, Collection of scientific works. Series: Economic science, 1 (56), vol. 2, 59-66.
[94]Sarukhanov, E. R. (1981). Social and economic problems workforce management at socialism, Leningrad : Publishing house of Leningrad State University, 144.
[95] Cherep, A. V. & Somchenko, V. V. (2011). Social and economic nature of the category "labor resources" in the industrial sector of the economy, Herald of ZNU, 1(9), 78-84.

particular L.I. Lychuk believes that agricultural labor force includes all able-bodied men and women in working age, the members of agricultural enterprises; able-bodied individuals from other industries of the national economy, if they are involved in agricultural works; people of retirement age, teenagers up to 16 years old who live in rural areas [96]. T.A. Nedzelskyi introduces the criterion of physical and professional development of employees, claiming that labor force of agricultural enterprises is a set of employees, who have the necessary physical development, knowledge and practical skills for high quality and timely fulfillment of work according to the technology of agricultural production[97].

V.I. Perebyinis develops this vision, noting that the rural population of working age should also have the required physiological, social and motivational, educational and qualification, intellectual, cultural, spiritual power and other characteristics according to the category of human resources of the agricultural sector [98].A.A. Vorotnikov and H.V. Doroshenko, regard the agriculture sector as a specific branch of the economy emphasizing the need for work experience in it. Therefore, human resources in agriculture include "the part of the population, which has the necessary physical qualities, knowledge, skills and experience in agriculture" [99].

L.O. Popyk argues that labor resources of agricultural enterprises are the able-bodied part, mostly the rural population that worked, can work or is currently working at the enterprise, which systematically fulfills the production (growing), processing, sale (sales) of food for plants, animals or other purposes [100]. Thus, the author expands the category of human resources in agriculture by the workers' implementation of networks of agricultural products. In terms of seasonal production of agricultural products, we agree with the definition of such scholars as V.P. Tkachenko and T.V. Mazana. They reveal social and economic nature of human resources in agriculture. The social nature of society, according to the authors, defines the workforce that actually operates in the production process. It is the main part of human resources; the rest is a potential labor force that can participate in the

[96]Lychuk, L. I. (2009). Labor resources of rural territories and especially their use in the social production, Innovative economy, 13, 38-42.
[97]Nedzelskyi, T. A. Problems of reproduction of labor resources at agricultural enterprises, Retrieved from: http://repository.vsau.org /card.php?id=2746
[98]Perebyinis, V. I. & Zhytnyk, T. P. (2008). Management of using labor resources at enterprises: a monograph, Poltava: RVTs PUSKU, 331.
[99]Vorotnykov, A. A. & Doroshchenko, H. V. Meaning of labor resources in agriculture and their study in using geoinformation technologies, Retrieved from: http://www.rusnauka.com/ONG_2006 /Economics/17837.doc.htm
[100] Popyk, L. O. (2012). The essence of the labor resources of agricultural enterprises: theoretical aspects of forming the definition, Herald of Kharkov National Technical University of Agriculture, Kharkiv: HNTUSH, 221-228.

production and execution of services. The economic nature – working time that is needed for socially useful work [101]. We conducted a comparative analysis of the definition of this category in the domestic and foreign literature considering some differences in the vision of the concept "human resources of agriculture" in the study (Table 1).

The difference between defining labor resources in agriculture and the definition of this category in general economic literature, in our opinion, is due to the specifics of agricultural production.

1) Land as a basic and indispensable means of production is also the instrument of labor (when people use physical, biological and other features of land) and the subject of labor (when people work on land).

In other words, intertwining of the economic process and natural reproduction, which determine the productive activity of human resources in agriculture, is viewed in agriculture. In this regard, considerable importance is attached to the ability of employees to possess theoretical knowledge and practical experience of activities in the field of agriculture.

Table 1. Defining the essence of the concept "labor resources in agriculture" in the scientific literature.

№	The author	Definition of the concept
1	Bohynia D., Marshall M., Strumilin S.	The main productive force of society, the most economically active part of the population consisting of workers from towns and villages and providing expanded reproduction of the social product[4]
2	Oliynyk Ye.	A special and very important kind of economic resources, the assessment of which is determined by the number of workers with certain professional skills and knowledge that can be used in the labor process and can serve as the initial information base for planning and analysis[102]
3	Lychuk L.	Able-bodied men and women of working age, members of agricultural enterprises; able-bodied individuals from other industries of the national economy, if they are involved in agricultural works; the people of retirement age, teenagers up to 16 years old, who live in rural areas[8]
4	Popyk L.	Able-bodied part of mostly the rural population, who worked, can

[101] Mazana, T. V. & Tkachenko, V. P. (2011). Labor resources of agriculture and effectiveness of their use in market conditions, *Efficient economy,* 12, Retrieved from : http://nbuv.gov.ua/UJRN/efek_2011_12_23

[102]Oliynyk, Ie. O. Evaluation criteria of labor resources of agricultural enterprises, Retrieved from: http://www.nbuv.gov.ua/portal/Soc_Gum/Vbumb /2011_3/12.pdf

		work or is currently working at the enterprise with systematical producing (growing), processing,selling (sales) of food for plants, animals or other purposes[12]
5	Nedzelskyi T.	A set of employees, who have the necessary physical development, knowledge and practical skills for high quality and timely fulfillment of work according to the technology of agricultural production[9]
6	Vorotnikov A. Doroshenko H.	That part of the population, which has the necessary physical abilities, knowledge, skills and working experience in agriculture[11]
7	Tkachenko V., Mazana T.	Existing and potential labor force that actually operates in the production process[13]
8	Merzliak A., Mykhailov Ye., Koretskyi M., Mykhailova H.	The intermediate category between "population" and "total labor force". All able-bodied population is engaged, regardless of their age, in the sectors of public economy and self-employment activity, as well as people of working age, who could take part in work, but are engaged in domestic and personal economy, in off-job training, in the military [103]

Source: compiled by the authors

2) Work in agriculture is rather complicated and does not guarantee to obtain the desired results that are largely dependent on natural climatic, social, and economic conditions and territorial distribution of enterprises.

3) Social and psychological factors are important in attracting labor resources in agricultural production, particularly, - the desire to work in agriculture, giving preference to those living in rural areas, maintaining family traditions.

4) Peculiarities of conducting agricultural production usually involve the use of workers simultaneously in several areas, providing multi-functionality of employees that is they have skills in several areas of agricultural production.

5) Agricultural crops growing is the object of work that determines discrepancy between the working period and the period of production, which inevitably causes seasonality of labor resources and is one of the causes of their incomplete employment, particularly in crop production.

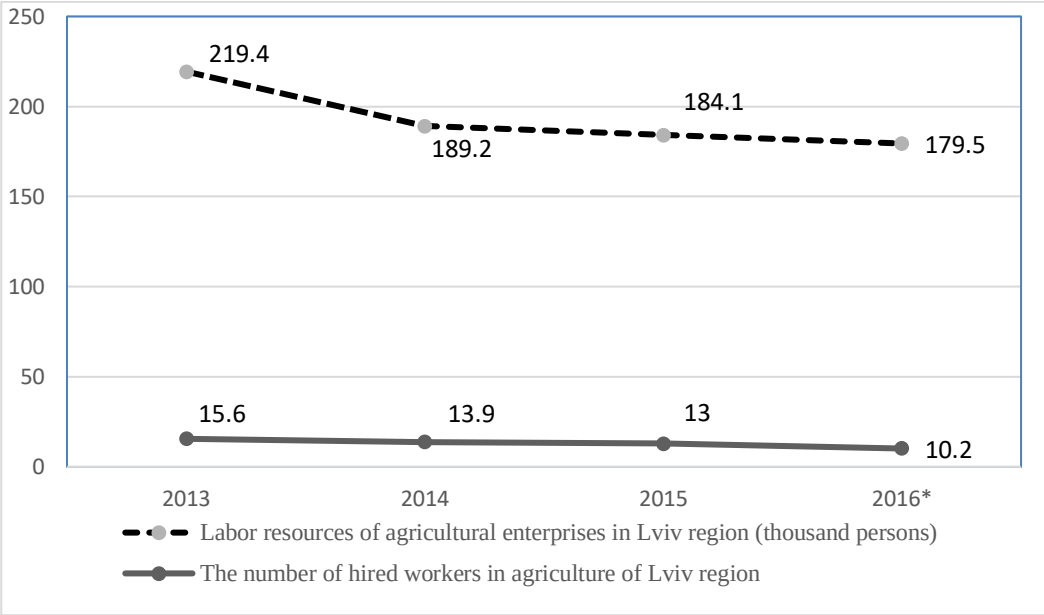
A significant underutilization of labor causes a reduction in wages of permanent employees, which is one of the main factors of staff turnover into other sectors of the economy. This leads to a sharp reduction of labor resources in agriculture in conjunction with the demographic crisis in the country that in the near future will have an impact not only on the gross performance of the agricultural production but also on food security in general.

[103]Mykhailov, Ie. P. (2005). Economics of labor, social and labor relations, tutorial, Kyiv: Center of scientific literature, 18-19.

We studied the dynamics of the state and structure of labor resources of the agriculture in Lviv region, since the size, structure, composition and economic activity of the population etc. are the reflection of the development of both rural and agricultural enterprises.

The issue of reducing workforce, including the number of employees, is acute in the agricultural complex of Lviv region, as well as throughout the state in general.

Figure 1. The dynamics of workforce in the agricultural sector of Lviv region.



*Taken into account the average number for the period from January to October 2016.
Source: compiled by the authors based on the source [104]

A stable tendency to decrease the number of employees in the agricultural sector has been fixed during the study period. In 2013-2016, this index was 18.7% for all workers in the agricultural sector. A significant reduction in the number of hired workers of agricultural enterprises - 34.7% is observed, that is more than 8.6% annually.

[104] State Statistics Service of Ukraine (2016), retrieved from: http://database.ukrcensus.gov.ua/ (Accessed 28 November 2016)

The reasons for sustainable reduction in the number of hired workers in the sector of agriculture are the following factors:

1) The negative natural increase of the rural population of the region. A characteristic feature of the resettlement of the population in Lviv is a large population living in villages.

More than 989 thousand of rural inhabitants lived on the territory of Lviv as of January 1, 2016, which is the highest index among the regions of Ukraine. In addition, the area is characterized by the high level of concentration of labor resources in rural areas – 45.31 people / km^2, which is the 4^{th} index among regions, traditionally giving way to small-urbanized regions – Chernivtsi, Ivano-Frankivsk and Zakarpattia (where the share of rural population is more than 50%).

However, unfortunately, the current difficult demographic situation in Ukraine makes adjustments in the natural movement of the rural population too. Analyzing the demographic situation in Lviv region, it is worth noting that the number of the current rural population of the region is steadily decreasing: in 1991, there was 1103.9 thousand of people; in 2001 – 1068.8 thousand of people (-35.1 thousand of people); in 2011 – 998.2 thousand of people (-70.6 thousand of people), in 2016 – 989.3 thousand of people (-8.9 thousand of people). More than 7.1% of the rural population of Ukraine lives in Lviv region at the end of 2016. This region ranks the 4^{th} in Ukraine for the total population.

2) Attracting inhabitants of rural areas of the region into other areas of activity**.** The results of the study demonstrate a significant reduction in the fund of labor resources of the agricultural sector both in absolute terms and in comparison with other sectors of the regional economy. Particularly, during the period 2013-2015 the total number of the employed population in the regional economy decreased by 63 thousand of people (or 5.7%), while more than half of them were in the agriculture sector (-35 thousand of people), which was characterized by the reduction of labor resources by almost 16% (Table 2).

3) Reducing the number and share of economically active population in rural areas of the region. The economically active population of Lviv region in 2015 was 1134.7 thousand of people (44.77% of the total population). In the gender ratio, 54.2% of them are women (615.1 thousand of people) and 45.8% are men (519.6 thousand of people). The majority of economically active population – 731.9 thousand of people (64.4%), lives in the urban areas, and is characterized by a decrease at the level of 11-12 thousand of people annually.

Table 2. The dynamics of the number of the employed population at the age of 15-70 years by types of economic activity in Lviv region (thousands of people)

Branches of economy		2013	2014	2015	%, 2015 to 2013
Industry	In total	159	154	149	93.71
	including - hired workers	127	125	121	95.28
Agriculture	In total	219	189	184	84.02
	including - hired workers	15	13	13	86.67
The sphere of trade	In total	203	189	194	95.57
	including - hired workers	59	54	50	84.75
Processing industry	In total	120	117	113	94.17
	including - hired workers	88	88	85	96.59
Other industries	In total	404	489	402	99.50
	including - hired workers	310	301	307	99.03
In total	In total	1105	1138	1042	94.30
	including - hired workers	599	581	576	96.16

Source: compiled by the authors based on the source [105]

The share of the economically active rural population of the region in total regional indexes is characterized by a progressive decline. This indicator has decreased during the research from 40.21% to 35.5%.

Constant negative growth of the economically active population within the limits of 3-4% annually is typical for the rural population of the area. The mentioned negative situation is aggravated due to the reduction of rural employment (to 18.03%) and, respectively, the growth of unemployed (to 19.31%). The number of the economically inactive population increased by almost a third (76.5 thousand of people) (Table 3.).

[105]State Statistics Service of Ukraine (Migration of population) (2016), retrieved from: http://database.ukrcensus.gov.ua/PXWeb2006p/Saveshow.asp (Accessed 11March 2016)

Table 3. The number of the economically active and inactive population in rural areas of Lviv region (thousands of people)

Indexes	2011	2012	2013	2014	2015	2015 to 2011%
The number of the rural population	998.2	996.1	994.6	992.6	990.8	99.26
Economically active population of the region, in general	1192.8	1189.0	1189.0	1135.4	1134.7	95.13
Economically active population in rural areas	479.6	464.4	461.1	412.2	402.8	83.99
Employed people	453.7	437.0	438.6	377.3	371.9	81.97
Unemployed people	25.9	27.4	22.5	34.9	30.9	119.31
Economically inactive population	234.8	249.0	251.4	301.3	311.3	132.58
The share of economically active population,%	48.05	46.62	46.36	41.53	40.65	-7.40
The share of employed economically active population,%	45.45	43.87	44.10	38.01	37.54	-7.92

Source: compiled by the authors based on the source [106]

Thus, during the studied period (2011-2015), the majority tendencies concerning labor resources in rural areas of Lviv region had a negative vector. In particular, the reduction in the share of working rural inhabitants to the total rural population is especially dangerous. If in 2011 this index was 45.45%, while already in 2015 it decreased to 37.54%, therefore, the ratio of the employed population to the unemployed population of the region is 1.66:1.

We have implemented the clustering of enterprises of the AIC sector according to the load of agricultural land per worker and found the optimal size of this load during the analysis of labor resources by agricultural enterprises in Lviv region (Table 4).

[106]The official site of Main Statistical Office in Lviv region (2016), retrieved from:http://www.lv.ukrstat.gov.ua/ukr/themes/18/theme_18_1_01.php?code=18&ind_page=stattables (Accessed 14 March 2016)

Table 4. The influence of the load of agricultural land per worker on the effective functioning of agricultural enterprises in Lviv region, 2015*

Indexes	Groups of enterprises by the size of load of agricultural land per worker employed in agriculture, ha / person:				
	to 20	21-49	50-99	100-150	over 150
Number of enterprises	26	22	19	13	8
Number of employees in the plant growing industry	1069	660	1598	410	127
Attributable area of agricultural land per employee, ha	17.26	30.30	74.15	117.5	196.0
Labor productivity, thousand hrn / person	128.73	243.58	883.90	910.41	1680.74
Level of remuneration	4105.83	3482.92	3736.05	4204.89	4501.93
Received agricultural land on 100 hectares, thousand hrn: gross output	745.82	803.89	1192.043	774.817	857.52
The level of profitability,%	-2.58	2.05	35.12	28.17	24.32

* the scale of the sample covers 88 agricultural enterprises of the region.
Source: compiled by the authors based on the form 50-sg of investigated agricultural enterprises.

There is a direct connection between the growth of production scale, respectively, land resources and the efficiency of production activity of enterprises according to the data presented in the table. The results of the analysis of these groups demonstrate the highest efficiency of using land and labor resources in the groups 4 and 5 that combine more than 70% of the largest agricultural enterprises of the region according to the land resources.

In particular, the growth of labor productivity in more than 13 times was fixed in average increasing the load of agricultural land per employee from 20 hectares to 150 (from 128,73 to 1680,74 thousand of UAH / person), profitability of production – by more than 26% (from 2,58% of unprofitableness to 24,32% of profitability).

In our opinion, it is caused by the following factors:

1) Activization of the investment activity of large agricultural enterprises into the manufacturing sector;

2) Increasing the automation of production and a gradual decrease in the share of manual labor due to the implementation of more effective technical equipment.

Thus, the growth of labor productivity in major agricultural formations is caused not only by the increase in the intensity of production but also, unfortunately, a gradual reduction in the number of employees in total and per 100 hectares of arable land.

It is impossible to avoid the fact, that the largest enterprises of the area combine the reduction in the number of employees with the growth of the fund for payment; that is they sack not qualified labor, offering more attractive working conditions to highly skilled experts.

The effect of high wages on the labor activity motivation and the increase of the multiplane production efficiency is also shown in the following.

Firstly, a higher level of wages (in comparison with the average of its value) assists in decreasing staff turnover and, consequently, the formation of a stable labor collective. Under conditions of the decrease in staff turnover, the employer has a possibility to cut down the expenses on employment and training of the personnel, to direct the saved means at progress of manufacture, which, in its turn, ensures the increase of the production competitiveness.

Secondly, implementing the policy of high wages allows selecting the most prepared, skilled, initiative employees, who focus on success on the labor market and whose labor productivity is potentially above an average level. In this case, one can also save some means for training and improvement of professional skills of employees.

Thirdly, high wages serve as a factor of increasing the sense of duty, the responsibility and intensity of work. The attempt "to work off" the salary, which is higher than the average as well as the fear of being fired contribute to it.

Analyzing the data of the table, we want to note that in contrast to the indicators of the production efficiency, the tendency towards the increase (which is directly proportional to the scale of economic performance at enterprises of fourth and fifth groups, where the load of agricultural land per worker employed in agriculture is more than 100 hectares) begin to decline. It is obvious that enterprises feel the opposite effect from increasing the scale of production, due to the shortage of skilled labor resources, and pushing up the cost due to the increase of investments in production.

During the research, we found that the optimal level of the load of agricultural land per worker employed in agriculture, which provides a high level for the production effectiveness in agricultural enterprises of Lviv region, is 68 hectares.

It should be noted that this index is not fixed and varies greatly depending on the sphere of activity of agricultural enterprises. About 5-5.5 thousand hired workers are enough for full activity of agricultural enterprises in the available sown area of 341.5 thousand hectares (for agricultural enterprises) in 2016.

Thus, it is clear that the available human resources in rural areas, despite a sharp reduction in our time, are able to provide labour resources for the production activity of agricultural enterprises, but the dynamics of the reduction (1.2 thousand annually) demonstrate the danger of a deficit of this type of resources during 4-5 years.

Conclusions. The results of this research give us the opportunity to draw the following conclusions:

1) Labor resources in agriculture differ from a similar category in other sectors of the economy in the external similarities that is connected with the specific implementation of the agricultural production;
2) The current level of technology and automation of agrarian enterprises can achieve the optimum economic performance at a load of about 68 hectares of the agricultural land per 1 employee. Thus, the available number of labour resources fully meets the needs of production;
3) A stable tendency to decrease workforce in rural areas is fixed and in the nearest future, it is likely to cause a shortage of labor resources. The reasons of these are the natural, economic and migration factors, including a demographic crisis in rural areas, the reduction in the number of economically active population and unemployment growth, attracting available resources in other spheres of the economy.

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MANAGEMENT PRINCIPLES FOR REPRODUCTION OF LABOR POTENTIAL OF TRADE ENTERPRISES

Abstract. *In the investigation there is proved the expediency of adding the assessment of reproduction phases of trade enterprises' labor potential by determining the factors having the most significant influence on formation, distribution (redistribution), development and usage of labor potential. To ensure that, the methods of correlation and regression analysis are used and correlation-regression models are built separately for all phases of trade enterprises' labor potential, as well as correlation dependence rates (between the resulting value and its factors) are determined.*
For trading entities there are substantiated the strategic decisions, as well as the policy provisions, directed towards rising the efficiency of management for their labor potential, in particular with regard to the peculiarities of reproduction and introduction of innovations and intellectualization of labor activity.
The sociological investigation is carried out, while by its results the main trends are detected for improvement of the labor potential reproduction for domestic trade enterprises.

JEL Classification System: F 190;C 130; J 240.
Key words: Labor potential, phases of trade, innovation, intellectualization.

Introduction. Intensification of social production and formation of pre-conditions of the transfer into an innovation model of economic development (starting from the second half of the 20th century) has increasingly more actualized the issue of human's (employee's) participation in ensuring efficiency and productivity of production and economic activity. The theory of human's capital (G. Becker, A.Denison, R. Lukas, R. Solow, I. Fisher, T. Schultz et al.), which was formed on achievements of institutional and neo-classic theories, as well as neo- Keynesianism, has become widespread. Its appearance has become an answer of an economic science to the needs of the real economy and life. There appeared a problem of a deeper understanding of the role of a human being and accumulated results of its activity upon the rate and quality of development of both the society and the economy. In later course into the scientific circulation there was introduced a notion of labor potential as potential perspective possibilities of society with regard to working capacity of population with a corresponding level of professional and qualification education, taking into consideration technical and technological equipment of the production complex.

Conceptual bases of the theory of the labor potential development have also expanded into its lower levels – branch and sectoral, micro- and nano- levels. The improvement went on in both quantitative and qualitative aspects, as well as in the peculiarities of a componential structure. By today, the stable conviction has ripened, that it can be exclusively on the basis of principles of the efficient formation and using of the enterprise's labor potential, that the enterprise can be provided by such quantitative and qualitative composition and structure, which can ensure high labor productivity and efficiency and facilitate the formation of conditions for the innovational activity and intellectual creative activity. In the trade there exists its own specificity of labor potential, connected with the need for specialized professional personnel, their high mobility and continuous education and improvement of competence features in the extent of dynamic development of the trade and its segments (in particular, the retail trade), the ability of personnel to develop a high rate of buyers' loyalty, as well as their ability to realize the special functions of marketing and commerce.

By the results of analyzing the genesis of the notion "labor potential" in the theory of management, it was stated that the trade enterprise's labor potential is formed from labor potential of all the employees that comprise the working team. This labor potential presents an aggregate of those employees' internal abilities (professionalism, qualification, working capacity) and means for their realization (conditions of work and life, a rate of incomes, a system of motivation and stimulation, a level of workplaces' technical equipment). As far as each employee realizes his/her labor potential in different ways (completely or partly), the efficiency of its using depends upon using the individual labor potential, and the result can be both negative and leading to improvement of the trade enterprise functioning.

In the process of investigation, we determined that the nature of labor potential is based on conceptions of its reproduction. The modern scientific literature gives substantiation of concepts mainly for an intensive type of the labor potential reproduction, while these concepts are formed on the basis of the extended reproduction of population and labor, colligating it with employment, the labor market, workplaces, qualitative characteristics and socio-economic policy of the state. It reduces the nature of the process to reproduction of generations.

The reproduction of labor potential in the light of manpower consists in creating the human's ability to work, providing for every new generation the extended reproduction of working capability, knowledge, skills, consciousness and intellectual development, while it enables fulfillment of certain amount of work according to the society's degree of development. As dominant phases of the reproduction of the trade enterprise's labor potential, there are the following phases:

(1) creation, (2) distribution (redistribution), (3) using and (4) development. Within the frame of each of them, there are selected own structural components, on the basis of which both the analysis is conducted and the management policy is implemented.

For trading enterprises, taking into consideration the specificity of their activity, the characteristic feature is the increased role of an employee in reaching the results of economic activity, since the services offered on the market require the direct contact of personnel with clients. It substantially raises the requirements for labor potential, that is: professional competence, communicability, culture and creativity in resolving the situational problems. Such a situation requires a special approach to managing the employees' labor potential – starting from its understanding as a functional component of the management and production link of the enterprise and ending by its investigation and optimization (as a strategic resource with significant and high-efficient potential, which comprises professional competences, the ability of development, creative work and creative ideas).

The strategic management of the reproduction of the trade enterprise's labor potential shall contain (besides defining purpose-oriented imperatives) both a concrete definition of functions and a sequence of phases of their realization (Fig. 1).

The investigation of labor potential requires an application of a wide range of methodical tools, which assist in defining tendentious regularities and problem trends in phenomena and processes determining its reproduction.

The corresponding information support presents the basis for an application of labor potential investigation methods. The selection of a methodical set of tools (and then, the effectiveness of the conducted investigation) substantially depends upon the availability of corresponding data.

Thus, having processed the methodical basis for analyzing the reproduction of the trade enterprises' labor potential, one can conclude that economic and mathematical (factor- and comparative- analysis, forecasting, simulation, grouping, optimization, coefficients etc.) and special (sociological poll, classification, retrospective and system analysis) investigation methods are over-differentiated, while their selection depends upon the available information support and the purpose of investigation, which is conducted.

However, the main result of the application of a methodical set of tools consists in quantitative and qualitative estimation of labor potential. Such a conclusion became the basis of creating the author's system of trends and parameters for analyzing the reproduction of the trade enterprise's labor potential. The corresponding indices are selected for the phase of formation by a demographical, medical, biological and educational trend; for distribution (redistribution) phases – by

an organizational and economical one; for phases of development – by a qualification, intellectual and innovational and cultural one, while for phases of the efficient application – by a motivational and mobility one.

Based on the results of analyzing the trade development trends in context of the reproduction of the trade enterprises' labor potential (using as an example Lviv region), the factors facilitating the efficiency increase of this process are determined. They are: the decrease of the migration flows extent, the growth of business and economic activity, the enhancement of the volumes of trade turnover, lowering the fraction of unprofitable enterprises, the improvement of employment and mobility of employees, the reduction in the quantity of employees transferred into the incomplete working day due to economic reasons, the growth of both the fraction of young people (in the structure of personnel) and quantity of employees, who have raised their qualification.

Still, for the policy of further increase of the management efficiency of the trade enterprise's labor potential, the unstimulating factors are of greater applied importance. Those are the complicated demographical situation, an incomplete employment, a high labor turnover, the growth of employment in a non-formal sector of the economy, the reduction of signed collective agreements and employees passing the primary training, the decrease of the rate of capital investments into the development of enterprises and financing of the innovational activity.

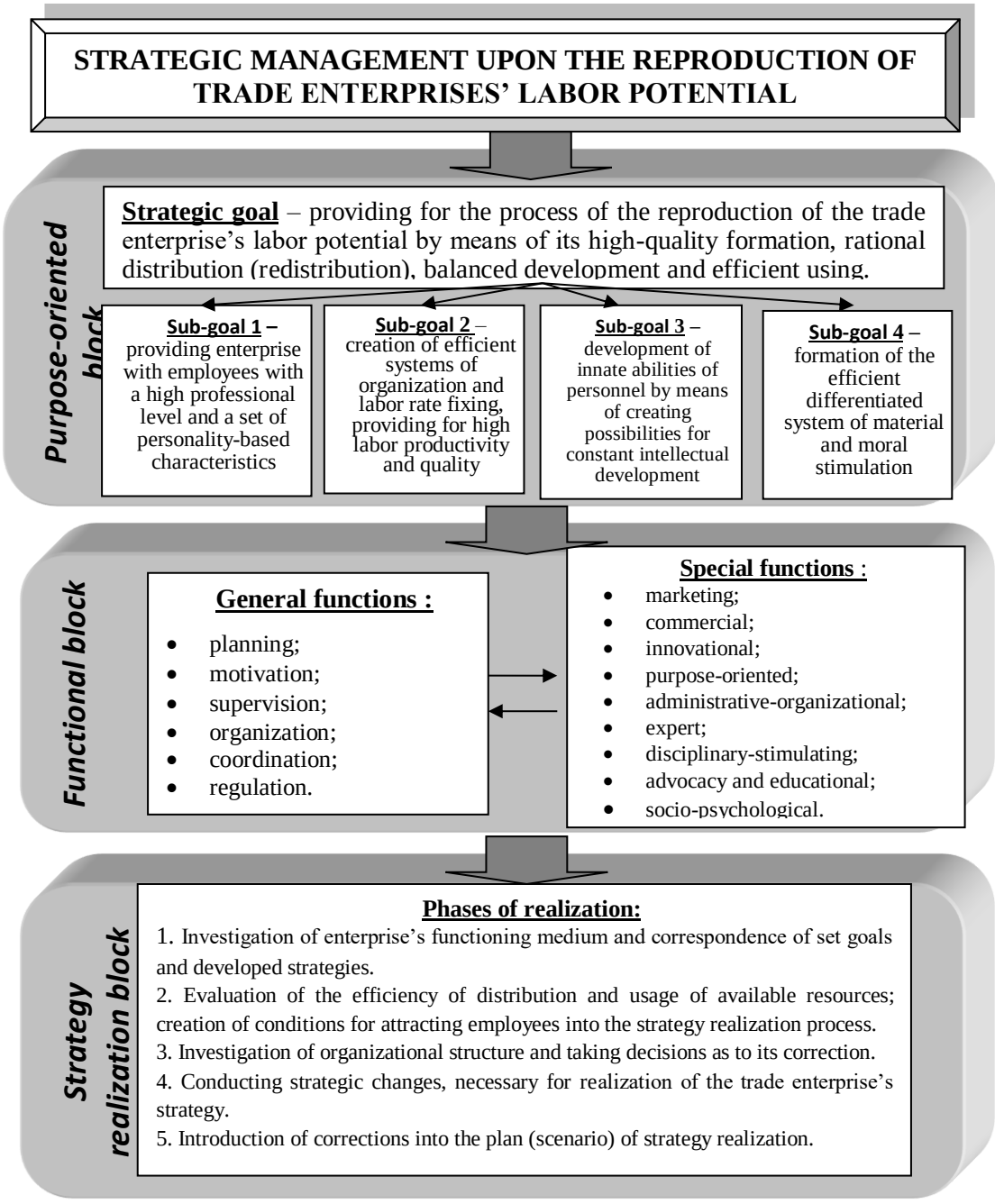
The development trends in the field of trade determine the process of the reproduction of the trade enterprise's labor potential. Improvements in trade objectively present the precondition of a high-quality formation, rational distribution (redistribution), dynamic development and an efficient use of trade potential. Negative developments interfere with the process of the efficient reproduction of labor potential and require special attention and intervention on the part of both the trade enterprise management and representatives of the state and regional authorities.

In order to draw the quantitative conclusions with regard to managing the reproduction of the domestic trade enterprises' labor potential in this study (on the basis of the author's methods) there was conducted the corresponding integral estimation that ensured the calculation of taxonomic indices of the development of the components of trade enterprises' labor potential by phases of reproduction (Fig. 2).

The integral index of forming trade potential in Lviv region until 2011 has a trend towards growth. Still, in the period of 2011-2015 one can observe its decrease [107].

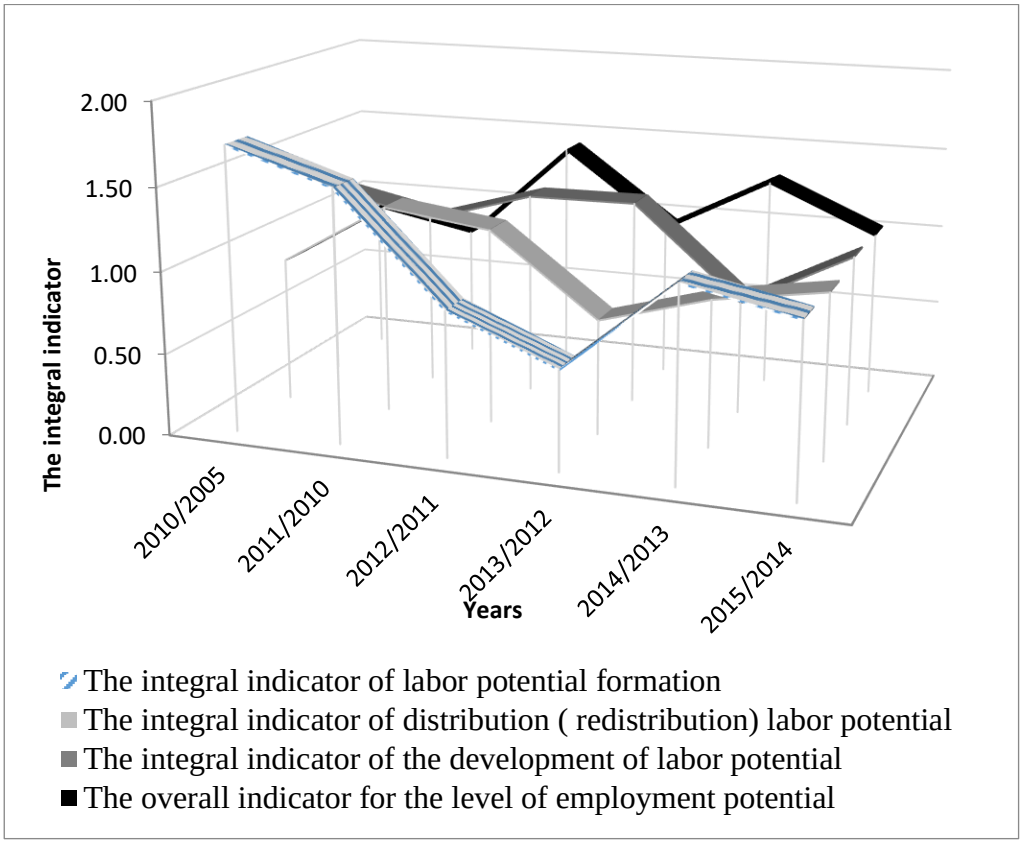
[107] The official site of government service of statistics (2016), retrieved from: http://www.ukrstat.gov.ua (Accessed 20 March 2016)

Figure 1. Structural components of strategic management upon the reproduction of enterprises' labor potential



Source: Proposed by the author

Figure 2. Rapid changes of the integral indices of labor potential in trade in Lviv region by phases of reproduction



Source: Compiled by the author based on own investigations

Such a situation happened mainly due to worsening of the dynamics for the indices of a demographic component, while it (in its turn) was caused by consequences of multiple regional migration flows against a background of the growth of the quantity of able-bodied population and the increase of average life expectancy. A similar situation occurred also in an educational component, while it depicts in somehow different aspect the strategic orientation points for the process of labor potential formation in Lviv region.

In 2013, the integral index for the rate of forming labor potential in trade equalled 0.34 and, while increasing in dynamics, by the end of the analyzed period (2015) it was 0.40, and thus it increased by 0.06. Taking into account the fact that the maximum value of the coefficient equals 1, the indicated dynamics suggest the growth of the formation rate of trade enterprises' labor potential by the end of the

investigated period. The growth of the value of the integral index in 2015 can be explained by the increase in taxonomic indices of the development of all components of the labor potential formation phase.

There is a definite conclusion that (in case of an unchanging existing demographic situation in the state in general, and in Lviv region in particular, and the situation in the field of health care and education) the prospects for the efficient formation of labor potential in trade are endangered and this will be especially manifested in the long-term perspective.

As regards the integral index of distribution (redistribution) of labor potential in trade in Lviv region, until 2012 the growth of this index has been observed. Starting from 2012 the trend for its decrease was observed. In 2015, the integral index was 0.24, while it is by 0.03 less than in 2013, and by 0.11 less than in 2012. In general, the indicated dynamics suggest worsening of the rate of distribution (redistribution) of labor potential in trade.

Such a situation occurred due to a gradual decline (starting from 2013) in the quantity of trade enterprises, the decrease of working time fund and the quantity of registered collective agreements in trade. Moreover, it happened simultaneously with the growth of economically active able-bodied population, employed in this sphere. The insubstantial growth of the taxonomic index of the development of an economic component (starting from 2014) does not provide for strict determination of prospects for the further trend.

According to the presented in the table data, the integral index of the rate of development of labor potential in Lviv region until 2013 has had a trend towards growth, while one can observe its decrease just in 2014. Here one should indicate the positive dynamics of its taxonomic indices, caused by: the growth of the quantity of trade personnel, involved in improvement of qualification, participation in re-training and studying new professions; the growth of expenditures on financing the innovation activity and expenditures on Internet services (except for 2014). A rather high value of the indicated integral index in 2013 gives grounds to affirm the enormous capabilities of Lviv region concerning the development of labor potential in trade, while its decrease in 2014 suggests worsening of the situation.

Finally, the dynamics of the integral index of labor potential in trade in Lviv region do not give grounds to affirm the presence of a strictly expressed trend towards the decrease or increase of this index. Within the period of 2012-2013, the decrease of the integral index was observed, while in 2014 its value increased by 0.15 in comparison with 2013 and amounted to 0.64. Taking into account the maximum value of coefficient (1.0), it suggests the improvement of the rate of using labor potential only by the end of the investigated period. The same dynamics are inherent

to taxonomic indices of a reproduction phase. In 2014, one can observe the growth of the taxonomic index of a motivation component (while it undoubtedly will have a positive effect on the reproduction of labor potential) and the growth of the taxonomic index of mobility (while it will have a negative effect on its use).

Tracking the speed of changes in the integral indices of labor potential by phases of its reproduction acquires great importance in the context of checking the balance of the labor potential reproduction in trade in Lviv region.

As the modern society creates absolutely new demand for labor potential, the particular importance is attached to the personality traits, which determine the working behavior. Therefore, there is a need for determining a typical portrait of the modern trade enterprise employee, along with the detection of possibilities for developing its labor potential and specific features of working behavior, as well as identification of trends towards further efficient reproduction of labor potential. With this purpose in 2015, there was conducted a sociological investigation on the basis of shopping centers «Metro», «Silpo», «Furshet», «Rukavychka» and «Arsen», which provided for detection of certain problematic aspects in possibilities of the reproduction of personal trade potential of employees.

Choosing these trade networks as objects of the analysis is caused by the fact that consumers prefer purchasing goods just in organized trade formats – hyper- and supermarkets or shops in the vicinity of the place of living: in supermarkets, purchases of everyday goods are made by 45% of buyers; in shops in the vicinity of the house – by 25%; in hypermarkets – 8%; in counter-service shops – 3%; in warehouse stores – 2%, at marketplaces, in kiosks and from street vendors – 15%. By the poll results, the peculiarities of the labor potential reproduction for the modern employee of a trade enterprise were identified (Table 1).

In the investigation there is proved that the policy of the efficient management of the reproduction of trade enterprises' labor potential shall be coordinated with raising the level of their innovatization and intellectualization. That is because personnel are the bearer of intellectual capital. Due to the formation and professional, qualification development of personnel, the accumulation and the efficient application of the trade enterprise's intellectual capital is ensured. It is proposed to view innovatization of working activity as a constant process of attracting and introducing innovations into the personnel's activity. This process is a complex and systemic one and is based on the intellectualization of working activity, while it facilitates the formation of the innovation culture for trade enterprises and is mainly notable for positive influences with regard to optimization of resource expenditures for reaching better results. Eventually, it provides for the efficient reproduction of labor potential.

Table 1. The peculiarities of the labor potential reproduction for the modern employee of a trade enterprise.

Reproduction phases	Positive aspects of reproduction	Destructive aspects of reproduction
Formation	Productive age; Availability of education; Computer and Internet users' skills.	Non-conformity of an educational level to the professional activity and the position held; The absence of labor choice.
Distribution (redistribution)	Flexible working schedule.	Incomplete employment.
Development	The quantity of additionally mastered professions; Taking refresher courses; The ability for self-education; Information technologies, using experience in working activity.	Non-conformity of salary to working efforts spent on a job; The absence of mastery concerning innovative marketing technologies.
Using	Favorable atmosphere in a work-team; A high ability for durable mental and physical work; Internal mobility	An insufficient level of material stimulation; A high level of working mobility; Emotional "burning-out"; Physical overload; The absence of social guarantees.

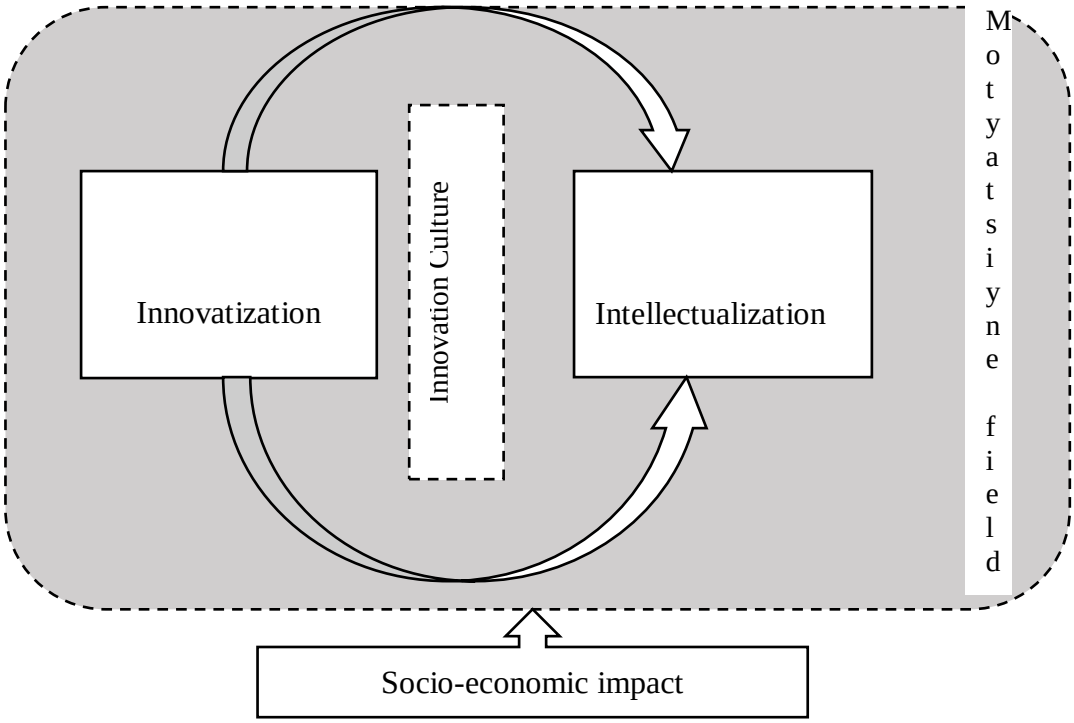
Source: compiled by the authors

Studying and understanding the world trends in the trade development allow determining the innovation priorities in the trade enterprises' personnel management, namely:

- Innovatization of working activity;
- Intellectualization of working activity;
- Innovative culture of enterprise (Fig. 3).

Moreover, labor innovatization and intellectualization facilitate the decrease of working time losses, the increase of work productivity, achievement of a high level of the social tendency for innovations, the growth of the quality of personnel's working life, the introduction of social guaranties of a higher quality, positive changes in the structure of employees and their level of qualification.

Figure 3. Innovative priorities in the management of the trade enterprises' personnel



Source: Proposed by the author.

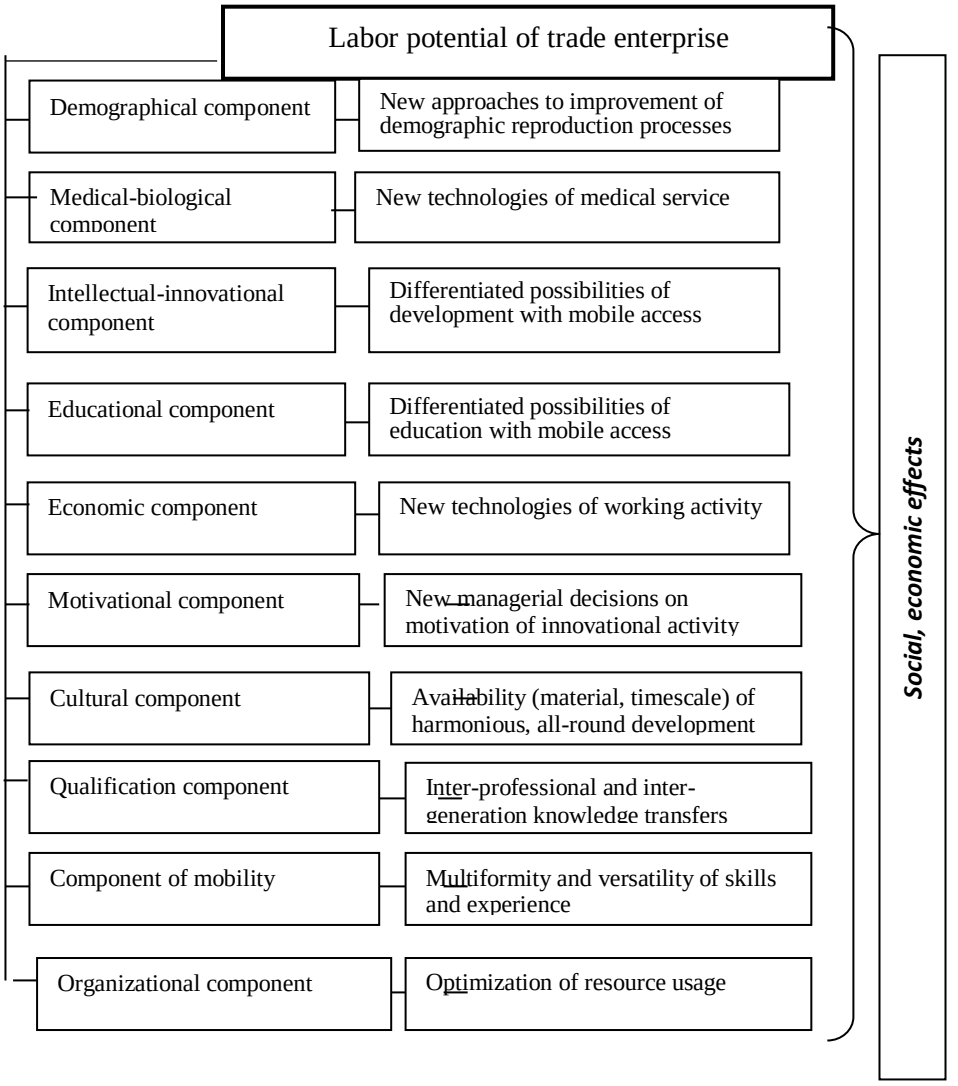
It is worth noticing that high integrativeness is inherent to the process of innovatization, in particular that one, which becomes apparent in the component structure of the trade enterprises' labor potential (Fig. 4).

The managerial aspect of securing innovatization of labor activity of a trade enterprise shall provide for the creation of the motivation field for manifesting creative abilities and non-standard approaches in the fulfillment of official obligations. Still, it requires sufficient financial support, capable of motivating employees towards increasing innovation activity, the introduction of innovative technologies into the working process and economic practice.

The priority task in the reproduction of the trade enterprise's labor potential is the formation and successful realization of a strategic approach, i.e. the availability of a clearly determined strategy of the trade enterprise's activity, along with the

corresponding mechanism of its realization.

Figure 4. Integrativeness of innovations in the component structure of the trade enterprise's labor potential.



Source: Proposed by the author.

The strategic goal of plenty of trade enterprises is raising (or retaining) the competitive ability of an enterprise on the basis of the efficient use of the available labor potential and, as a consequence, raising (or retaining) a profitability level of an enterprise. Therefore, the mission of a strategy of the eproduction of the trade enterprise's labor potential is securing the corresponding conditions for the labor

potential formation, rational distribution (redistribution), balanced development and efficient using. One should also notice that a strategic approach towards the reproduction of labor potential is directed at performing both short-term and long-term tasks according to the interests of an enterprise.

Determining the trade enterprises' positioning by the level of the labor potential reproduction presents the basis for choosing a strategy for labor potential reproduction. We suggest applying the graph-analytical method of entrepreneurs' potential diagnostics [108] to determine the position of an enterprise by the level of the labor potential reproduction. The graph-analytical approach today is rather topical, as it corresponds to the practice of the market competition, where every enterprise tries by all parameters to be better than its competitor. In our case, this method will allow not only estimating quantitative and qualitative relations between the separate phases of the enterprise's labor potential reproduction. The method will also allow detecting the level of the labor potential reproduction and competitiveness, and on this basis – substantiating (and timely implementation of) the managerial decisions. The algorithm of the graph-analytical method of diagnostics for the reproduction of the trade enterprise's labor potential is shown on Fig. 5.

It is worth mentioning that the square of the labor potential reproduction has several specific theoretical aspects [109].

The shape of the square of the labor potential reproduction can be of two types.

The first type has the proper shape of a square (i.e., vectors, forming it, shall be even or approaching it) and, if as a result of the analysis, we will have a geometrical figure, visually close to a square, then the phases of the enterprise labor potential reproduction are balanced, while it presents the basis for success of the enterprise's activity. The second type has a curved shape of a square, and the reason for that can be dual: one of the vectors is more developed than the other one (sickly vector) or all the vectors are differently developed (vectors' misbalance). If an enterprise possesses the second type of a square shape, then the process of reproduction of its labor potential requires the urgent changes, while it will facilitate the improvement of the balanced state of all its phases (vectors).

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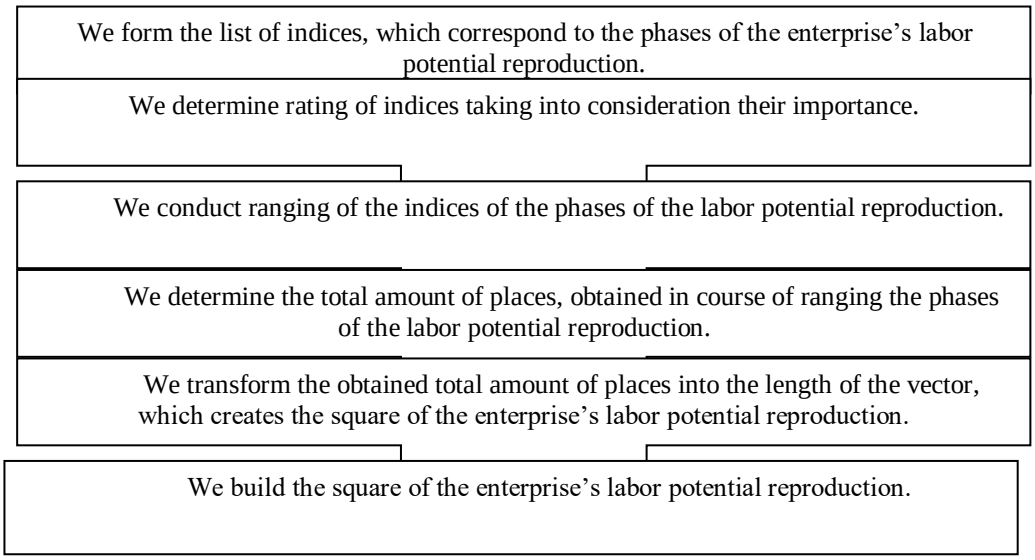
[108] O.S. Phedonin, Potential of enterprise: Formation and estimation: educational accessory / O.S. Phedonin, I.M. Riepina, O.I. Oleksiuk. – Kyiv, KNEU (Kyiv National Economic University), 2003. – p. 316.
[109] Blyzniuk, V. (2003). Ukraine Human capital as a factor of economic growth. Ukraine: aspects of labor, 6, 20-24 (in Ukr.).

Figure 5. The algorithm of the graph-analytical method of diagnosing the reproduction of the trade enterprise's labor potential.



Source: Proposed by the author.

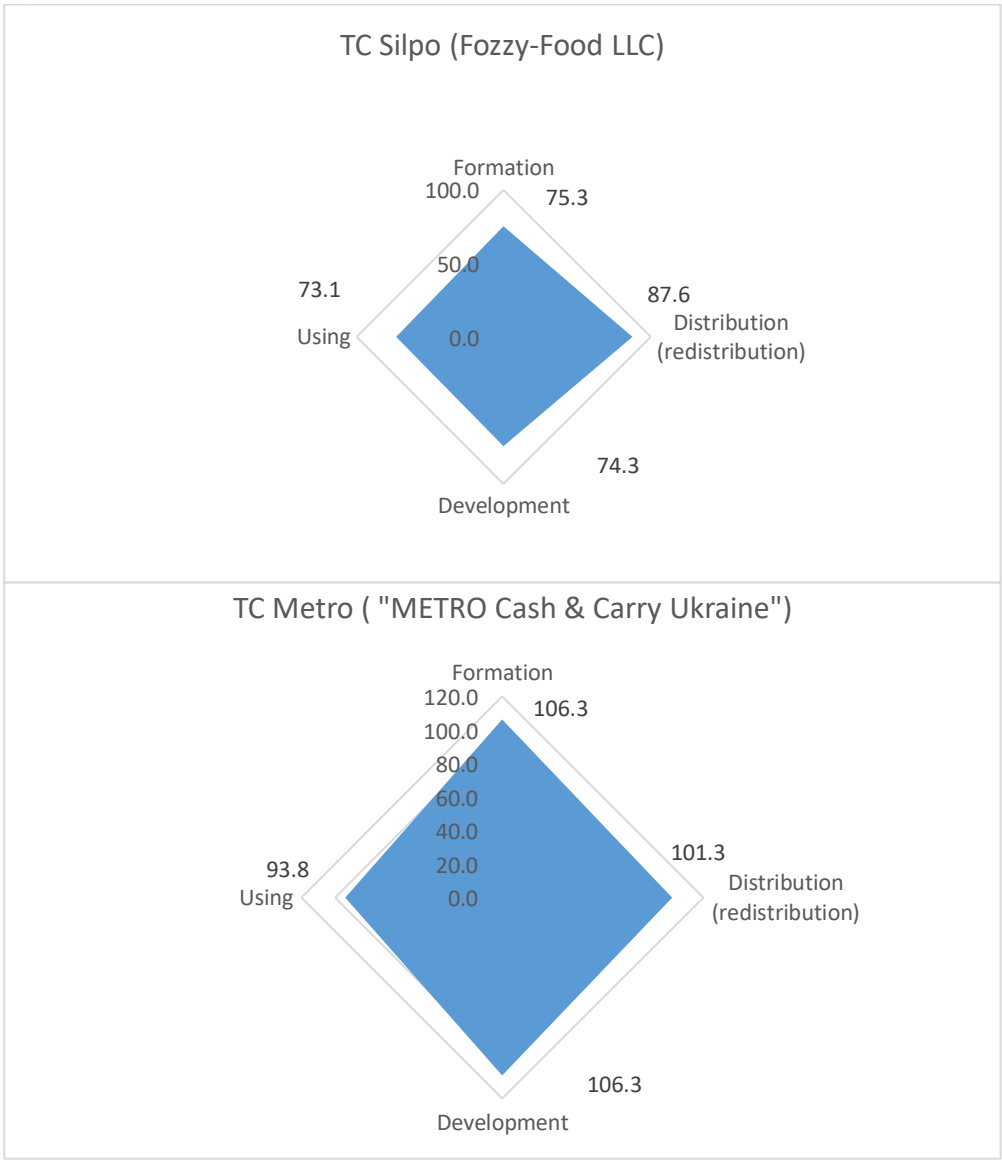
The reproduction of the enterprise's labor potential can be classified according to different levels: high, medium, low.

In the Fig. 6 there are presented the results of positioning the enterprises of the first group.

In general, building the squares of the labor potential reproduction allowed finding out that for all the trade enterprises under investigation the sickly vector is the one, which shows the level of using labor potential, while that is caused by an unsatisfactory policy of the material and moral stimulation of employees.

The subsequent stages for creating a strategy of the reproduction of the trade enterprises's labor potential are generating a chain of strategies, determining their peculiarities and selecting a strategy for each specific enterprise. Summarizing the available experience in the practice of the strategic management, there are distinguished three types of strategies for the enterprise's activity management – conservative, balanced and aggressive.

Figure 6. Positioning the trade enterprises with a high level of the labor potential reproduction.



Source: Proposed by the author.

The conclusion is made that for «METRO Cash & Carry Ukraine» Ltd. (TC «Metro») and «FOZZI-FOOD» Ltd. (TC «Silpo») (which take position with a high level of the labor potential reproduction and are recognized as leaders in their segments of the market) it is reasonable to apply the aggressive strategy of activity only in short-

term period with further transfer to the principles of a balanced strategy. For enterprises with a medium level of reproduction (PJSC «Furshet» (TC «Furshet»), TVK ((TPC) Trading-Production Company) «Lvivkholod» (Lvivcold) Ltd. (TC «Rukavychka»)) the priority strategy is a balanced one, while for the enterprise with a low level of the labor potential reproduction (PJSC «Retailing company «Evrotek» (TC «Arsen»)), it is worth applying the conservative strategy with the transfer to the balanced one.

Conclusions. The efficient labor potential management allows using (to a maximum extent) a labor resource – the basic factor of production, as far as it is formed from labor potential of a working team of employees and presents the aggregate of means of its realization (conditions of work and life, incomes and employment, a system of motivation and stimulation, a level of technical equipment of workplaces). As a result of analyzing the economic nature of labor potential and its reproduction cycle, it was determined that the reproduction of the trade enterprise's labor potential presents the continuous process of forming its quantitative and qualitative structural components (demographical, medical and biological, educational, organizational, economic, motivational, qualification, intellectual and innovation, cultural, labor and mobile), renewing capacities and abilities of personnel to work and perform the set tasks, securing in each next cycle the extended reproduction of working capacity, knowledge, skills, conscience and intellectual development.

As the main phases of the reproduction of the trade enterprise's labor potential there are determined the following phases: formation, distribution (redistribution), development and using.

Summarizing the analysis of the theoretical bases of the enterprise's management and labor economics, the components of strategic and tactical management of reproducing the labor potential of the retail trade enterprises are determined in the research. The objective of the analysis is to ensure the process of extended reproduction of labor potential by means of its qualitative formation, rational distribution (redistribution), balanced development and efficient reproduction. For this purpose, the corresponding mechanism, along with the aggregate of general and special functions, methods and means of management and the stages of policy implementation are used.

Part 3

SECTORAL TRANSFORMATIONS OF ENTITIES OF THE NATIONAL ECONOMIC SYSTEM

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GRAVITY MODEL OF TRANSPORT AND COMMUNICATION INFRASTRUCTURE INFLUENCE ON TRADE IN THE STEEL INDUSTRY

Abstract. *This research intends to examine whether transport and communication infrastructure affects countries' capabilities to enhance trade in steel and its articles. To estimate the impacts of the transport and communication infrastructure (quality of sea ports, Internet, mobile phones, and fixed-telephones on bilateral trade flows in the steel industry), the author applies various gravity model specifications, including those capturing multilateral resistance terms. Three different panels for total exports, exports of steel, and exports of articles of steel were analyzed over the period 2001-2012. The study reveals a positive influence of the quality of sea ports, Internet and mobile phones on exports of steel and its articles.*

JEL Classification System: F170, F 470, J280, L160, L610, L920, L960
Key words: transport and communication infrastructure, exports of steel**,** gravity model, quality of sea ports, Internet, mobile phones, fixed-telephones, trade in the steel industry.

Introduction. The advances in Information and Communication Technology (ICT) over the last 20 years, particularly proliferation of the Internet, fixed-telephones, and mobile phones, have significantly reshaped the way modern firms do their business. Transport infrastructure for trade was also considerably improved over the last years by building new sea ports, airports, highways etc. The economic literature suggests that both transport infrastructure and ICT could be potential trade-enablers, given their ability to reduce costs of search and communication between trade partners.

To empirically determine the impact of transport infrastructure and ICT on export flows, I apply several specifications of the gravity model. Similar to Baier and Bergstrand (2007) and Mattes et al. (2012), the estimation procedure includes both the traditional gravity model and one accounting for multilateral resistance. I choose to use fixed effects rather than random effects for panel estimations as proposed by Baier and Bergstrand (2007). The entry point to the econometric analysis is a log-linearized basic specification of the gravity equation:

$$\mathrm{Ln}\, T_{ijt} = \beta_0 + \beta_1 \ln (Y_{it} * Y_{jt}) + \beta_2 \ln D_{ij} + \beta_3 \boldsymbol{F_{i(j)}} + \beta_4 \boldsymbol{F_{it(jt)}} + \beta_5 \boldsymbol{F_{ij}} + \beta_6 \boldsymbol{F_{ijt}} + \varepsilon_{ijt} \quad (1)$$

where exports from country *i* to country *j* is denoted by T_{ij}, *Y* is a country's economic mass (GDP), *D* represents distance and may capture other trade costs, *t* is a time

subscript, ε_{ij} is a bilateral error term, and $\beta_1, \beta_2, \beta_3$ are unknown parameters. As Table 1 depicts, vectors $\boldsymbol{F_{i(j)}}$, $\boldsymbol{F_{it(jt)}}$, $\boldsymbol{F_{ij}}$, and $\boldsymbol{F_{ijt}}$ refer to the set of both dummy and individual or bilateral country characteristics that are ether time-variant ($\boldsymbol{F_{it}}$, $\boldsymbol{F_{jt}}$, and $\boldsymbol{F_{ijt}}$) or constant over time ($\boldsymbol{F_i}$, $\boldsymbol{F_j}$, and $\boldsymbol{F_{ij}}$). Notably, not all variables are included to estimate the basic gravity equation (Eq. 1).[110]

Table 1. Description of Factor Variables

Factor	Riables
$\boldsymbol{F_i, F_j}$	Landlockness
$\boldsymbol{F_{it}}$, $\boldsymbol{F_{jt}}$	Quality of port infrastructure, real effective exchange rate, tariffs, and WTO membership
$\boldsymbol{F_{ij}}$	Contiguity, common language, colonial ties, and experience of being the same country
$\boldsymbol{F_{ijt}}$	Mutual WTO membership, mutual participation in regional trade agreements or customs unions (RTA), and non-tariff measures (NTM)

Source: adapted by the author.

Theory suggests that common language, mutual RTA membership, and geographical adjacency are likely to increase bilateral trade (Mattes et al., 2012). Likewise, colonial ties and experience of being formerly the same country may predict higher volumes of bilateral trade (Yushkova, 2014).

The next specification endows Eq. 1 with a set of ICT variables as well as country-specific parameters Eq. (2):

$$\begin{aligned}\operatorname{Ln} T_{ijt} = {} & \beta_0 + \beta_1 \ln (Y_{it} * Y_{jt}) + \beta_2 \ln D_{ij} + \beta_3 \boldsymbol{F_{i(j)}} + \beta_4 \boldsymbol{F_{it(jt)}} + \beta_5 \boldsymbol{F_{ij}} \\ & + \beta_6 \boldsymbol{F_{ijt}} + \beta_7 \ln \boldsymbol{ICT_{it-1}} + \beta_8 \ln \boldsymbol{ICT_{jt-1}} + \beta_9 (\ln \boldsymbol{ICT_{it-1}} \\ & * \ln \boldsymbol{ICT_{jt-1}}) + \varepsilon_{ijt}\end{aligned}$$

Because the effect of ICT deployment at the firm level may not be realized instantaneously, ICT variables are lagged by one year. In this specification vectors $\ln \boldsymbol{ICT_{it-1}}$ and $\ln \boldsymbol{ICT_{jt-1}}$ refer to countries' ICT characteristics, namely proliferation of the Internet, mobile phones, and fixed landlines. This specification extends vectors $\boldsymbol{F_{i(j)}}$, $\boldsymbol{F_{it(jt)}}$, and $\boldsymbol{F_{ijt}}$ by adding dummies for WTO membership and landlockness, and numeric measures of quality of ports, real effective exchange rates (REER), bilateral tariffs, and cumulative number of non-tariff measures (NTM)

[110] To keep the specification as close as possible to the standard gravity equation, I include only the following variables from Table 5-1: contiguity, common language, colonial ties, experience of being formerly the same country, and RTA.

imposed against an exporter. The theory suggests that lower tariffs and fewer NTMs imply higher volumes of trade flows (Blonigen et al., 2013). Though, in the steel industry one may expect the problem of endogeneity as governments tend to address growing imports from major country-competitors by raising tariffs and imposing additional NTMs such as countervailing, antidumping and safeguard duties.

Having access to water transportation and better quality of ports are reported to have positive impacts on country's trade competitiveness (Schwab and Sala-i-Martín, 2013). Values of currency's real effective exchange rate (REER) above unity are likely to weaken a country's competitiveness on foreign markets and may cause a decrease in exports (Catão, 2012). Trade practitioners would also expect positive coefficients on WTO membership as that is reported to boost countries' trade performance.[111] According to Mattes et al. (2012), ICT network effects may enhance trade volumes "*when both countries have good ICT development.*" Therefore, to determine whether network effects are in place, I hereinafter supply Eq. 2 with an ICT interaction term $\ln \boldsymbol{ICT_{it-1}} * \ln \boldsymbol{ICT_{jt-1}}$.

Inclusion of multilateral resistance terms e_i and e_j transforms Eq. 2 into the following functional form:

$$\text{Ln}\, T_{ijt} = \beta_0 + \beta_1 \ln (Y_{it} * Y_{jt}) + \beta_2 \ln D_{ij} + \beta_3 \boldsymbol{F_{i(j)}} + \beta_4 \boldsymbol{F_{it(jt)}} + \beta_5 \boldsymbol{F_{ij}} + \beta_6 \boldsymbol{F_{ijt}} + \beta_7 \ln \boldsymbol{ICT_{it-1}} + \beta_8 \ln \boldsymbol{ICT_{jt-1}} + \beta_9 (\ln \boldsymbol{ICT_{it-1}} * \ln \boldsymbol{ICT_{jt-1}}) + e_i + e_j + \gamma_t + \varepsilon_{ijt} \quad (3)$$

Additionally, Eq. 6 contains a year dummy γ_t that captures year-specific unobserved characteristics. While inclusion of the individual country-specific terms may be a sufficient measure to control for multilateral resistance in a cross-section dataset, in the panel, one needs to account for time-varying country-specific characteristics (Baier and Bergstrand, 2007). For this purpose, Eq. 4 is augmented with the interaction variables of year and countries' fixed effects e_{it} and e_{jt}:

$$\text{Ln}\, T_{ijt} = \beta_0 + \beta_1 \ln D_{ij} + \beta_2 \boldsymbol{F_{ij}} + \beta_3 \boldsymbol{F_{ijt}} + \beta_4 (\ln \boldsymbol{ICT_{it-1}} * \ln \boldsymbol{ICT_{jt-1}}) + e_{it} + e_{jt} + \varepsilon_{ijt} \quad (4)$$

Noteworthy, variables that do not change over time or across all trade partners, such as GDP or country's quality of ports in a given year, will correlate with time-varying country fixed effects. Hence, these variables cannot be included into a model with multilateral resistance (Yushkova, 2014). The same condition applies to country specific ICT variables, therefore the impacts of ICT are only observed through ICT interaction variables.

[111] What we stand for, WTO; URL: http://wto.org/english/thewto_e/whatis_e/what_stand_for_e.htm

The concluding model (Eq. 5) is augmented with both bilateral[112] and country-and-time fixed effects to control for any country-pairs' unobserved characteristics in a given year. This specification allows inclusion of only interaction variables and those that vary with each trade partner over time.

$$\mathrm{Ln}\, T_{ijt} = \beta_0 + \beta_1 \boldsymbol{F_{ijt}} + \beta_2 (\ln \boldsymbol{ICT_{it-1}} * \ln \boldsymbol{ICT_{jt-1}}) + e_{it} + e_{jt} + e_{ij} + \varepsilon_{ijt} \quad (5)$$

Lastly, the estimation procedure for three different samples (hereinafter referred to as "total trade sample", "steel sample", and "articles of steel sample") starts with basic gravity equation and continues by adding various forms of fixed effects such as time, country, country-and-time, and country-pair effects. Specification (2-4) yield coefficients on both individual and interaction ICT variables, while (5-6) produce estimates only on countries' ICT interaction. The following chapter describes all the samples as well as variables and their data sources.

There are several issues that determine the estimation order and, thus, need to be clarified. First, to check the adequacy of the aforementioned model specifications, instead of steel exports I begin modeling with total exports as a dependent variable. This exercise permits (i) to find out whether obtained coefficients support theoretical findings; and (ii) to compare obtained coefficients with those of steel products later on. Second, due to the distinction between steel and articles of steel in the HS classifications[113] I estimate impacts of ICT on both "raw" and "processed" steel. This approach allows for finding differences in ICT impacts on both types of steel products.

Estimation of the impact of ICT in all samples is conducted using panel data over the period of 12 consecutive years (2001-2012). The number of exporting countries depends on which export flow is selected. For the sample with total exports there are 153 exporting countries; for the sample with exports of steel – 127 reporters; and for the sample with exports of articles of steel, the number of exporting countries is 128. Unavailability of historical data on ICT variables prior to 2000 hampers the extension of both the time period and country sample. Below I describe the dependent variable and independent variables as well as report their data sources.

Dependent variable – Exports. I obtain data not only for exports of steel but also for total exports. There are several possible sources for trade flows disaggregated by industry. Among them are UN Comtrade, OECD STAN Bilateral Trade Database, and the World Banks's Trade Analysis and Information System (TRAINS). Because OECD

[112] Bilateral fixed effect has the same value for both exports from country *i* to country *j* and exports from country *j* to country *i*, but only in a given year.
[113] The distinction is further explained in Chapter 6.

Database contains data on 30 non-OECD countries, with 64 reporters in total, I choose to use TRAINS which reports a broader set of countries using the UN Comtrade database. This source is also used to extract data on total exports. TRAINS reports export values in current U.S. dollars ($ 1,000). Notably, only positive export values are included in the datasets.

United Nations Statistical Commission (UNSD)[114] states that "*currently most data are reported to UNSD according to the HS classification, version 1996*." HS clearly distinguishes 2-digit codes for steel and products of steel; therefore I choose two aggregated categories: 72 – Iron and Steel and 73 – Articles of Iron and Steel.[115]

Following Baldwin and Taglioni (2006), De Benedictis and Taglioni (2011), UNCTAD (2012), and Shepherd (2013), I do not deflate trade flows but use their nominal values instead. These studies suggest that use of the U.S. price index to deflate trade values in pooled data may produce misleading results. These papers claim that time and country fixed effects should capture varying price terms. A similar approach is also applied towards data on GDPs.

ICT Variables. The economic literature suggests a number of options to proxy for ICT development. For example, Freund and Weinhold (2002, 2004) employ the number of Internet web-hosts registered in a country, which today may be replaced with more appropriate variables such as the number of fixed broadband subscriptions per 100 citizens. A cross-section model in Yushkova (2014) utilizes the extent of business Internet use reported by the World Economic Forum (WEF) reports. While Mattes et al. (2012) exploit a composite ICT Development Index (IDI) reported by the International Telecommunication Union (ITU), the studies by Thiemann et al. (2012) and Chung et al. (2013) choose disaggregated ICT variables such as Internet penetration and the number of mobile and landline connections. Below I analyze potential variables with the ultimate goal to use different kinds of ICT over the longest period and for as many countries as possible.

The Global Enabling Trade Report of the World Economic Forum attempts to measure "*the extent to which individual economies have developed institutions, policies, and services facilitating the free flow of goods over borders and to destination*" (Lawrence et al., 2012). The ICT variables listed in the report cover the Internet, mobile and landline connectivity. Accordingly, I choose to employ statistics on broadband Internet subscribers per 100 population, telephone lines per 100 population, and mobile telephone subscribers per 100 population. The advantage of using these three variables is the possibility to get separate estimates of their impact

[114] UNSD, Data Extract Service. URL: http://unstats.un.org/unsd/trade/dataextract/dataclass.htm
[115] Hereinafter I use terms "raw steel" and "processed steel" referring to 72 and 73 HS codes respectively.

on trade. Data on these variables are obtained from the ITU database for 220+ countries over the period of 2000-2012.

Because trade in steel is usually carried out in offices with fixed broadband connection, I refrain from using variables percentage of individuals using Internet and Internet users per 100 population that are also available at ITU database. These variables cannot represent a steel company's workplace as they may include those using free public Wi-Fi on mobile devices which is not typically used by a sales team. The data on Internet use by business are only available since 2005. In addition to the variables discussed above, the composite ICT Development Index (IDI) employed in Mattes et al. (2012) includes international Internet bandwidth, percentage of households with computer and Internet access, mobile broadband, and level of education and computer literacy. However, this index would not allow estimates on different ICTs but rather provide a single coefficient for ICT infrastructure. Another drawback of IDI is that the index is reported only for 2002, 2007-2008, and 2010-2012.

Transport infrastructure. The quality of port infrastructure is extracted from the WEF Global Competitiveness Report and "*measures business executives' perception of their country's port facilities*" (WDI, 2012). The variable's values lie on a scale between 1 (poor infrastructure) and 7 (very efficient). For landlocked countries, the variable shows how accessible are port facilities in neighboring countries. Values are ranged from 1 (extremely inaccessible) to 7 (highly accessible). In addition, using the CIA World Fact Book (CIA, 2014) I construct a dummy variable for landlocked countries which gets unity value when country has no access to ports and zero otherwise.

Country-specific and dummy variables. Most of the papers reviewed in the literature section employ GDP as a measurement of country's economic mass. The conventional source for data on GDP is the World Bank's World Development Indicators database (WDI). While some researchers also include population and GDP per capita variables as additional measurements of economic mass, I refrain from doing so. Due to the use of time-variant country fixed effects in some of the specifications, economic mass variables will eventually drop out. Instead, I include a set of variables of high importance to the steel trade such as quality of ports, tariffs, exchange rate volatility, and non-tariff measures.

The steel trade is subject to frequent trade disputes which entail changes in tariff rates and imposition of trade protection measures (Blonigen et al., 2013). Data on tariffs for both steel and articles of steel products come from the TRAINS database. I choose to use applied import-weighted tariff rates over simple average. While simple average gives the same values for all imported goods regardless how much

was imported, the use of the weighted average can partially fix this bias by accounting for the structure of imports (UNCTAD, 2012). Non-tariff measures (NTM) refer to a cumulative number of countervailing, antidumping, and safeguard duties imposed by an importer against an exporter. This variable aims to account for trade protection barriers as a form of both bilateral and multilateral resistance and is constructed by author using the WTO Integrated Trade Intelligence Portal (WTO, 2014). To handle the problem of zero-value observations in both tariffs and NTMs, I add unity to both variables which allows transforming larger amount of observations into the log-form.

As currency volatility may affect a country's trade performance, the real value of a country's currency must be accounted for. To retrieve data on real effective exchange rates (REER), I use a REER database for 178 countries maintained by Bruegel, a European think tank (Darvas, 2012). Data on participation in the free-trade agreements (FTA) is obtained from de Sousa, J. (2012), who maintains an RTA database for 199 countries over the period 1958-2014.

Finally, the CEPII gravity dataset of the French Research Center in International Economics (Head et al., 2010) serves as a primary source for the set of traditional dummy variables for common language, geographical border, colonial ties, and for the indicator reporting history of being the same country. Additionally, I use the CEPII distance database (Mayer and Zignago, 2011) to obtain bilateral distances. I also use data from the WTO web-site to assign a membership status to the countries included in the sample, including mutual WTO membership dummy.

Estimation results. Tables 1 and 2 below report regression outputs of the total trade sample, steel sample, and articles of steel respectively. In all tables, column (1) presents OLS results for the standard gravity specification with no ICT variables included (Eq. 1). Column (2) reports OLS estimation results for the model augmented with ICT variables and a set of dummies and country-specific variables (Eq. 2). Columns (3)-(4) include OLS regression estimates where year dummies and countries' individual fixed effects are included (Eq. 3). Column (5) presents results for the OLS specification with time-varying country fixed effects (Eq. 4). Lastly, column (6) reports OLS estimates for the model augmented with both bilateral and country-by-time fixed effects (Eq. 5).

Even though I discuss the results obtained in all six specifications across three samples, I typically interpret coefficients from the specifications that include all possible unobserved fixed effects (columns 4-6), unless otherwise stated. Because I employ log-liner models, all of the coefficients, with the exception of dummies, can easily be interpreted as a percentage change in respective export flow caused by percentage change in an independent variable. The results are laid out in the following order: I begin with traditional gravity parameters – economic mass and

distance, and then continue with country-specific and dummy variables; finally, I report the results on the impacts of three ICT variables, namely the Internet, mobile phones, and fixed-telephones.

Economic Mass and Distance. As expected, economy size of both trade partners predict higher volumes of trade in all samples. The obtained coefficients on countries' GDPs are traditionally close to unity across specifications (1-3), which implies that on average a 1 percent increase in the product of economic masses leads to a 1 percent increase in exports. Accordingly, one may assume that the volume of trade between the United Kingdom and France, which are comparable in terms of GDP, will be higher than that between France and Bulgaria. The coefficients on GDPs fall in all samples when time-variant country fixed effects are applied (column 4). For the total trade sample, log of GDP has coefficients between 0.6 and 1.07.

The steel sample yields coefficients on economic mass below unity, ranging between 0.67 and 0.87. GDP coefficients in the articles of steel sample vary from 0.74 to 1.03. I observe slightly higher impacts of GDP coefficients on steel exports as compared with total exports, and even higher magnitude of economic mass on exports of articles of steel. In Yushkova (2014), GDP coefficients also received higher values in high-tech, medium-low tech, and medium-low technology group, in which the steel industry falls, but not in low-technology group. It can be assumed, that countries with higher GDPs require more capital and intermediate goods, such as drilling pipe or railways, to cover their infrastructure needs. Also, larger economies on average have more diversified economies and thus export more complex goods rather than low-technology products, such as food or textiles (Hausmann and Hidalgo et al., 2011).[116] Distance remains a critical impediment for trade. In all samples, I observe statistically significant negative coefficients on distance close to traditional estimates of -1; which can be interpreted as 1 a percent decrease in exports, when distance between two countries rises by 1 percent.

Notably, inclusion of both ICT variables and especially various fixed effects makes distance coefficients rise, contrary to the findings of Lendle at al. (2011) who report that ICT reduces the effect of geographical distance. Though, similar effects of ICT on distance were also observed in Mattes et al. (2012). The results underline the importance of distance for trade and create room for discussion whether the effect of distance varies among countries with respect to the level of ICT development.

[116] See the rankings of economic complexity (Hausmann, 2011). Available at http://www.atlas.cid.harvard.edu/rankings/

Table 1: Regression Output – Steel

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Basic	+ICT	Yr FE	Cn&Yr FE	Cn*Yr FE	Pair&Cn*Yr FE
ln (GDP_exp*GDP_imp)	0.821*** (0.0159)	0.861*** (0.0191)	0.867*** (0.0193)	0.666*** (0.105)		
ln (Distance)	1.046*** (0.0580)	-1.144*** (0.0590)	-1.147*** (0.0590)	-1.706*** (0.0598)	-1.727*** (0.0267)	
ln (Internet, exp)		0.0185 (0.0309)	0.0291 (0.0365)	-0.0372 (0.0280)		
ln (Internet, imp)		0.0860*** (0.0290)	0.0851*** (0.0313)	0.00518 (0.0257)		
Internet interaction		**0.0180**** (0.00787)	**0.0279***** (0.00856)	**0.0204***** (0.00712)	**0.0326***** (0.00576)	-0.00924 (0.00685)
ln (Mobile phones, exp)		0.232 (0.226)	0.0481 (0.230)	**0.741***** (0.192)		
ln (Mobile phones, imp)		0.0735 (0.243)	-0.0956 (0.248)	**0.882***** (0.201)		
Mobile phones interaction		-0.0518 (0.0575)	0.0212 (0.0589)	-0.172*** (0.0478)	-0.158*** (0.0387)	-0.0551 (0.0456)
ln (Fixed phones, exp)		-0.637*** (0.109)	-0.613*** (0.109)	-0.716*** (0.148)		
ln (Fixed phones, imp)		-0.699*** (0.119)	-0.665*** (0.117)	-0.842*** (0.137)		
Fixed phones interaction		**0.189***** (0.0338)	**0.150***** (0.0356)	**0.227***** (0.0279)	**0.189***** (0.0210)	0.0861 (0.0686)
Contiguity	1.704*** (0.148)	1.312*** (0.155)	1.314*** (0.155)	0.823*** (0.158)	0.811*** (0.0729)	
Common language	-0.00773 (0.111)	-0.132 (0.110)	-0.135 (0.110)	0.294*** (0.100)	0.290*** (0.0489)	
Colonial ties	0.281* (0.170)	0.411** (0.168)	0.422** (0.167)	0.811*** (0.136)	0.825*** (0.0722)	
Same country	0.733*** (0.263)	0.596** (0.265)	0.616** (0.268)	0.934*** (0.254)	0.966*** (0.105)	
Regional trade agrmt	0.101 (0.110)	0.143 (0.110)	0.133 (0.109)	0.485*** (0.0880)	0.477*** (0.0449)	-0.00854 (0.0866)
Exchange rate (exp)		-2.777*** (0.267)	-2.720*** (0.268)	-1.179*** (0.228)		
WTO membership (exp)		-2.746*** (0.469)	-2.711*** (0.466)	-0.708* (0.382)		
WTO membership (imp)		-1.147** (0.481)	-1.169** (0.476)	-0.637* (0.385)		
WTO mutual membership		1.805*** (0.493)	1.774*** (0.489)	1.165*** (0.371)	1.104*** (0.306)	0.426 (0.481)
Landlockness (exp)		-0.00359 (0.105)	0.00209 (0.105)			

	(1)	(2)	(3)	(4)	(5)	(6)
Landlockness (imp)		-0.866***	-0.824***			
		(0.106)	(0.106)			
Non-tariff measures		0.699***	0.761***	0.291**	0.288**	0.326**
		(0.129)	(0.131)	(0.115)	(0.131)	(0.129)
Tariff rate (weighed)		0.197***	0.198***	-0.0723*		
		(0.0357)	(0.0361)	(0.0371)		
Quality of ports (exp)		-0.309**	-0.298**	0.594***		
		(0.145)	(0.149)	(0.183)		
Quality of ports (imp)		0.119	0.139	0.0465		
		(0.131)	(0.133)	(0.160)		
Constant	-26.96***	-11.24***	-11.31***	-13.28***	-74.69***	7.896***
	(0.844)	(1.862)	(1.928)	(4.367)	(13.88)	(1.311)
Observations	29,499	29,499	29,499	29,499	29,499	29,499
R-squared	0.307	0.351	0.354	0.595	0.628	0.818

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Sourse: compiled by the author

Table 2: Regression Output – Articles of Steel

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Basic	+ICT	Yr FE	Cn&Yr FE	Cn*Yr FE	Pair&Cn*Yr FE
ln (GDP_exp*GDP_imp)	1.025***	1.033***	1.034***	0.744***		
	(0.0116)	(0.0138)	(0.0138)	(0.0804)		
ln (Distance)	-.271***	-1.422***	-1.424***	-1.959***	-1.959***	
	(0.0409)	(0.0415)	(0.0412)	(0.0479)	(0.0217)	
ln (Internet, exp)		**0.198*** **	**0.304*** **	**0.0481** **		
		(0.0232)	(0.0267)	(0.0203)		
ln (Internet, imp)		-0.300***	-0.216***	0.0108		
		(0.0239)	(0.0258)	(0.0203)		
Internet interaction		**0.0480*** **	**0.0600*** **	**0.0366*** **	**0.0441*** **	**0.0144*** **
		(0.00579)	(0.00604)	(0.00572)	(0.00437)	(0.00545)
ln (Mobile phones, exp)		-0.154	-0.323*	**0.338** **		
		(0.179)	(0.182)	(0.167)		
ln (Mobile phones, imp)		**0.586*** **	**0.441** **	**0.566*** **		
		(0.195)	(0.199)	(0.172)		
Mobile phones interaction		-0.112**	-0.0149	-0.0875**	-0.0674**	0.0520
		(0.0449)	(0.0465)	(0.0411)	(0.0311)	(0.0372)
ln (Fixed phones, exp)		-0.0259	-0.171**	-0.275**		
		(0.0786)	(0.0799)	(0.111)		
ln (Fixed phones, imp)		-0.386***	-0.503***	-0.489***		
		(0.0891)	(0.0887)	(0.113)		
Fixed phones interaction		**0.0884*** **	0.0357	**0.0562** **	**0.0314** **	-0.0276
		(0.0244)	(0.0252)	(0.0226)	(0.0152)	(0.0498)
Contiguity	1.216***	1.084***	1.073***	0.641***	0.673***	

	(0.139)	(0.155)	(0.153)	(0.174)	(0.0649)	
Common language	0.696***	0.581***	0.604***	1.031***	1.022***	
	(0.0797)	(0.0835)	(0.0829)	(0.0865)	(0.0390)	
Colonial ties	0.267*	0.421***	0.422***	0.680***	0.681***	
	(0.141)	(0.149)	(0.146)	(0.140)	(0.0636)	
Same country	1.016***	1.134***	1.133***	1.073***	1.075***	
	(0.235)	(0.267)	(0.269)	(0.257)	0.673***	
Regional trade agrmt	0.297***	0.218***	0.190***	0.305***	0.309***	-0.0464
	(0.0725)	(0.0740)	(0.0734)	(0.0739)	(0.0365)	(0.0716)
Exchange rate (exp)		-2.248***	-1.912***	-0.947***		
		(0.210)	(0.206)	(0.173)		
WTO membership (exp)		-0.684	-0.820**	-2.316***		
		(0.424)	(0.416)	(0.434)		
WTO membership (imp)		-1.978***	-2.092***	-2.331***		
		(0.431)	(0.424)	(0.433)		
WTO mutual membership		1.928***	1.875***	2.132***	2.116***	0.131
		(0.444)	(0.437)	(0.431)	(0.222)	(0.416)
Landlockness (exp)		0.0247	0.0176			
		(0.0777)	(0.0765)			
Landlockness (imp)		-0.559***	-0.520***			
		(0.0800)	(0.0804)			
Non-tariff measures		0.618***	0.691***	0.375***	0.473***	-0.186**
		(0.102)	(0.102)	(0.0892)	(0.0654)	(0.0733)
Tariff rate (weighed)		0.00336	0.00400	-0.107***		
		(0.0346)	(0.0344)	(0.0382)		
Quality of ports (exp)		0.422***	0.335***	0.249*		
		(0.113)	(0.113)	(0.141)		
Quality of ports (imp)		0.485***	0.397***	0.0855		
		(0.104)	(0.105)	(0.112)		
Constant	-6.38***	-25.07***	-24.46***	-15.31***	-76.58***	1.380
	(0.614)	(1.518)	(1.548)	(3.410)	(12.53)	(1.009)
Observations	40,426	40,426	40,426	40,426	40,426	40,426
R-squared	0.436	0.506	0.511	0.692	0.709	0.855

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Sourse: compiled by the author

Country-specific and dummy variables. Some of the traditional dummy variables broadly used in gravity models, namely common border, colonial ties, and mutual experience of being the same country, receive positive coefficients in all specifications across three samples. When ICT variables are included (column 2), I clearly observe a decrease in contiguity coefficients in both steel samples as compared with a slight increase of those coefficients in the total trade sample. Overall, common border has a more significant impact on steel exports. When country-and-time effects are included (column 5), a change of contiguity dummy from

0 to 1 predicts an increase in exports by 29 percent for total exports, 96 percent for articles of steel, and 125 percent for steel. Besides possible similarities of technology standards in both neighboring countries, some features of the steel industry can help explain that difference in estimates. Because steel products are usually both heavy and massive, transportation requires having either direct access to ports or a developed system of railways. Bulk transportation by trucks or air is less efficient. The shortest destination for a steel exporter would be a neighboring country, which most likely has similar if not the same system of railroads.

Similar to contiguity, coefficients on colonial ties and mutual experience of being the same country suggest significant impacts on volume of trade. If two trade partners have ever been in colonial relationships, the volume of exports rises by 98-128 percent on average. Interestingly, today colonial relationship may take a reverse form: Indian Tata Steel owns assets of British Steel Corporation, the largest steel manufacturer in the United Kingdom. A dummy variable for being a single country in the past gets even higher estimates: on average, exports to a “sister” country rise by 163-165 percent. The highest value of 193 percent increase is obtained for exports of articles of steel. It might be assumed that those “sister” countries may have similar, if not identical, technology standards, systems of water supply, gas pipelines, railroads, bridges etc. Therefore, local consumers in a “sister” country tend to choose familiar products from familiar suppliers.

Coefficients on common language and mutual participation in FTAs are less consistent. Predictably, common official language has positive coefficients among all samples. Even though, coefficients on language turn out to be insignificant in specifications 1-3 of the steel sample, those get significant values of 0.29, when I include fixed effects. Overall, language appears to have a higher impact on total exports (0.89), and even larger impact on exports of articles of steel (1.02). Surprisingly, when both country-by-time and country pair fixed effects are applied (column 6), coefficients on mutual participation in FTAs turn negative (-0.11) in the total trade sample and insignificant in two steel samples. Though, specifications (1)-(5) range in impact of FTA between 0.19 and 0.66. Noteworthy, if total trade and the articles of steel samples contain only one insignificant coefficient, the raw steel sample yields insignificant FTA coefficients in four specifications out of six. To check whether multilateral trade unions have similar effect on exports, I further unfold the estimates on individual (both exporter’s and importer’s) and mutual membership in WTO.

Unexpectedly, individual participation in WTO of both exporter and importer receives negative estimates. When I include country and year dummies, WTO membership status predicts 39 percent fewer exports in the total trade sample, from 47 to 51 percent drop in trade value in raw steel, and around 90 percent fall in exports of processed steel. It can be assumed that the impact of individual WTO participation is partly captured in the mutual WTO membership dummy. Though,

when country-and-time dummies applied together with country pair fixed effects, coefficients on mutual WTO membership lose statistical significance in all samples.

I close up the discussion on dummy variables with the finding that landlockness has no particular impact on exporters in either steel sample. Though, it receives negative coefficients for importers (-0.82; -0.52). In total trade, change of this dummy from base value 0 to 1 leads to almost 14 percent lower value in total exports, and to 48 percent fall in total imports. In the real world, landlockness effect may be mitigated if a country has easy access to ports in neighboring countries. Good examples of that are Austria and Czech Republic, whose exports of steel and its articles in 2012 were higher in nominal values than of Romania and Bulgaria – countries with a coastline. It should be noted that many steel manufacturers are located not in a close proximity to water, therefore transportation of heavy steel products to ports might be carried out by railway or trucks. That is, mills often have to use at least two means of transportation to deliver their products regardless if a home country is landlocked or not.

Tariffs imposed by importers over the sample period were an import-barrier for both steel and its articles. Raising tariffs on HS72 code (steel) by 1 percent reduces volume of exports to importing countries by 0.07 percent on average. Exports of articles of steel shrinks even more – on average by 0.1 percent, when tariffs on HS73 code rose by 1 percent. Interestingly, in steel a cumulative number of NTMs imposed by importers received positive coefficients in all specifications. Column (6) finds that an increase in the number of NTMs leads to a higher volume of trade in steel by 0.33 percent. Notably, the largest amount of NTMs in the steel sample was imposed against China – 36, though Chinese exports continue to rise.

A positive value of the NTM coefficient in steel might be caused by reverse causality, that is, NTMs were imposed by importers that had recently faced dramatic increases of imports from a certain country. Recent examples include U.S. antidumping duties against Chinese steel producers and producers of oil country tubular goods from 9 developing countries.[117] Similarly, positive coefficients on NTMs are observed in articles of steel in columns (2)-(5), however in column (6) NTM coefficient turns negative (-0.19), which implies the presence of positive unobserved bilateral bias. That is, bilateral fixed effects may have accounted for unobserved factors, such as bilateral trade history or trade partner's exchange rates.

As expected, real effective exchange rates (REER) coefficients receive negative values, ranging from -0.43 to -2.77. The specification with country and year fixed effects suggest that 1 percent stronger currency causes a decrease in total exports by 0.43 percent on average. Meanwhile, the same move in currency leads to a 1.2

[117] US Trade Commission:
http://www.usitc.gov/trade_remedy/731_ad_701_cvd/investigations/2014/welded_stainless_steel_pressure_pipe_from_china/reviewphase.htm; or
http://www.usitc.gov/trade_remedy/731_ad_701_cvd/investigations/2013/octg/prelimphase.htm

percent drop in steel exports and 0.95 fall in those of articles of steel. Because those coefficients are higher in both steel samples as compared to total exports, it can be assumed that domestic steel manufacturers might be incentivized in making governments to keep their national currency weak rather than strong. One example from the real world supports this assumption: in the end of 2008, Ukraine's steel manufacturers saluted the devaluation of national currency Hryvnia by 80-90 percent, and as a result mitigated the effect of decreased demand in steel in 2009 and increased their competitiveness on the global market.

Transport infrastructure. Maritime transport is one of the major transportation tools for international shipments of steel and its articles. There are several reasons for that: (i) price of shipping by marine vessel per metric ton may be ten times cheaper as that by airfreight; (ii) marine transport has a comparative advantage against railway because railroads are limited by continent boundaries; and (iii) marine vessels can transport significant tonnage and by doing so increase returns to scale. To see whether quality of ports or ease of getting to the ports to landlocked countries has a significant effect on trade performance, I present estimation results on quality of ports infrastructure. In steel, quality of ports is only significant for exporters – a 10 percent increase in the ports index on average causes a 6 percent increase in steel exports. In articles of steel, the ports index improvement by 10 percent increases exports only by 2.5 percent. At the same time, an importer's quality of ports improvement of 10 percent predicts 0.9 percent higher imports of articles of steel. Thus, the importance of quality of ports for exporters is confirmed in both steel samples. Indeed, ports infrastructure basically determines how accessible ports are for other transportation means, how advanced storage yards are, whether cranes prevent cargo damages, and eventually how fast cargo will be loaded on board and shipped to customers.

Internet. The number of fixed broadband subscriptions appears to be positively significant for exporters in all specifications in total trade and articles of steel samples. The coefficients on the Internet variable lie between 0.05 and 0.3. On average a 10 percent increase in the number of fixed broadband subscriptions in the exporting country leads to a 0.68 percent increase in total exports and 0.48 percent rise in exports of articles of steel, respectively. The same variable happened to have no effect on imports, giving significant estimates only in basic specifications.

Meanwhile, neither specification yields significant results for the exports of raw steel. There are several possible explanations to why the Internet has no impact on trade in raw steel. First, technological advancements in the industry are somewhat slow, that is, mills can successfully work using technological inventions of the early 20th century. Supposedly, those firms who have cheaper raw materials or low labor cost, not high Internet proliferation, get competitive advantage. Second, products like slabs, billets, ingots, and flat-rolled coils are rather homogenous and often used for further processing. Thus, quality control can supposedly be performed without having extensive information technology software as compared with drilling pipes for

hydraulic fracking. Third, these products not only can be purchased from mills, but also on open exchanges,[118] which implies that the path from mill to customer may involve resellers in other countries and the use of transfer pricing schemes.

The most consistent positive effect of the Internet interaction variables of both exporter and importer in all six specifications is observed in articles of steel, confirming the hypothesis of positive influence of ICT network effects on trade (Mattes et al., 2012). The specification with a country-pair and time-varying effects implies that a 10 percent increase in the Internet interaction variable predicts 0.14 percent higher exports of articles of steel. In steel, coefficients on the same interaction variable receive positive values in columns (2)-(5). Though, in the last specification (column 6) the Internet interaction loses its significance, which implies the presence of negative unobserved bilateral bias. That is, bilateral fixed effects may have caught unobserved bilateral factors, such as long-lasting contract relationships, supply chains within multinational steel companies, or transportation costs from country *i* to country *j*. A slightly lower coefficient on the Internet interaction is reported in total trade sample: its 10 percent increase leads to 0.06 percent higher volume of exports. Noteworthy, in total trade the Internet interaction variable becomes positive only in the last specification, when country-pair effects are included. Thus, the results demonstrate more significant impacts of Internet network effects on articles of steel rather than on total trade, and no particular effect on exports of raw steel.

As Mattes et al. (2012) point out, in the presence of interaction terms, marginal effects of the term's components need to be duly calculated. The marginal effect of the exporter's Internet variable must be evaluated as $\beta_7 + \beta_9 * \ln Internet_j$ (from Eq. 5). The obtained coefficient, thus, reports "*the effect of exporting country i's ICT level on its exports for given levels of destination country j's ICT endowment*" (Mattes et al., 2012). Calculation of marginal effects gives some insight. The coefficient remains almost the same for the exporter's Internet endowment (0.066) in total trade. Coefficients in steel as reported earlier continue being insignificant. In articles of steel, the marginal effect of the Internet variable for the exporter rises to 0.08 as compared to previous coefficient's value of 0.05. Moreover, the marginal effect of the Internet for the importer is positive at 0.06.

Mobile phones. Increases in the number of mobile phone connections, which serves as proxy for mobile connectivity, positively affect exports capabilities of steel exporters. Notably, the estimates in steel are almost twice as high as those in articles of steel. On average a 10 percent increase in mobile usage in the exporting country leads to 7.4 percent more exports of raw steel and a 3.4 percent increase in exports of steel articles. Positive coefficients on mobile phone proliferation are also observed for

[118] Steel billet futures are traded on the London Metal Exchange, hot rolled coil futures – on the New York Mercantile Exchange (NYMEX), and rebar and wire rod futures on Shanghai Futures Exchange. Source: The Platts Steel Futures Guide, https://www.steelbb.com/steelfutures/

importing countries. Again, higher values are reported in raw steel. A 10 percent increase in mobile phone use implies 8.9 percent higher imports of steel and a 5.7 increase in consumption of articles of steel. Mobile phone variables appear to be insignificant in total trade, when country and time effects are applied.

Unlike the Internet, network effects are not observed for the use of mobile phones when country-pair and time-varying fixed effects are included. Specifications yield somewhat mixed results with coefficients varying from -0.17 to 0.09. This might be explained by the high cost of international calls and that one would rather call to an office landline phone or would use Internet-supported applications such as Skype or a corporate Voice over Internet Protocol network.

Fixed phones. The number of fixed landline phones has negative coefficients in both steel samples and no particular impacts on total exports. However, it does not necessarily mean that higher level of fixed-telephone subscriptions reduces trade due to the presence of the interaction variable. While landline marginal effects were expected to be insignificant in the total trade sample, those turn insignificant in the steel sample. The only significant value of landline marginal effects is obtained for importers of articles of steel. Accordingly, marginal effects for importers receive a value of -0.31, somewhat lower than the ordinary importer's coefficient of -0.5.

It can be inferred that fixed phones do not play a critical role in trade anymore, and have eventually been replaced by other communication channels such as emails, mobile connectivity, and Internet-based voice applications. Even fax machines got their Internet-based software substitutes. Though, landlines are still in use by businesses and primarily serve their domestic needs and often are used in combination with email communication.

Conclusions. The empirical analysis has found that the Internet penetration high quality of port infrastructure positively affects countries' capabilities to export articles of steel: a 10 percent increase in the number of fixed broadband subscriptions would lead to about a 0.48 percent growth in exports. Furthermore, the Internet network effects are observed in articles of steel, that is, one would expect higher volumes of trade if both partners are Internet advanced. Mobile phones also appeared to have positive influence on export performance. Accordingly, a 10 percent increase in mobile usage in exporting country would lead to approximately a 7.4 percent rise in steel exports and to about a 3.4 percent growth in exports of steel articles. The results on fixed-telephone use did not confirm the importance of landlines on exports of neither steel nor its articles. Quality of ports received positive coefficients and thus enhances export performance.

The results confirm that volume of exports is proportional to the product of their GDPs and inversely proportional to bilateral distances. Common border, colonial ties, common language, and experience of being the same country received positive coefficients in all samples. Raising tariffs on both steel and its articles predictably received negative coefficients, which is consistent with the theory and practice. The

effectiveness in reducing imports by non-tariff measures was detected only in articles of steel.

Potential avenue for further research may include employing firm-level data to examine whether the impacts of transport infrastructure and ICTs vary among individual firms different in size, revenue, location of assets etc.

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METHODOLOGICAL TOOLS OF EVALUATING FACTORS THAT INFLUENCE INNOVATIVE DEVELOPMENT OF COMPANIES

Abstract. *The research is devoted to the development of methodological tools to evaluate factors that influence innovative development of construction companies. It was proven that innovative development lays the foundations for establishing and strengthening competitive advantages of a company. That is why innovative development of construction companies in Ukraine is crucial for the improvement of public support, which should be aimed at creation of the positive innovation climate, given the high risk of innovative activities of construction companies. In this research, the factors that have an impact on innovative development of construction companies were identified. The classification of factors that influence innovative development was obtained by a multi-criteria classification with splitting into blocks that provide the decomposition of the aggregate of all factors by different signs. The approaches to identify and methods to evaluate the factors that influence innovative development of construction companies were selected. The sequence to evaluate the factors that have an impact on innovative development of construction companies was given.*

JEL Classification System: O12, O31, O32.
Key words: Ukraine, constructions, innovation, innovative development, impact factor, classification

Introduction. In the context of European integration of the Ukrainian national economy and increased global competition, the attention of many domestic and foreign scientists is focused on the issues of the company's innovative development that lays the foundations for establishing and strengthening its competitive advantage. At the same time, it cannot be claimed that the problem of ensuring an adequate level of the innovation development and management of a construction company is studied in full, especially in the volatile internal and external environment.

The issues of the methodological tools development to evaluate factors that influence innovative development of companies in the construction sector still require particular attention in the research system. The abovementioned issue is of particular

relevance in view of the fact that construction is one of the sectors that are most sensitive to any changes in the turbulent environment.

It should be noted that scientific works by J. Schumpeter, C. Freeman, and B. Lundvall are devoted to the basics of innovative development of society. In addition, a significant contribution to the research into innovative development has been made by such foreign scholars as A. Barker, W. Granstrend, M. Grunwald, L. Gohberg, J. Kornai, K.M. Christensen, G. Mensh, A. Marshall, K. Perez, M. Porter, V.P. Soloviev, F. Malherbe, R. Nelson, E.J. Fern and others [119, 120].

Y. Yepifanova, M. Tyutyunnyk, T. Pozhuyeva, K. Samsonova, H. Klimova, K. Boyko and others should be mentioned among Ukrainian scientists, whose papers are devoted to this topic [121].

Based on researches and consolidation of works of the previously mentioned scholars, we can conclude that the applied aspects of identification and evaluation of factors that have an impact on innovative development of construction companies require a more thorough examination. This is due, primarily, to the need for reducing costs by construction companies associated with the collection and submission of information on identifying the most significant factors that influence innovative development of construction companies and its results, as well as, its systematization and generalization.

With this in mind, the topic of the research devoted to the development of methodological tools to evaluate factors that influence innovative development of construction companies becomes particularly relevant.

The main tasks performed during the research are as follows: the identification of factors that influence innovative development of construction companies; the selection of approaches to identify factors that have an impact on innovative development of construction companies; the selection of methods to evaluate factors that affect innovative development of construction companies; the formation of the sequence to evaluate factors that influence innovative development of construction companies.

Carrying out the set tasks enables us to form methodological tools that can be used for a thorough and comprehensive evaluation of factors that influence innovative development of construction companies. Thus, an important aspect, which should be given more attention, is consideration of the specific operation of construction companies in the course of such evaluation.

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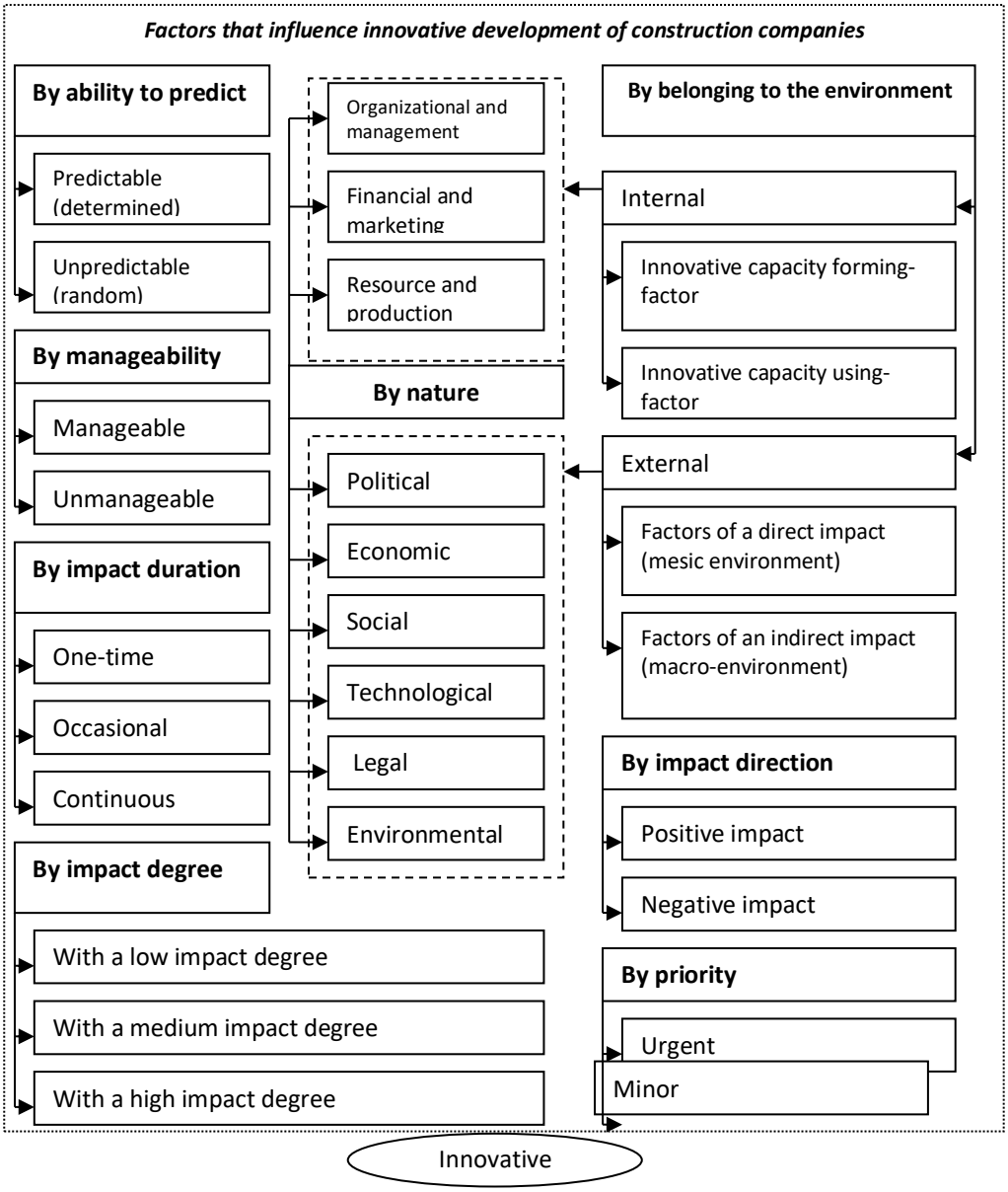
119 Shumpeter, Y. (1982) Theory of Economic Development. Moscow: Progress.

120 Adamanova, Z.O. (2006) Innovative factors of economic development in the context of globalization. Synopsis of doctoral thesis according to speciality 08.05.01 – World household and international economic relationships. Kiev: KNEU, 29 p.

121 Adamenko, O. A. (2010) Conceptual bases of innovative development of enterprises. Proceedings of the National University of Food Technologies, 35, 5-10.

Figure 1. The classification of factors that influence innovative development



Source: compiled by the authors based on source [122], [123]

[122] Mykytyuka, P. P. (2015) Innovative development of a company. Ternopil' : PE "Printer Inform"
[123] Khobta, V.M., Lavryk, U.V., Popova, O.Yu. & Shylova, O.Yu. (2009) Mechanisms for ensuring development of an enterprise: an ecological and economic aspect]. Donetsk: P.P. Chernets'ka N.A.

The innovative development of construction companies means changes in the functioning of a company, the content of which is using the latest achievements of science and technology, leading-edge practices, providing better satisfaction of the needs of those interested in its development without an increase in the required resources, in construction operations.

Moreover, it is also necessary to consider many factors that promote or hinder innovative development of construction companies under current conditions [124]. The study of the scholars' approaches allowed us to systematise the existing features of the classification of factors influencing innovative development of construction companies (Figure 1).

The classification of factors that affect innovative development is obtained by a multi-criteria classification with splitting into blocks that provide the decomposition of the aggregate of all factors by different signs. Systematization and classification of impact factors are linked primarily to their statistical feasibility [125]. It is advisable to split factors into blocks of attribute characteristics due to the large number of factors that influence innovative development. Eight groups of factor characteristics were selected and formed based on this principle and consolidation of the studied material: by ability to predict, by manageability, by impact duration, by impact degree, by impact nature, by impact direction, by consideration priority and by belonging to the environment.

In this case, unlike existing classifications, we suggest considering internal factors based on their belonging to the environment by groups of formation and use of innovative capacity.

The implementation of priorities of the construction company's innovative development is carried out, in our opinion, mainly, due to the development and use of innovative capacity and timely adaptation to the impact of environmental factors. Thus, there is a need for the identification of internal (related to the formation and use of innovative capacity) and external (generated by the environment of construction companies) factors.

The methodological tools to evaluate impact factors enable us to analyse the information on the environment by different sources of origin [126].

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124 Pidkaminnyy, I.M. & Tsipurynda, V.S. (2011) Systemic factors influencing the innovative development of an enterprise. Efficient economy: electronic specialized edition, 3, Retrieved from: http://nbuv.gov.ua/UJRN/efek_2011_3_4

125 Rohoza, M.Ye. & Verhal, K.Yu. (2011) Strategic development of innovative companies: models and mechanisms. Poltava : RVV PUET

126 Drin', O.Ya. (2015) Methodological tools and practical aspects of assessing the environment instability of enterprises in Ukraine. Economic bulletin of NTUU «KPI», 12, 1-16.

A construction company is an open system, and all processes that occur in this system are exposed to the environment. This applies to the process of innovative development of a construction company based on the formation and use of its innovative capacity. For this reason, a special requirement is the consideration of the impact of factors of both the internal and external environment on innovative development of a construction company.

Obtaining a wide array of information regarding the internal and external environment of innovative development of construction companies requires using different methods and analysis. We have developed a sequence of evaluation of factors that affect innovative development of construction companies within the methodological tools (Figure 2).

The internal environment of innovative development of construction companies as a combination of factors of the formation and use of innovative capacity requires a detailed evaluation by the following characteristics (Figure 3).

After the identification of internal factors that influence innovative development, the indicators of development and use of innovative capacity should be calculated:

1. The innovative capacity formation indicator:

$$IF_i(t) = \frac{\sum_{k=1}^{13} FS_{ki}(t)}{13}, \quad (1)$$

Where $IF_i(t)$ shall mean an indicator of the innovative capacity formation for the ith company for the t period;

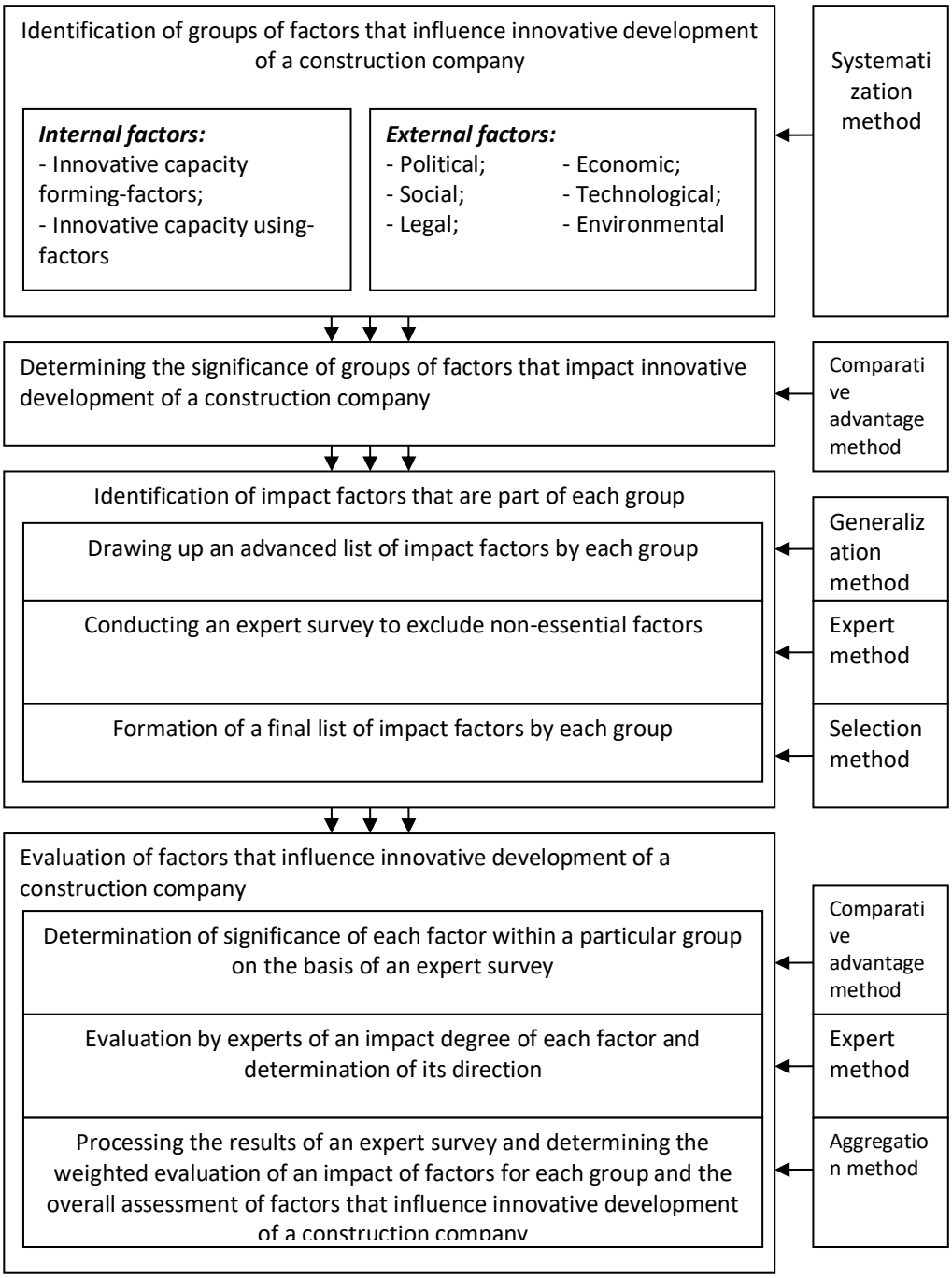
$FS_{ki}(t)$ shall mean a standardized value of the kth indicator by a criterion of the innovative capacity formation for the ith company for the t period.

$$FS_{ki}(t) = \frac{F_{ki}(t) - F_{k\min}}{F_{k\max} - F_{k\min}}, \quad (2)$$

Where $F_{ki}(t)$ shall mean a value of the kth indicator by a criterion of the innovative capacity formation for the ith company for the t period;

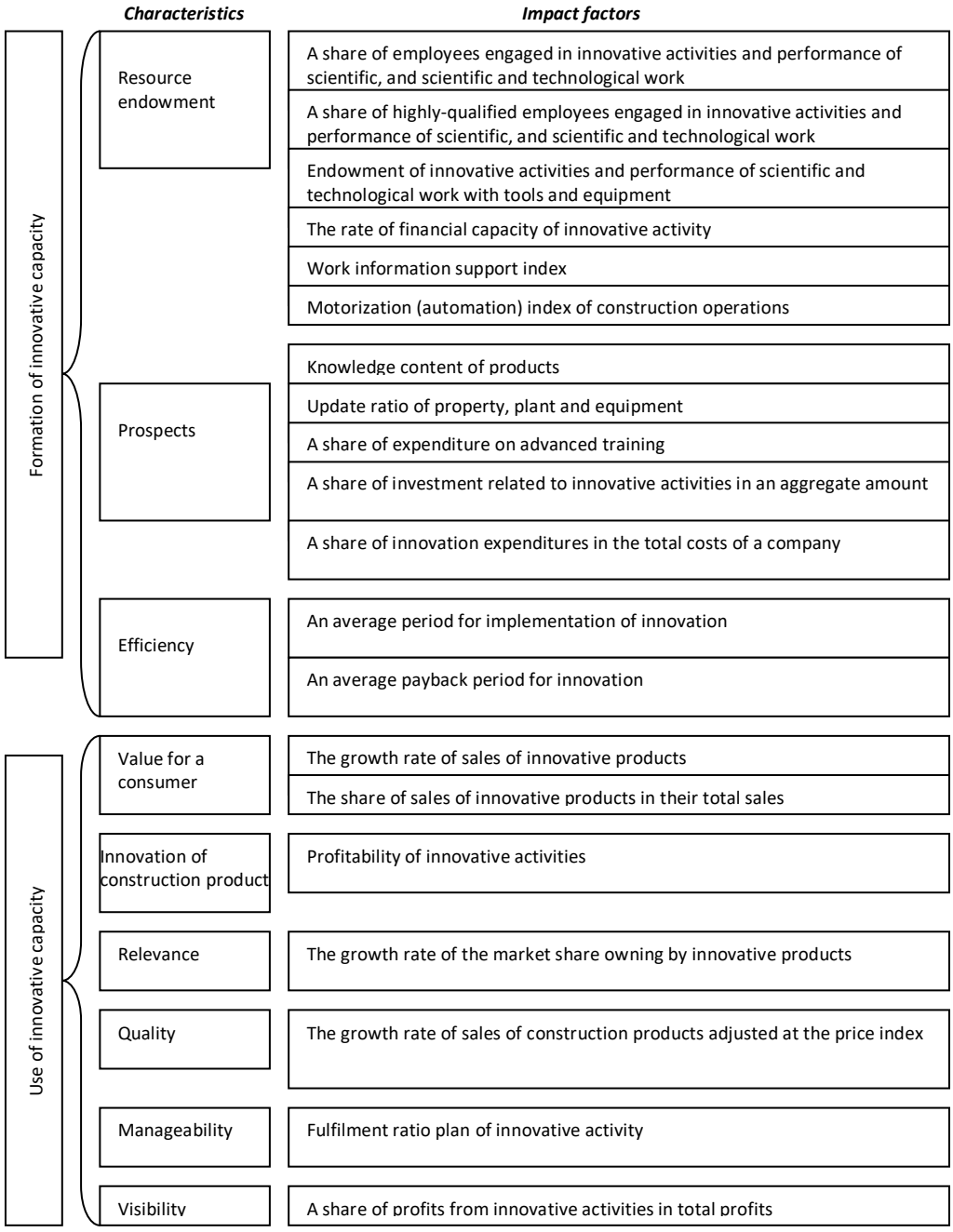
$F_{k\max}$ and $F_{k\min}$ shall mean a maximum and minimum value of the kth indicator by a criterion of the innovative capacity formation for the totality of the companies under research for last five years

Figure 2. The sequence and methods for evaluating factors that influence innovative development



Source: compiled by the authors.

Figure 3. The compliance of the internal impact factors with the characteristics of innovative development of a construction company



Source: developed by the authors.

1. The innovative capacity use indicator:

$$IU_i(t) = \frac{\sum_{l=1}^{7} FU_{li}(t)}{7}, \quad (3)$$

Where $IU_i(t)$ shall mean an indicator of the innovative capacity use for the i[th] company for the t period;

$FU_{li}(t)$ shall mean a standardized value of the l[th] indicator by a criterion of the innovative capacity use for the i[th] company for the t period.

$$FU_{li}(t) = \frac{F_{li}(t) - F_{l\min}}{F_{l\max} - F_{l\min}}, \quad (4)$$

Where $F_{li}(t)$ shall mean a value of the l[th] indicator by a criterion of the innovative capacity use for the i[th] company for a t period;

$F_{l\max}$ and $F_{l\min}$ shall mean a maximum and minimum value of the l[th] indicator by a criterion of the innovative capacity use for the totality of the companies under research for last five years.

The next step is to evaluate external factors that influence innovative development of construction companies. There are various approaches to identify the impact of the company environmental factors on its performance in general and on its innovative development in particular. An approach to identify environmental factors proposed by Robert Duncan [127] is worth sharing. A two-dimensional environmental model that includes two substantial components, i.e., a degree of number and similarity of environmental factors is built in this approach. A "simple" environment is characterized by a small number of similar instability factors, while a "complex" environment is characterized by many various factors.

Under current conditions, the PEST analysis and its modifications (SLEPT analysis, PESTLE analysis and STEEPLE analysis) are often used in the process of a strategic analysis.

The most common and simplest method for analysing the impact of environmental factors on the activities of a company is the PEST analysis, which is a strategic analysis of political (P – political), economic (E – economic), social (S – social) and technological (T – technological) factors of the company environment. The results of the PEST analysis allow us to evaluate an external political, economic, social and technological situation that has emerged and predict its impact on the industrial and

[127] Dunkan, R. (1972) Perceived environmental characteristics of operational environments and perceived environmental uncertainty. Administrative Science Quarterly, 17(2), 313–327

commercial activities of a company. It should be noted that one of the disadvantages of this type of analysis is a limited number of groups of factors that are subject to a detailed analysis. This has led to the emergence of all the varieties of the PEST analysis.

One of such modifications is the SLEPT analysis, which includes another group of environmental factors to be analysed in detail, namely, legal factors (L – Legal). This type of analysis is appropriate to be applied to companies that feel a high level of government regulation, and therefore the performance of which largely depends on changes in legal aspects of their operations. Given the fact that construction is an activity with a high level of legal regulation, legal factors shall be taken into account while conducting the analysis of the environment and its impact on innovative development of construction companies. However, it should be noted that a list of groups of factors that are analysed within the SLEPT analysis is not exhaustive, since it does not include such a significant group of factors as environmental.

This shortcoming has led to the emergence of the PESTLE-analysis, which is extended by two groups of factors, such as legal (L – Legal) and environmental (E – Environmental) factors, being a version of the PEST analysis. Considering that one of the priorities of the national economy of modern Ukraine as a whole and in its individual branches draws attention to the environmental protection and we believe that environmental factors should be necessarily analysed in the research of the impact of environmental factors on innovative development of construction companies.

Having studied various modifications of the PEST analysis, we should conclude that it is advisable for construction companies to use the PESTLE analysis, which takes into account besides political (P – political), economic (E – economic), social (S – social) and technological (T – technological) factors of the company environment, further legal (L – Legal) and environmental (E – Environmental) factors, an analysis of which is critical for innovative development of construction companies.

It has been suggested conducting an analysis of the impact of external factors on innovative development of construction companies in several stages:

- at the first stage, an expert group was provided with an advanced list of factors that make up each of the six groups of environmental factors and asked to exclude those factors that according to the experts' opinion do not have a significant impact on innovative development of construction companies from the list.

According to a survey of experts based on the questionnaires developed by us, it was established that the list of political factors, which have a significant impact on innovative development included five factors: the state regulation of competition; the severity of state control over the activities of construction companies; state

programmes in the field of construction and implementation of innovation; the property protection system; the stability of a political situation.

The list of economic factors, which have a significant impact on innovative development, included seven factors: the inflation rate; the investment climate; the problems in the taxation area; growth rates of the construction market; effective demand of the population; interest rates for capital; the average wage in construction.

The list of social factors, which have a significant impact on innovative development, included six factors: the innovation culture of the society; the level of education of the population; an unemployment rate; living standards; an age structure of the population; the level of economic activities of the population.

The list of technological factors, which have a significant impact on innovative development, included seven factors: the development of new technologies in construction; the level of R&D development; the society adaptation rate to new technologies; the level of equipment in construction; consumer demands for innovation in construction; the need for obtaining the titles of protection; the technology transfer.

The list of environmental factors, which have a significant impact on innovative development, included six factors: environmental friendliness of innovative technologies used in construction; environmental friendliness of building materials; natural landscape; access to environmentally friendly natural objects; the availability and value of green spaces; the possibility of resource recovery.

The list of regulatory factors, which have a significant impact on innovative development, included six factors: the land law; changes of legislation in the innovative sphere; changes of legislation in the construction and investment sphere; environmental regulations and their rigidity; the Housing Code and changes thereto; the real estate law and changes thereto.

At the second stage, the experts received the questionnaire, which contained the final list of factors by groups to be evaluated. The experts were asked to evaluate the significance of each factor group and each factor within a particular group, to determine the factor direction and to evaluate the degree of its impact. The significance of each factor group and each factor within a particular group was identified on the basis of scores given by the experts.

According to the experts, the most important, in terms of the impact on innovative development, are technological factors. This is logical, because the formation and use of innovative capacity in a single company depends largely on the level of innovative activities in the economy as a whole, the development of new technologies, and their perception by the society and so on. At the same time, current

realities bring such a group of factors as economic – the significance ratio of this factor group was 0.211 according to the experts – to the forefront. Slightly lower is the significance of environmental, regulatory and social groups of factors (0.164; 0.151 and 0.141, respectively). The least significant group was the group of political factors (0.117), as recognized by the experts.

The most significant political factor that affects innovative development of construction companies is state programmes in the field of construction and innovation (the significance ratio within the group is 0.369). The second place is occupied by the stability of the political situation (0.200), and the third one is occupied by the property protection system (0.164). The significance ratio within a group of political factors, such as government regulation of competition and severity of state control over the activities of construction companies constitutes 0.149 and 0.118 respectively.

The most significant economic factors, in terms of innovative development of construction companies, include the investment climate and growth rates of the construction market (the significance ratios within the group are 0.206 and 0.195). Somewhat lower is the significance of effective demand, amounting to 0.172. The significance ratios within a group of economic factors, such as interest rates for capital and the inflation rate are on the same level and represent 0.150. The least significant economic factor, according to the experts, is the level of the average wages in construction (0.127).

The most significant social factors that influence innovative development of construction companies include the innovative culture of the society and the level of education of the population (the significance ratios within the group are 0.240 and 0.204). Somewhat lower is the significance of such a factor as living standards, amounting to 0.167. The significance ratios within a group of social factors, such as the level of economic activities of the population and an unemployment rate are on the same level and represent 0.139. The least significant social factor, according to the experts, is an age structure of the population (0.111).

The most significant technological factors that influence innovative development of construction companies include the development of new technologies in construction, consumer demands for innovation in construction and the level of R&D development (the significance ratios within the group are 0.199; 0.159 and 0.149 respectively). Somewhat lower is the significance of such factors as the level of equipment in construction (0.139), the technology transfer (0.124), and the society adaptation rate to new technologies (0.119). The least significant technological factor, according to the experts, is the need for obtaining the titles of protection (0.111).

The most significant environmental factors that affect innovative development of construction companies include environmental friendliness of technologies and materials used in construction (the significance ratios within the group are 0.206 and 0.186). Somewhat lower is the significance of such factors as the possibility of resource recovery (0.175), access to environmentally friendly natural objects (0.165), the availability and value of green spaces (0.144). The least significant environmental factor, according to the experts, is natural landscape (0.124).

The most significant regulatory factors that influence innovative development of construction companies include changes of legislation in the innovative sphere and changes of legislation in the construction and investment sphere (the significance ratios within the group are 0.212 and 0.191). Somewhat lower is the significance of such factors as the land law (0.169), environmental regulations and their rigidity (0.159), the real estate law and changes thereto (0.142). The least significant regulatory factor, according to the experts, is the Housing Code and changes thereto (0.127).

The experts were offered to evaluate the degree of impact of a particular factor on the following scale:

0 points – No impact on innovative development of construction companies;

1 point – A low degree of impact on innovative development of construction companies;

2 points – A medium degree of impact on innovative development of construction companies;

3 points – A high degree of impact on innovative development of construction companies.

We suggest interpreting the impact power index using the scale of desirability, whereby the values of the index of 0 to 0.2 indicate a very small impact on innovative capacity; 0.2 to 0.37 indicate a small impact; 0.37 to 0.63 indicate an average impact; 0.63 to 0.8 indicate a big impact, 0.8 to 1 indicate a very big impact of a factor.

In addition to an evaluation of the impact power, the experts determined also its direction: a positive impact (+1) or a negative impact (-1).

As Table 1 shows, the experts noted positively a slight positive shift in the field of the state regulation of competition. According to their estimates, this factor had a positive, albeit very small impact on innovative development (directional impact power is 0.167). The impact on innovative development of construction companies made by state programs in the field of construction and implementation of innovation was positive but small (0.267). Other political factors had a negative impact on innovative development of construction companies, its formation and use.

The evaluation results of the impact of political factors are given in Table 1.

Table 1. The evaluation results of the impact of political factors on innovative development of construction companies

Factor	Average score of the impact degree	Impact power (as per Column 2/3 points)	Direction impact ratio	Directional impact power (as per Column 3 * Column 4)	Significance ratio within a group	Significance ratio adjusted to the group significance (as per Column 6 * 0.117)	Weighted evaluation (as per Column 5 * Column 7)
1	2	3	4	5	6	7	8
State regulation of competition	0.5	0.167	1	0.167	0.149	0.017	0.003
Severity of state control over the activities of construction companies	1.4	0.467	-1	-0.467	0.118	0.014	-0.006
State programmes in the field of construction and implementation of innovation	0.8	0.267	1	0.267	0.369	0.043	0.012
Property protection system	1.6	0.533	-1	-0.533	0.164	0.019	-0.010
Stability of the political situation	2.8	0.933	-1	-0.933	0.200	0.023	-0.022
Political factors				-0.206			-0.024

Source: compiled by the authors

Thus, a high degree of severity of state control over the activities of construction companies and an imperfect property protection system had an average negative impact on innovative development (directional impact power is -0.467 and -0.533). The political situation remains quite volatile in the country, affecting the course of all processes, including innovation. Therefore, according to the experts, this factor had a negative impact of the very high power (directional impact power is -0.933). The total directional impact power of this factor group is -0.206, indicating its negative, though small impact on innovative development of construction companies. A weighted evaluation, which takes into account the group significance, amounts to -0.024.

The evaluation results of the impact of economic factors are given in Table 2.

Table 2. The evaluation results of the impact of economic factors on innovative development of construction compavcnies

Factor	Average score of the impact degree	Impact power (as per Column 2/3 points)	Direction impact ratio	Directional impact power (as per Column 3 * Column 4)	Significance ratio within a group	Significance ratio adjusted to the group significance (as per Column 6 * 0.211)	Weighted evaluation (as per Column 5 * Column 7)
1	2	3	4	5	6	7	8
Inflation rate	2.9	0.967	-1	-0.967	0.150	0.032	-0.031
Investment climate	2.1	0.700	-1	-0.700	0.206	0.043	-0.030
Growth rates of the construction market	2.5	0.833	-1	-0.833	0.195	0.041	-0.034
Effective demand of the population	2.8	0.933	-1	-0.933	0.172	0.036	-0.034
Interest rates for capital	2.4	0.800	-1	-0.800	0.150	0.032	-0.025
Average wage in construc tion	1.8	0.600	1	0.600	0.127	0.027	0.016
Economic factors				-0.656			-0.138

Source: compiled by the authors

As Table 2 shows, the experts noted an increase in the average wages in construction, which ensured additional incentives for staff to self-improvement and self-development, and therefore, this factor had a medium positive impact on innovative development (directional impact power is 0,600). Positive changes were not observed with regard to other factors, meaning that their impact was negative. The investment climate had a big impact on innovative capacity (directional impact power is -0.700), other factors had a very big impact. The total directional impact power of this factor group is -0.656, indicating its negative big impact on innovative development of construction companies. A weighted evaluation, which takes into account the group significance, amounts to -0.135.

The evaluation results of the impact of social factors are given in Table 3.

Table 3. The evaluation results of the impact of social factors on innovative development of construction companies

Factor	Average score of the impact degree	Impact power (as per Column 2/3 points)	Direction impact ratio	Directional impact power (as per Column 3 * Column 4)	Significance ratio within a group	Significance ratio adjusted to the group significance (as per Column 6 * 0.141)	Weighted evaluation (as per Column 5 * Column 7)
1	2	3	4	5	6	7	8
Innovation culture of the society	1.5	0.500	1	0.500	0.240	0.034	0.017
Level of education of the population	1.2	0.400	1	0.400	0.204	0.029	0.012
Unemployment rate	1.6	0.533	-1	-0.533	0.139	0.020	-0.010
Living standards	1.5	0.500	-1	-0.500	0.167	0.024	-0.012
Age structure of the population	0.8	0.267	-1	-0.267	0.111	0.016	-0.004
Level of economic activities of the population	0.9	0.300	1	0.300	0.139	0.020	0.006
Social factors				0.056			0.008

Source: compiled by the authors

As Table 3 shows, the experts evaluated positively an increase in the level of the innovation culture of the society. According to them, this factor had a medium positive impact on innovative development (directional impact power is 0.500). The level of education of the population is traditionally quite high, as well as the level of economic activities, so these factors, according to their estimates, had a positive impact on innovative development of construction companies, while preserving high and low impact power, respectively (directional impact power is 0.400 and 0.300). Deterioration was observed with regard to other factors, meaning that they had a negative impact on innovative development of construction companies. The total directional impact power of this factor group is 0.056, indicating its positive, albeit very small impact on innovative development of construction companies. A weighted evaluation, which takes into account the group significance, amounts to 0.008.

The evaluation results of the impact of technological factors are given in Table4

Table 4. The evaluation results of the impact of technological factors on innovative development of construction companies

Factor	Average score of the impact degree	Impact power (as per Column 2/3 points)	Direction impact ratio	Directional impact power (as per Column 3 * Column 4)	Significance ratio within a group	Significance ratio adjusted to the group significance (as per Column 6 * 0.216)	Weighted evaluation (as per Column 5 * Column 7)
1	2	3	4	5	6	7	8
Development of new technologies in construction	1.1	0.367	1	0.367	0.199	0.043	0.016
Level of R&D development	2.5	0.833	1	0.833	0.149	0.032	0.027
Society adaptation rate to new technologies	1.8	0.600	1	0.600	0.119	0.026	0.015
Level of equipment in construction	2.5	0.833	1	0.833	0.139	0.030	0.025
Consumer demands for innovation in construction	2.4	0.800	1	0.800	0.159	0.034	0.027
Need for obtaining the titles of protection	0.8	0.267	-1	-0.267	0.111	0.024	-0.006
Technology transfer	1.9	0.633	1	0.633	0.124	0.027	0.017
Technological factors		0.000		0.561			0.121

Source: compiled by the authors

As Table 4 shows, the acceleration of the innovative technologies development in construction had positive but small impact on innovative development (directional impact power is 0.367). The society adaptation rate to innovation grew, so the impact of this factor was positive and had a medium impact power (0.600). Gradually, the demands of consumers, who are more interested in innovation in construction increased. This factor had a very big positive impact on innovative development of construction companies. The opportunities in the field of the technology transfer slightly increased, which had a positive impact of an average power on innovative capacity of construction companies. The level of R&D development and the level of equipment in construction remained quite high traditionally, so these factors had a very big positive impact on innovative development (directional impact power is 0.833). The need for obtaining the titles of protection, with a procedure which still

remains complicated in construction, somewhat restrained innovative activities of construction companies that had a negative impact on innovative development of construction companies. The total directional impact power of this factor group is 0.561, indicating its positive medium impact on innovative development of construction companies.

The evaluation results of the impact of environmental factors are given in Table 5. As Table 5 shows, the majority of environmental factors experience deterioration, except for access to environmentally friendly natural objects, natural landscape and the possibility of resource recovery, whereunder the changes were positive (directional impact power is 0.500, 0.367 and 0.100, i.e., a medium and very small impact). The situation deteriorated, with regard to other factors, which had a negative impact on innovative development of construction companies.

The total directional impact power of this factor group is -0.040, indicating its negative, albeit very small impact on innovative development of construction companies. A weighted evaluation, which takes into account the group significance, amounts to -0.007.

Table 5. The evaluation results of the impact of environmental factors on innovative development of construction companies

Factor	Average score of the impact degree	Impact power (as per Column 2/3 points)	Direction impact ratio	Directional impact power (as per Column 3 * Column 4)	Significance ratio within a group	Significance ratio adjusted to the group significance (as per Column 6 * 0.164)	Weighted evaluation (as per Column 5 * Column 7)
1	2	3	4	5	6	7	8
Environmental friendliness of technologies used in construction	1.4	0.467	-1	-0.467	0.206	0.034	-0.016
Environmental friendliness of building materials	1.2	0.400	-1	-0.400	0.186	0.031	-0.012
Natural landscape	0.3	0.100	1	0.100	0.124	0.020	0.002
Access to environmentally friendly natural objects	1.5	0.500	1	0.500	0.165	0.027	0.014
Availability and value of	0.6	0.200	-1	-0.200	0.144	0.024	-0.005

green spaces							
Possibility of resource recovery	1.1	0.367	1	0.367	0.175	0.029	0.011
Environmental factors		0.000		-0.040			-0.007

Source: compiled by the authors

The evaluation results of the impact of regulatory factors are given in Table 6. As Table 6 shows, although experts noted positive changes in different areas of legislation, they are minor. Thus, there was no significant positive impact of this factor on innovative development of construction companies. The total directional impact power of this factor group is 0.118, indicating its positive, but very small impact on innovative development of construction companies. A weighted evaluation, which takes into account the group significance, amounts to 0.018.

Table 6. The evaluation results of the impact of regulatory factors on innovative development of construction companies

Factor	Average score of the impact degree	Impact power (as per Column 2/3 points)	Direction impact ratio	Directional impact power (as per Column 3 * Column 4)	Significance ratio within a group	Significance ratio adjusted to the group significance (as per Column 6 * 0.164)	Weighted evaluation (as per Column 5 * Column 7)
1	2	3	4	5	6	7	
The land law	0.4	0.133	1	0.133	0.169	0.026	0.003
Changes of legislation in the innovative sphere	0.1	0.033	1	0.033	0.212	0.032	0.001
Changes of legislation in the construction and investment sphere	0.1	0.033	1	0.033	0.191	0.029	0.001
Environmental regulations and their rigidity	0.2	0.067	1	0.067	0.159	0.024	0.002
The Housing Code and changes thereto	0.8	0.267	1	0.267	0.127	0.019	0.005
Real estate law and changes thereto	0.8	0.267	1	0.267	0.142	0.021	0.006
Regulatory factors				0.118			0.018

Source: compiled by the authors

The overall evaluation of the external environmental factors is as follows:
OE=-0.024-0.138+0.008+0.121-0.007+0.018=-0.022, or -2.2%

In other words, the level of innovative development of construction companies decreased by 2.2% under the influence of external environmental factors.

Conclusions. The research into the trends in the national economy, the quantitative and qualitative analysis of the construction company operations allowed us to draw the conclusion that innovative development of construction companies in Ukraine is crucial for the improvement of public support, which should be aimed at creation of the positive innovation climate, given the high risk of innovative activities of construction companies.

All of the abovementioned will allow, first, conducting a search of the most significant internal and external factors that influence the construction company operations and their innovative development; second, determining the conditions of innovative development of construction companies; third, identifying the relationship between the identified impact factors and innovative development; and fourth, evaluating the response of the results of innovative development of construction companies to the impact of the identified factors.

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CRISIS MANAGEMENT AS THE BASIS FOR IMPROVEMENT OF FINANCIAL ACTIVITY OF AN ENTERPRISE

Abstract. *The article substantiates that in order to improve the financial situation it is necessary to use anti-crisis measures. This prevents the crisis and emergence of financial problems, reduces the level of risk. The main anti-crisis measures should be the reduction or optimization of costs, efficient use of marketing and human resources policies, timely phased planning, budgeting optimization and more. The application of anti-crisis measures at each stage of the life cycle of the company is suggested. In particular, at the development stage of an enterprise, there must be a clearly phased strategy of moving goods to market, as well as pricing and communication strategies. In order to prevent the crisis, the use of efficient and professional management, attraction of qualified professionals are required at the stage of the enterprise's rising. The purpose of anti-crisis measures at the stage of maturity is to stabilize the situation and prevent a decrease in the market segment. The phase of reorganization or bankruptcy is characterized by the use of measures aimed at optimization of budgeting.*

JEL Clacification System: M 210
Key words: crisis, anti-crisis management, strategic analysis, market, enterprise.

Introduction. The worsening of the economic and political situation in the country, rising inflation and the growth of the unemployment rate lead to the deteriration of the financial condition of enterprises. Without proper management, the situation regarding the possible existence on the market in such conditions is critical. Therefore, there is a need for using anti-crisis measures that make it possible to retain the market position somewhat longer and survive "difficult days" for the company.

Crisis management is one of the means of domestic enterprises to respond effectively to changes that threaten their normal functioning. However, many enterprises have no coherent anti-crisis strategy to ensure stable and successful implementation of financial and economic activity.

Effective use of crisis management measures can enhance the production volumes, stabilize the financial revenue, improve accounts receivable, and ensure the viability of the company in difficult economic situations.

Shtanhret A.M., Kopylyuk O.I. argue that crisis management must anticipate and prevent crises or, at least, weaken them [128].

Crisis management of an enterprise should now be regarded as one of the specific systems of control related to the management of financial and economic activity of the enterprise, its financial stability and paying capacity [129]. This is a permanent process of identifying the signs of the crisis and preventing their spread and stagnation of the enterprise, which is carried out throughout the entire period of its operation [130].

During the implementation of crisis management, particular attention should be paid to a combination of strategy and tactics, making the right strategic decisions, obtaining reliable information that is studied and used in conditions of limited time in order to implement the radical restructuring of the company. The management of the company is forced to make decisions or take emergency measures to prevent the crisis or to implement measures aimed at overcoming the crisis [131].

We want to mention that it is important for the company to identify the crisis at its early stages.

One of the ways of the company's success and ways of improving its financial condition is an optimal anti-crisis management strategy.

The main aim of crisis management is the achievement of high stable financial performance, the expansion of a market segment, provision of stable position on it. A characteristic feature is an instant response to changes in the internal and external environment, with the advancement of implemented anti-crisis measures.

The use of anti-crisis measures prevents the emergence of financial problems, reduces the risk of bankruptcy and liquidation, coordinates management decisions with practical actions, facilitates the adaptation to market conditions and access to new markets, justifies the priority of problems, ensures the improvement of performance during the crisis with minimization of costs.

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131 Naumenko A.P. Crisis management of an enterprise [electronic source] / A.P. Naumenko, Gavrilko T.O. – Retrieved from: http://jrnl.nau.edu.ua/index.php/PPEI/article/viewFile/ 518/502.

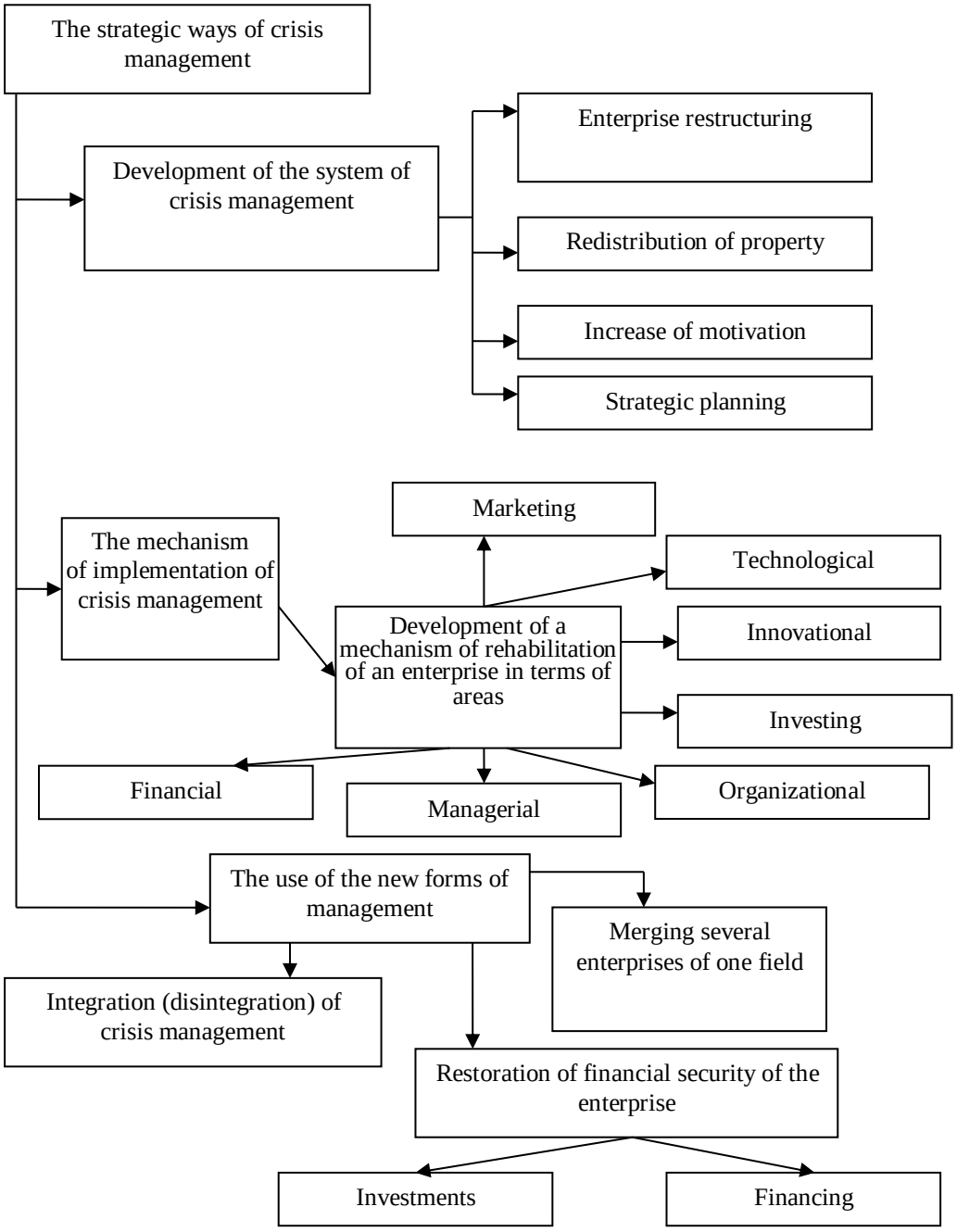
At the strategic level, we offer to use the following phasing of crisis management (Fig. 1).

It is worth noting that the processes of crisis management should be carried out continuously without stopping the practical actions and research because bankruptcy is not an instant thing, it emerges and develops gradually. In order to select the optimal anti-crisis strategy, we offer the following phasing (Fig. 2).

To improve the financial condition of enterprises we suggest using the anti-crisis measures:

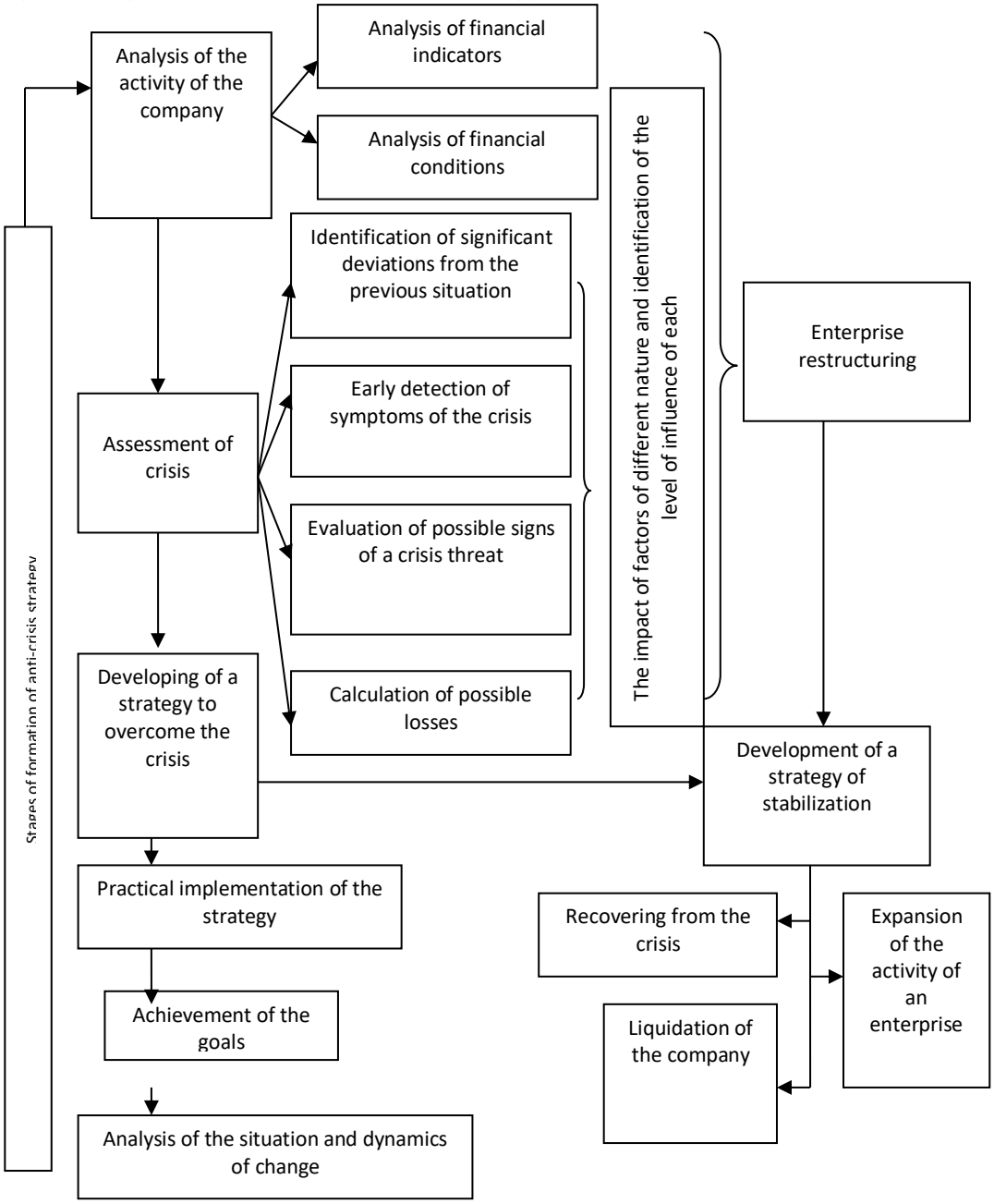
1. The reduction or optimization of costs can occur in:
   - the use or introduction of new innovative technologies;
   - the reduction or optimization of administrative and transportation costs;
   - the use of less expensive materials;
   - the introduction of non-waste production technologies;
   - studying the causes of defects and cost reduction by reducing losses from defects;
   - the optimization of budgeting;
   - the reduction of material and labor consumption;
   - the optimization of an organizational structure in order to reduce the cost of the administrative apparatus.
2. Effective use of marketing to increase sales of products through:
   - the promotion of sales;
   - the use of advertising and promotional campaigns;
   - the production of a clear distribution system.
3. Tax optimization consists of:
   - the reduction of tax payments during the tax period;
   - the minimization of a tax burden;
   - maximum allowed growth of tax payments per unit increase in the financial results.
4. Tightening the personnel policy of the company, consists of:
   - employee's opportunities to make decisions and a high level of responsibility for these decisions;
   - each person should be the most important part of the company, his/her positive psychological state, social security, etc., rather than finance;
   - the maximum confidence in employees and delegation of powers;
   - the interest of managers in staff development;
   - the use of incentive measures.

Figure 1. The strategic ways of crisis management.



Source: compiled by the authors

Figure 2. Stages of development of antic risis strategy of an enterprise.



Source: compiled by the authors.

5. Providing a positive net cash flow, which consists of:
   - the reduction in the volume of the consumption of financial resources;
   - the formation of optimal measures to improve the financial condition, which depend on the areas of activity, the system of management, market conditions, etc.
6. The improvement in the effectiveness of the planning system consists of balancing the principles of self-organization and control as well as the relationship between all departments of the company and staff.
7. The proper and efficient enterprise's management system at all stages consists in the optimization of the number of managerial and production staff with regard to rules, regulations and the actual needs of the enterprise.
   The chosen strategy of improving the enterprise's management system must take into account:
   - purposes and principles of the company;
   - the level of effective decision-making and coordination of informational flows with processes of their implementation;
   - the system of integrated management of automated production process.
8. The improvement in the quality of basic information by tracking the sources and forms of presentation of information; development and implementation of own system of "information circulation" based on the creation of own information system, monitoring and analysis of the level and quality of meeting the information needs by professionals, departments and other structural divisions of the company.
   We believe that reliable information will ensure making the right management decisions.
9. Budgeting optimization should be aimed at the financial results, on the one hand, and liquidity – on the other hand. Future financial results (profits and losses) are estimated by budgeting of incomes and expenses for all kinds of ordinary activities of the enterprise, which are expected in the planning period. The selection and development of the initial budget, in which the planned value factor that limits the company's activity is recorded, are important elements of budgeting. The type of the primary budget depends on the specifics of the financial and economic activities and capacity of resource attraction. The basic element of budgeting system is partial budgets that are formed in accordance with the principles of specialization and decomposition and cover some of the income and expenses of the enterprise (e.g

budgets of business units, cost or income centers, functional budgets of individual expenses, etc.) [132].

10. The implementation of preventive anti-crisis measures is characterized by an independent professional activity. The main goal is to prevent the possibility of the onset of the crisis and overcome it in material and financial activities of the company. It is well known that the normal financial position is achieved through efficient use of assets, minimization of costs, competent management and coordinated work of associates [133].

Crisis management, above all, should ensure financial stabilization of the company. The elimination of the shortcomings of the enterprise's work with the use of possible crisis management is probable given the implementation of the following (Fig. 3).

We believe that the crisis management has to keep control of the financial situation of the company and ensure timely adoption of optimal adequate solutions and timely elimination of possible problems with a phased solution of them. The actions of the manager during the crisis management use should be directed primarily at the payment of financial obligations, the focus of attention on the benefits of the company, the expansion of the range of production and the increase of production volumes.

The process of crisis management is cyclical: diagnosis – marketing – planning – approval of managerial solution – the organization of its implementation – motivation – account of results – control – diagnosis, etc. until the company overcomes the crisis fully [134].

Crisis can always be prevented if it is recognized at an early stage or if measures that will lead the company to the appropriate level of development and not allow the recession are proposed and implemented. It is important to continuously monitor the financial condition with regard to quarterly changes. Constant monitoring of the situation will make it possible to detect early signs of the crisis in time and support financial stability, ensuring the successful operation of the enterprise on the market.

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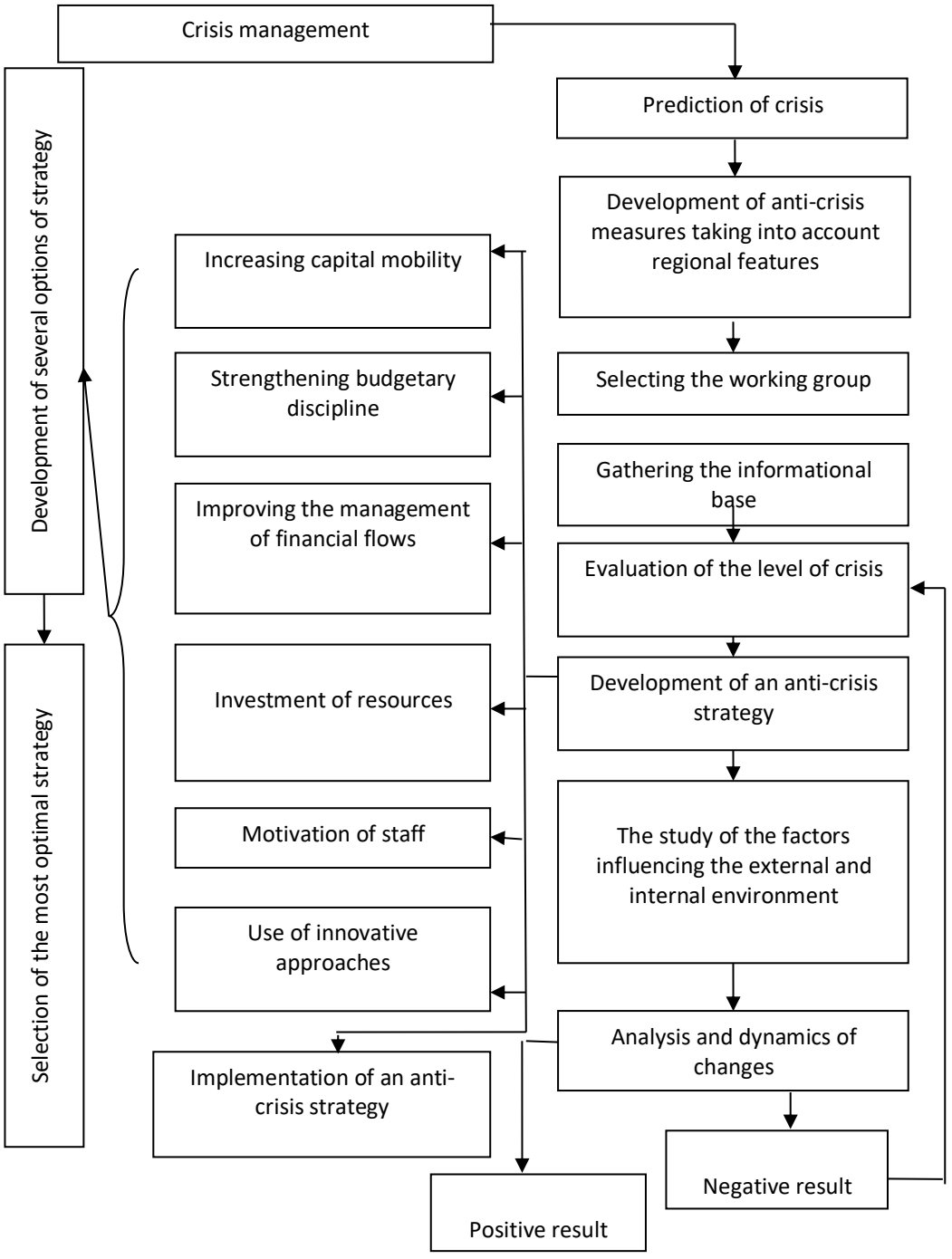
132 Bochko O. U. Planning of the enterprise in the non-production sphere, teach. Ref. / O. U. Bochko, V. F. Proskura. – K., Condor. – 241 p.

133 Sazhiyenko S. A. The role of crisis management in the prevention of bankruptcy [Electronic resource] / Sazhiyenko S. A. // Herald of Khmelnytsky National University, 2009. – № 6. – T. 2. – (Economical studies). – Retrieved from: http://journals.khnu.km.ua/vestnik/pdf/ekon/2009_6_2/pdf/052-055.pdf.

134 Telnova G. V. Crisis management engineering companies: Author. Dis. on competition sciences degree candidate. Econ. Science. / Telnova G. V. – Mariupol. – 2006. – 22 p.

Figure 3. Model development of crisis management.



Source: compiled by the authors.

We suggest using anti-crisis measures at each stage of the life cycle of the company in order to timely diagnose the crisis (Fig. 4).

After analyzing the works of domestic and foreign scientists, we want to note that they describe several stages of the life cycle of the company.

In particular, Flamholts E. in his writings shows that the life cycle of the company data is characterized by 7 stages: a new enterprise, expansion, professionalism, consolidation, diversification, integration, decay and renewal [135].

Shtanhret A. M., Kopylyuk O. I. reveal five stages: conception, development, suspended growth, recession, bankruptcy, and liquidation [136].

Lihonenko L. A. believes that businesses go through 4 stages of the life cycle [137] and highlights the stages of recovery, development slowing, crisis, and recovery. Somewhat fewer stages, three, are revealed by Milner B. Z., which the author called: a simple system, stabilization, and improvement of the organization structure [138].

After analyzing the work of scientists and studied the practical part of enterprises, we believe that the life cycle of the company goes through four stages: creation, rise, maturity and bankruptcy (reorganization) that most closely match modern enterprises. We believe that during each of the proposed stages there is a need to use a number of measures that are adequate to a particular stage.

We offer to take measures of crisis management at each of the stages of the life cycle of an enterprise; their implementation may change certain conditions or the situation in general.

In addition, we believe that there are some factors, due to which a company has a little influence. We consider these to be political, economic, legal, environmental and tax system. Although these factors are not permanent, they change, but only after a long time.

The stage of the creation of an enterprise is characterized by a low level of the crisis. As soon as a company enters the market, managers and marketers carefully study the competitors, potential customers, their needs and requirements and mainly use the right strategy to move goods to market. It is important to choose the right price and communication strategy.

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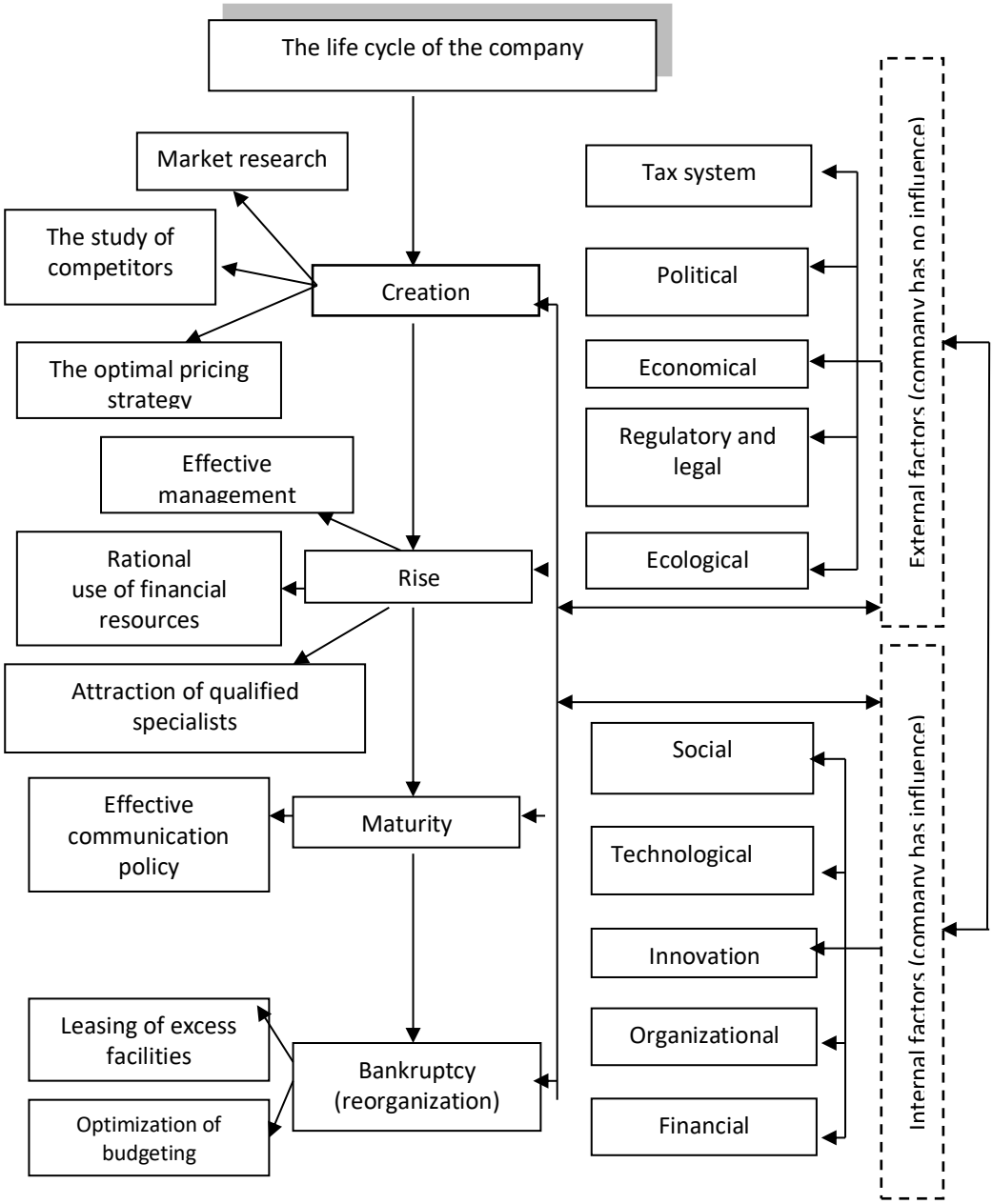
135 Flamholts E. Managing strategical changes: from theory to practice / Flamholts E., Randl I. – Eksmo. – 2011. – 320 p.

136 Shtanhret A. M. Crisis management of an enterprise, teach. guidances. / A. M. Shtanhret, A. I. Kopylyuk. – K: Knowledge, 2007. – 335 p.

137 Lihonenko L. O. Crisis management of an enterprise: theoretical and methodological principles and practical tools [Text] monograph / L.O. Lihonenko. – K: KNTEU, 2004. – 580 p.

138 Milner B. Z. Organization Theory: Textbook / B. Z. Milner. – 2nd ed., Rev. and Advanced. – Moscow: INFRA-M, 2001. – 480 p.

Figure 4. The anti-crisis measures at each stage of the lifecycle of the company.



Source: compiled by the authors.

The stage of an enterprise's rising is characterized by the choice of optimal strategy planning, attracting new market segments, production of new products and the expansion of distribution channels and consumers. The use of anti-crisis measures at this stage is characterized by a rational use of financial resources, including both own and borrowed, it is necessary to increase the demand by developing an effective strategy of marketing communications. To prevent the crisis, we suggest using efficient and professional management, the need to attract qualified professionals.

The stage of maturity is characterized by a significant decrease in sales of goods, high pressure from competitors, and stabilization of the demand for company's products. The main purpose of the anti-crisis measures is to stabilize the situation and prevent a decrease in the market segment.

The phase of reorganization or bankruptcy is characterized, in the first case, by the financial cost rationalization, optimization of budgeting, leasing of excess facilities, selling individual buildings and more. In the second case, when the company commits any actions, it receives damages, which are quite high, has debts on credit payments and wages. In this case, it is offered to liquidate a company or sell it at the highest price and thus get at least some profit.

The time factor plays a special role in the implementation of anti-crisis measures, because timely delivery of funds and making optimal decisions at a particular point depend on it.

An important role is given to employees and staff of an enterprise. This implies the timely delegation of authority, the optimal amount of time spent on specific tasks, determination of their level of clarity and formulation, the presence of an informational base and the necessary technical equipment, ways to achieve quantitative and qualitative indicators and so on.

Optimizing the economic nature of the application of crisis management is important during the practical use of it. This can be detected by continuous monitoring of the environment of an enterprise with the use of a complex market research, the techniques of a strategic analysis and controlling. The identification of the relationship and a logical sequence of economic events, the effectiveness of management decisions and a search for new opportunities and threats will have a systematic nature.

Particular attention in the implementation of crisis management in Ukraine is given to a combination of strategy and tactics; strategic decisions are made on early stages of control when signals of adverse trends are not reliable; tactical decisions are made on the basis of complete information, but in conditions of limited time to radically restructure company's activities. The management of a company is forced to

make decisions about the use of emergency measures to prevent crisis or find a way out of the crisis [139].

Crisis management is essential for businesses of all types and forms of ownership. Among all business entities in Ukraine, small businesses have prevailing quantitative importance (in 2015 – 327,815 units, representing 95.5% of all companies) [140].

The basis of the policy of crisis management should rely on the principles outlined in the Small Business Act for Europe - the main fundamental document that defines the ideology of promotion of small and medium enterprises in the countries of the EU [141]. Obviously, the practical implementation of these principles should adequately take into account the specifics of Ukraine.

There are a number of measures of direct financial support for small businesses, the main of which are:

- Loans at reduced rates or reimbursement of interest on loans;
- The guarantee of loans;
- Grants for starting a new business or development.

Subsidies to cover interest on loans promote the development of target group enterprises, while the number of existing enterprises from the untargeted group decreases. The grants for the unemployed, who want to start their businesses, also have significant drawbacks and only in some cases lead to noticeable positive results. The world experience shows that the most effective of these instruments of financial support of small and medium enterprises is the guarantee of loans; however, in general, this efficiency is low.

At the same time, promoting the increase of the financial capacity of enterprises is not always solved through direct financial support. This objective can be realized by a simplification in public procurement, etc.

It is obvious that in the medium and long term, macroeconomic stabilization, improvement of fiscal management and development of the stock market play an important role.

Conclusions. The results that were obtained in the study show that in order to act ahead of the crisis, companies should use crisis management measures that will

139 Naumenko A. P. Crisis management of an enterprise [Electronic resource] / A. P. Naumenko, T. A. Gavrilko. – Retrieved from: http://jrnl.nau.edu.ua /index.php/PPEI/article/viewfile/518/502 .

140 Statistical Annual Journal of Ukraine [Electronic resource] – Retrieved from: http://www.ukrstat.gov.ua/druk/publicat/kat_u/2016/zb/11/zb_2015_ukr.zip.

141 Small Business Act for Europe [Electronic resource]. – Retrieved from: http://www.europarl.europa.eu/webnp/webdav/users/jribot/public/JPM%20New%20Deal/small_business_actforeurope.pdf.

ensure an increase in production, stabilize financial income, improve receivable income, and ensure the viability of a company in a difficult economic situation.

The use of anti-crisis measures that prevent the crisis and emergence of financial problems and reduce risks is required in order to improve the financial condition. The implementation of anti-crisis measures should be comprehensive and with using constant research. Every company goes through four main stages of the life cycle: creation, rise, maturity and bankruptcy (reorganization). We consider it necessary to use anti-crisis measures at each stage of the life cycle of a company. There must be a clearly phased strategy of moving goods to the market, as well as pricing and communication strategies at the stage of the enterprise's creation. At the stage of rising, a company must use efficient and professional management, attract qualified professionals (if necessary) in order to prevent crisis. At the stage of maturity, the goal of anti-crisis measures is to stabilize the situation and prevent a decrease in the market segment. The phase of reorganization or bankruptcy is characterized by the use of measures to optimize budgeting, if necessary, leasing excess facilities, sales of individual buildings, etc., or selling a company at the highest possible price and thus getting at least some profit.

The achievement of positive results when using the tools of crisis management is possible with the application and purposeful coordination of actions between an employee and manager, a clear sequence of tasks, the urgency of decision-making, etc.

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THE ALGORITHM OF AN ECONOMIC ANALYSIS IN THE SYSTEM OF LOGISTIC MANAGEMENT OF ENTERPRISES IN THE GRAIN PRODUCTS SUBCOMPLEX OF THE AIC

Abstract. *The proposed algorithm of conducting an economic analysis within the given structural boundaries of the grain products subcomplex of Ukrainian AIC includes preparatory and analytical stages, and also a stage of creating the conceptual model of the logistic system efficiency and the stage of structural and functional verification of conceptual principles. The methodology presupposes an assessment of the condition and dynamics of all components of the grain production process – from land availability to the supply formation on the national grain market, which in the light of the grain balance is analyzed as to further use by enterprises of specialized branches for the production of food. Processing the information on a representative group of enterprises will help to clarify the peculiarities of using production factors with the involvement of a logistic grain equivalent, as a common base for comparison of production and sales activity of subsidiaries and an indicator of profitability of operational activity. The usage of this profitability indicator in the logistic management system allows excluding investment and financial activities of branch businesses from the assessment process, while focusing on performing logistic functions related to the transfer and modification of the grain flow. The proposed coefficient of the local provision of grain-saving capacities assists in finding territorial reserves for placing elevator capacities in Ukraine.*

JEL Classification System: C 10, C 82, D 24, L 16, O 12.
Key words: algorithm, economic analysis, logistic management, grain products subcomplex of AIC, enterprise.

Introduction. Cereal crops production is the basis for development of many sectors of the state economy, and careful consideration of the logistic system of the grain products subcomplex of the agro-industrial complex defines it as a set of elements (subsystems) that provide the movement of the grain flow through logistic chains from the primary source of raw materials (fields) to the end users of finished products (food industry enterprises, livestock farms of the AIC etc.) and alter the grain flow in the process of applying the operations to it in the functional areas of elevator and processing industry.

The requirements of a systematic approach are implemented in the economic analysis methodology, which involves consistency in researching the logistic system concerning its structural elements and the use of appropriate tools to identify the reserves of increasing efficiency of the enterprises of the grain products subcomplex.

Methodological tools for identification and calculation of the reserves of increasing the production efficiency include such simple techniques and methods of an economic analysis, as a comparison, the calculation of average and relative values, the construction of tables and graphs, as well as more complex, to which the techniques of elimination, an index method, balance equation, grouping, etc. belong and which allow studying causal connections.

An in-depth study of the regularities of the production process and relationships between factors and general indicators with the further detection and activation of the reserves is carried out with help of economic and mathematical methods, in particular, a correlation analysis. Great opportunities for identifying and counting the production reserves are provided by such mathematical methods as mathematical modelling of production processes, which is mainly based on deterministic functional models, mathematical programming (linear, dynamic, stochastic, etc.) and an analysis of variance, etc.

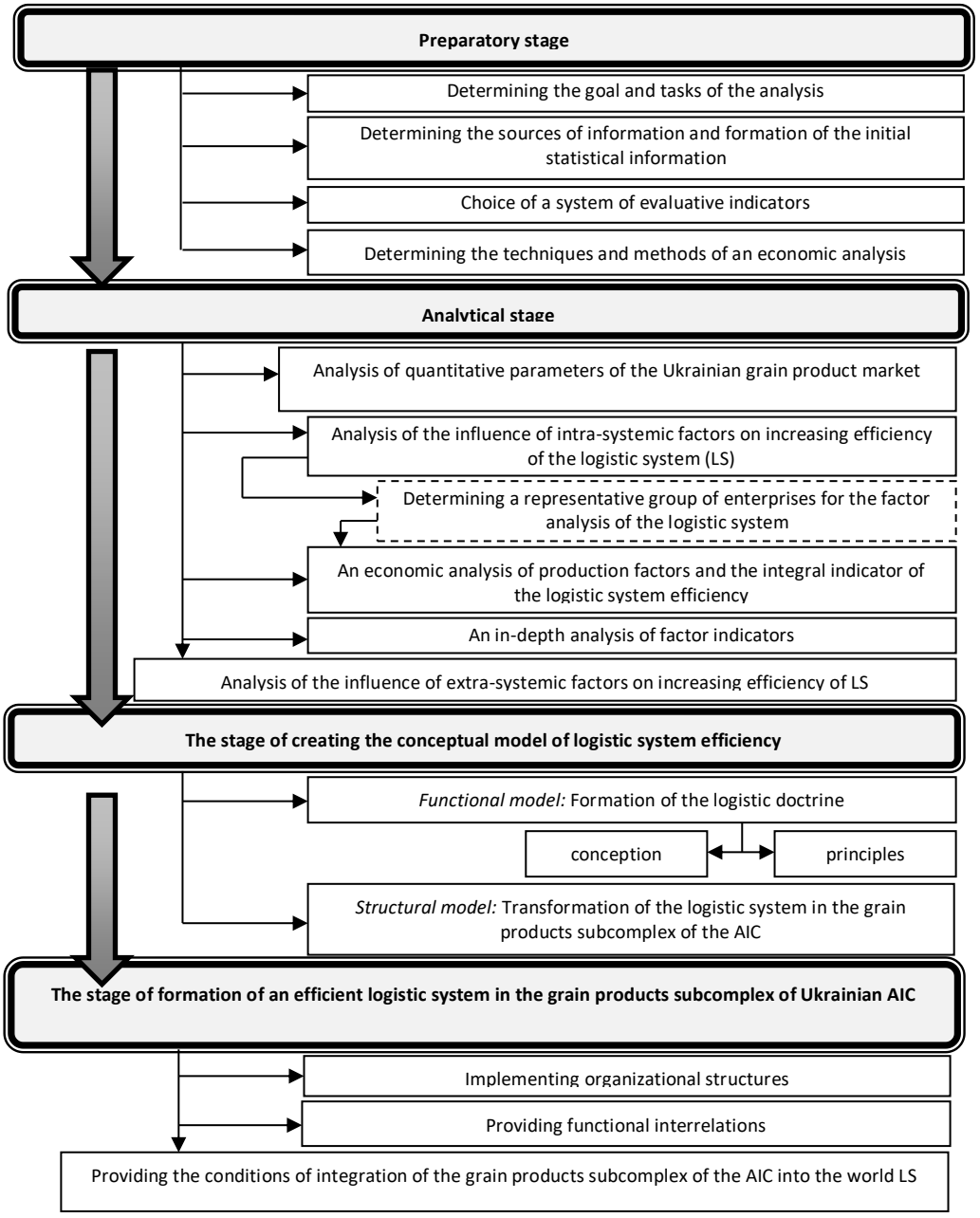
Hence, an arsenal of tools of the economic analysis for identification and calculation of the reserves of increasing the production efficiency is quite broad, and the choice of an optimal set of techniques and methods at each stage of the research ensures making rational managerial decisions [142].

To analyze the logistic systems effectiveness in the grain products subcomplex of Ukrainian AIC, we will determine the phasing of conducting the economic analysis (figure 1).

The purpose of the economic analysis is to prepare the necessary and sufficient analytical information for improving the efficiency of logistic systems in the grain products subcomplex of the agricultural sector of Ukraine. Along with a diagnostic function of the economic analysis, which shows signs of inconsistency between the obtained results of the production and their theoretical indicator (reserves of production), the other function is a search function, which aims at supporting the recommendations for effective management in using reserves.

142 Berezivskyi P. S. Technical and economic bases of the organization of grain processing enterprises / P. S. Berezivskyi, V. A. Kolodiichuk. – Lviv: Ukrainian technologies, 2003. – 176 p.

Figure. 1. The structural scheme of the algorithm of an economic analysis of the logistic system efficiency (LS) in the grain products subcomplex of the AIC.*



Source: compiled by the authors.

The objects of the economic analysis are a set of functionally dependent agricultural and industrial businesses that provide the formation of grain supply, its primary processing, storage, manufacturing flour, cereals, mixed fodder and its sales, including export, through the indirect participation of infrastructural elements. The objects serve as a source of raw materials for enterprises of special industries for the production of food products. The multiplicity of these structural elements, which, in our opinion, belong to the grain products subcomplex of the AIC, requires the formation of representative sampling for an in-depth factor analysis (see Fig. 1). For an effective application of appropriate methods of analyzing, one uses logical procedures of a system analysis, and statistical tools of finding interconnections and causal dependencies between indicators, which are realized through conducting a correlation and regression analysis. For the statistical analysis, one uses software packages of the integrated system of a statistical analysis and data processing STATISTICA, which are implemented on a PC.

Forming the conceptual basis for effective development of logistic systems on the market of grain processing products, and taking into account the influence of factors on the efficiency of the system under study, it is necessary to identify the main applied principles of the proposed logistic conception and conditions to ensure integrated implementation of its functions in the grain products subcomplex of the AIC. Using the method of modelling, along with the functional model one needs to introduce a structural model of the logistic system transformation, which will allow reaching a new quality level of its development.

The next stage of the formation of an effective logistic system in the grain products subcomplex of Ukrainian AIC (see Fig. 1) suggests a structural and functional verification of the conceptual principles of the previous stage. The defined logistic doctrine presupposes the integration of the studied subcomplex into global logistic systems, for which it is necessary to analyze international experience and develop a set of appropriate integration conditions that is also provided by the last stage of the proposed algorithm.

A crucial step in the methodology of the research into efficiency is the choice of the system of evaluation indicators, which allow drawing right conclusions regarding the level of the logistic system efficiency on the basis of the integrated evaluation of the impact of all factors [143]. Figure 2 shows the set of evaluation indicators of the logistic system efficiency, which we will work out in detail.

[143] Kolodiichuk V. A. Methods to analyse efficiency of the functioning of the regional grain products subcomplex of the AIC / V. A. Kolodiichuk // Socio-economic researches in the transition period. Issue 1

To evaluate the efficiency of the logistic systems functioning in the grain product subcomplex of the AIC, it is important to employ an informative and adequate analysis of quantitative and qualitative indicators of their functioning. The logic of the research involves synthesizing technological operations into a single coordinated technological process, which ensures the study of not only effective indicators of grain production, but also the causal relationships that form supply. Therefore, the methodology presupposes the assessment of dynamic and static states of all components of the process of grain production from land availability to the formation of supply on the national grain market, which through the prism of grain balances will be analyzed regarding future use. The criterion approach to the terminology of logistics defines the boundaries of the logistic system, which considers the movement of material and supporting flows from the primary source of raw materials to the ultimate consumer of the finished product.

A reasonable question arises: why do we need to consider the mechanism of the grain supply formation, if we can view the grain supply as an output parameter for further optimization of grain flows?

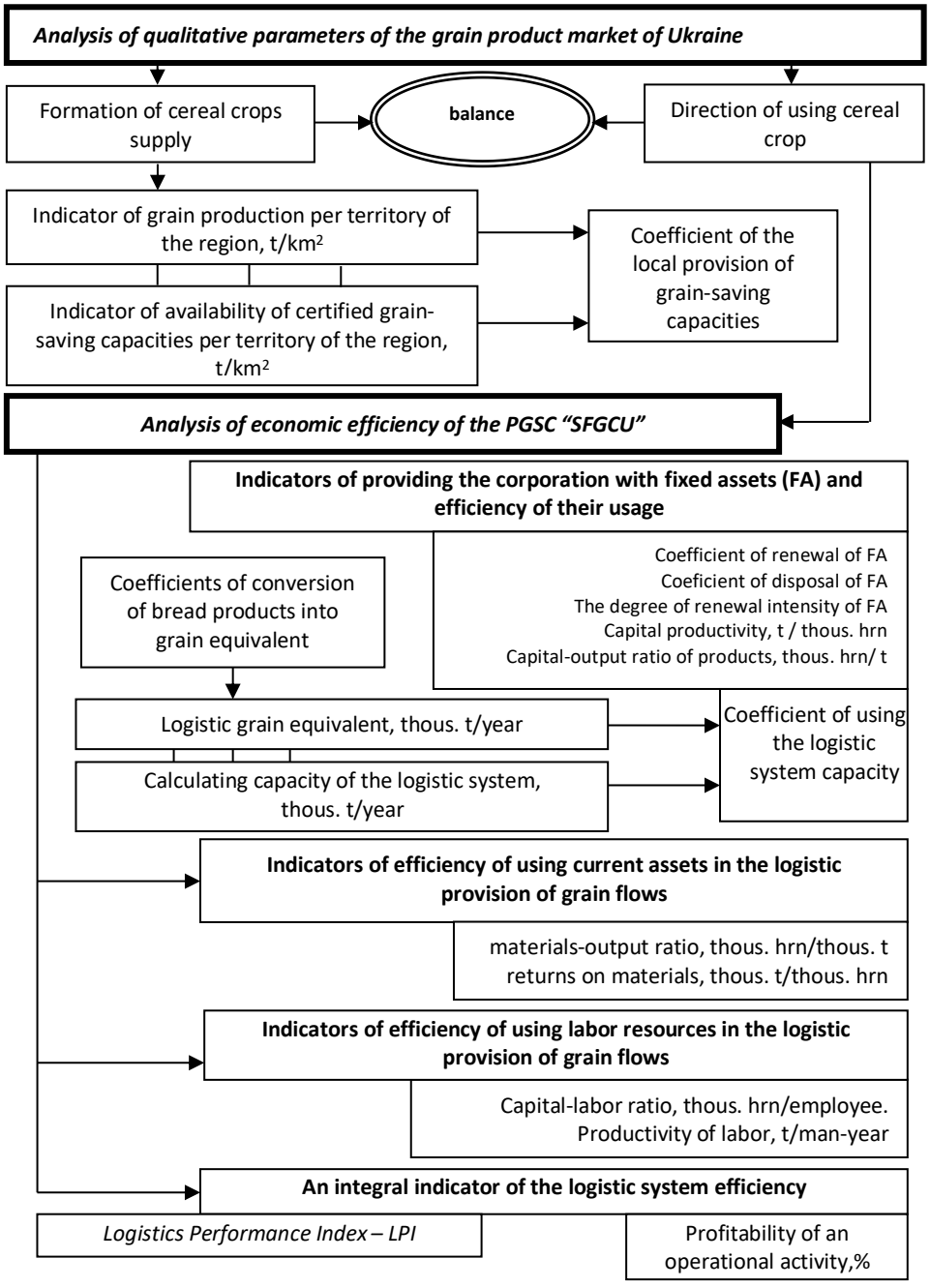
Answering this question, we want to mention one of the generally accepted properties in the theory of systems – homeostaticity, which determines the equilibrium on the basis of a self-regulatory mechanism that allows the entire system to maintain the state of a dynamic balance. Expanding the quantitative and qualitative parameters of the logistic system functioning in the grain products subcomplex of the AIC, we must objectively evaluate the potential of the systems, which go before ours.

Hence, the primary source of raw materials is also a dynamic parameter that under the influence of a significant number of controlled and uncontrolled factors can radically change its value every year. In other words, the change in the grain yield under the influence of economic, technological, natural and other factors annually generates different supply of grain, and it activates another property of the logistic system – its adaptability, i.e. the ability to adjust to dynamic changes in the external environment through the quantitative and qualitative change of its configuration and behavior.

Deviating a little from the marked boundaries of the logistic system, we want to introduce the mechanism of the supply formation on the national grain market in the form of a structural and logic scheme (figure 3).

(XXXIX). Economic problems of the market transformation of Ukraine. – Lviv: IRR of NAS of Ukraine, 2003. – P. 575-584.

Figure. 2. The system of evaluative indicators of the logistic systems efficiency in the grain products subcomplex of Ukrainian AIC.*



Source: compiled by the authors

The key stage of the analysis is evaluation of the dynamic states of crop areas, yield and gross harvest of grain and leguminous crops from different perspectives, which are reflected in the national statistical system. In corresponding sections of statistical collections, we take interest in data on the food processing industry, which uses raw materials and the information on transport and communication, which ensure the movement of grain flows in logistic systems. Such a stratum of indicators is usually classified according to the types of economic activities (as outlined in Classification of types of economic activity SC 009:2010 (CTEA-2010)), the product types, organization and legal forms of business and according to regions. It is advisable to compare national quantitative and qualitative indicators with those in different countries.

Along with the agricultural enterprises, one cannot but mention households of the population, which are an integral part of the functioning of the grain market. The category of "households of the population" in the national statistics was formed according to the comprehensive and selective censuses of the areas of crops and perennial plantings with their annual clarification using the form No.4-village council "Sown areas of agricultural crops in households businesses on the territory of the village council" and indicators of the selective survey of households' agricultural activities in rural districts. The study of households is determined by the Methodology of making the annual calculations of crop production in all categories of households, which was approved by the order of State Statistics Service from 02.08.2005, No. 225 (as amended on 18.11.2010 No. 467) [144].

The grain balance allows evaluating objectively the volume and structure of the domestic demand and supply of grain, foreign trade grain circulation, grain self-sufficiency and the sources of covering the consumption of grain.

To ensure compliance of the research with the requirements of international standards and recommendations in the process of drawing up balances of receiving and using grain and products of its processing, it is necessary to use such a principal diagram [145]:

RESOURCES = USE;

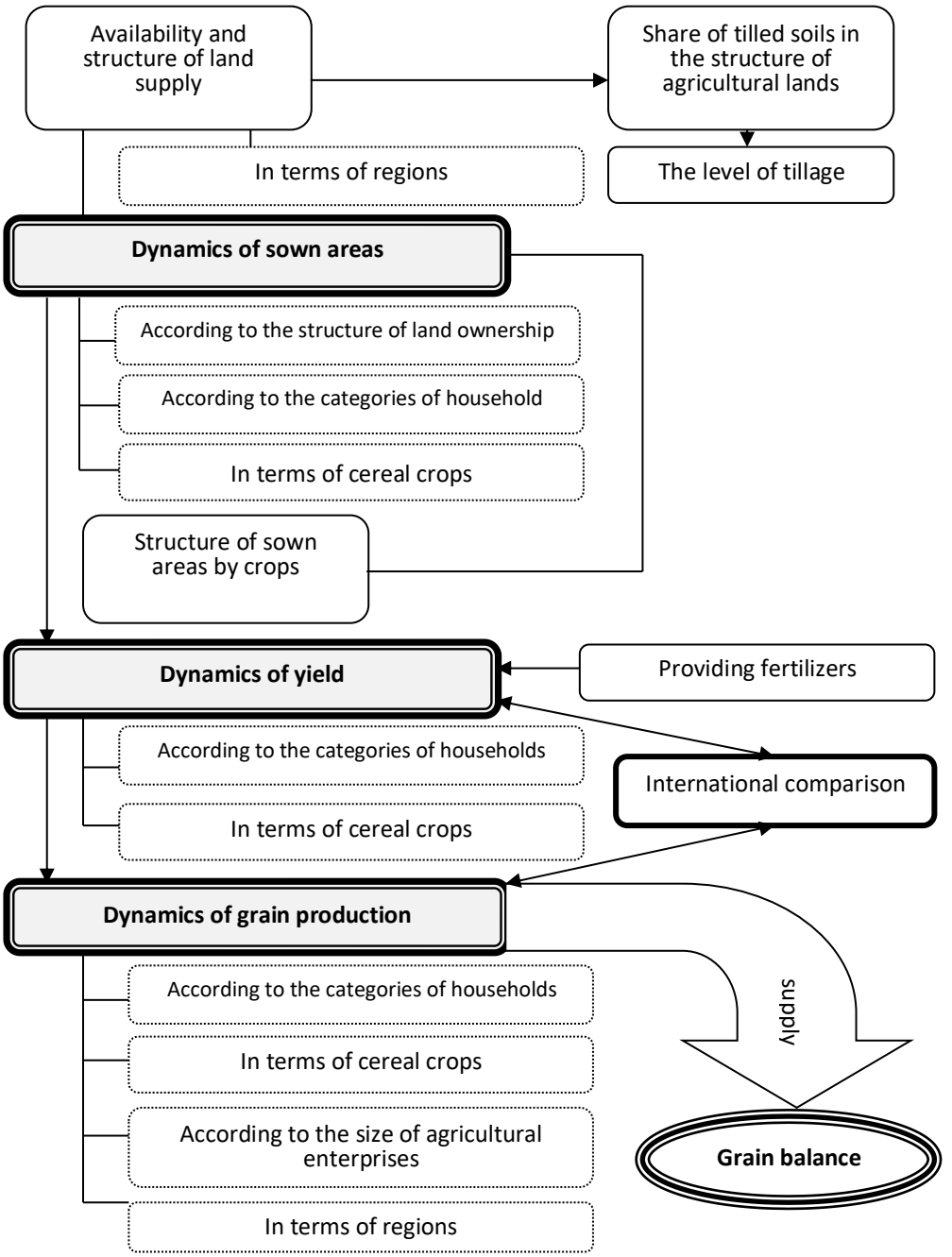
RESOURCES = SUITABLE FOR USE PRODUCTS+ IMPORT;

USE = EXPORT **+** CHANGES IN SUPPLIES (+ or –; supplies at the end of the year – supplies at the beginning of the year) + DOMESTIC USE.

144 Ukraine in numbers in 2015: statist. collect. – K., 2014. – 239 p.

145 Statistical book "Agriculture of Ukraine" for 2015. – K.: State statistics service of Ukraine, 2016. – 360 p.

Figure. 3. The structural and logic scheme of the algorithm of analyzing the supply formation of grain and leguminous crops.



Source: compiled by the authors.

The given scheme is based on the conceptions and methodological approaches to the preparation of balance sheets, which are used by the food and agriculture organization of the United Nations (FAO).

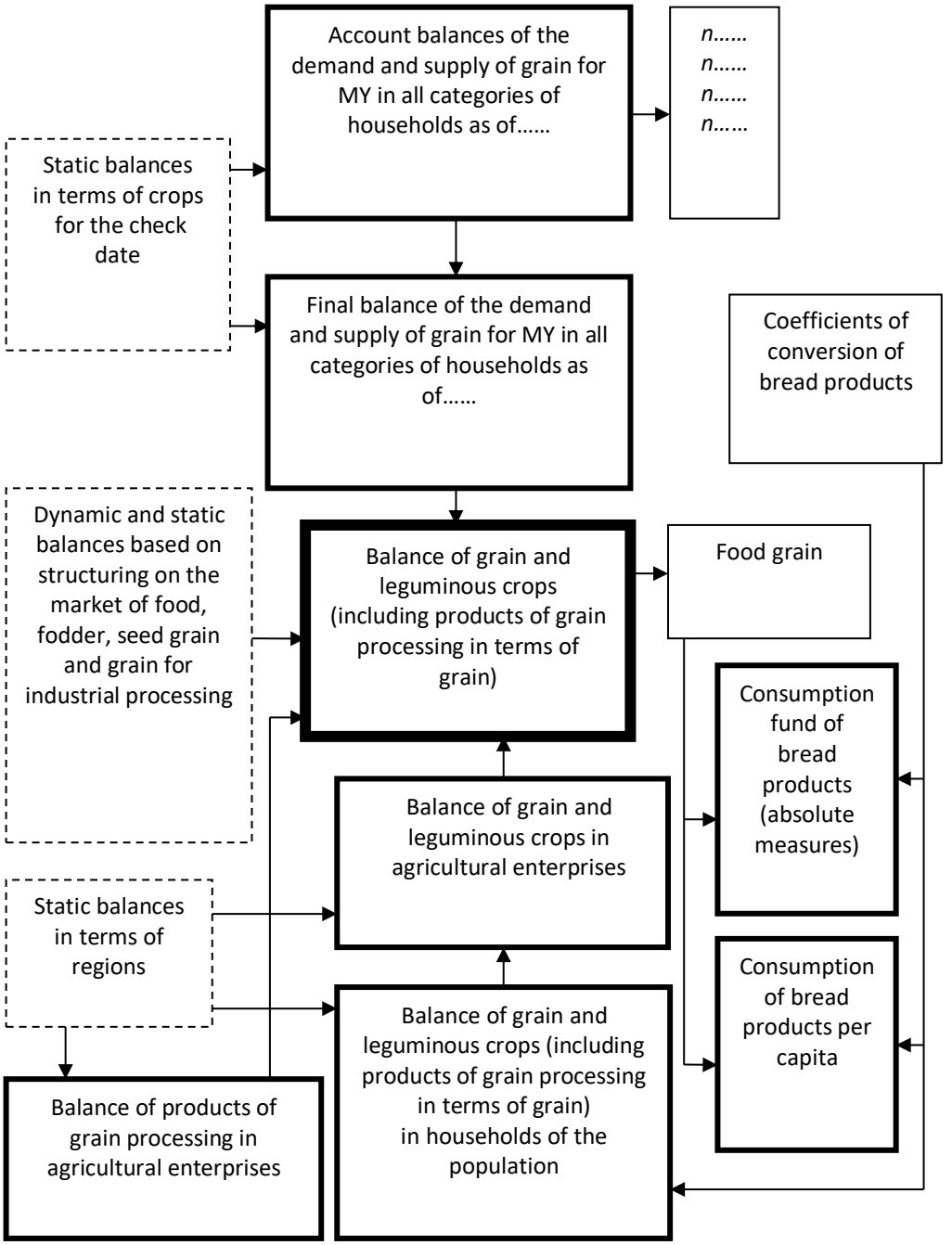
The efficiency of logistic systems in the grain products subcomplex of the AIC depends largely on the objectivity of information regarding the structure and trends of grain flows, their quantitative and qualitative parameters, etc. Therefore, a comprehensive analysis of grain balances will be carried out in terms of individual grain and leguminous crops as well as in terms of regions of Ukraine in accordance with the structural and logic scheme (figure 4).

The balance of grain and leguminous crops (see Fig. 4) aggregates all sources of the grain inflow and ways of its use. Since, the statistical reporting in many of the bulletins reflects some information in the context of the calendar year and some analytical information is presented for the marketing year, then, obviously, this requires close attention to the compatibility of indicators in the process of their comparison. We want to note that marketing year (MY) is the period, beginning with the month, in which a separate type of crop products of the corresponding harvest starts to be supplied; and it ends on the last day of the month preceding the month, in which the same kind of crop products of the next harvest starts to be supplied. For crops and legumes, the marketing year begins on 1 July of the current year and lasts until 30 June of the following year.

The indicators for determining the articles of grain resources formation and their future use are taken into account with conversion of the derivative products into the primary product, which is employed to make up the balance sheet according to the corresponding coefficients (table 1).

To determine the resource part in the balance sheets, we took into consideration the change of the product inventory at the end of the year compared to its beginning. Total product losses include losses in the households-producers during processing, transportation, storage etc. The amount of losses does not include losses during harvesting of agricultural products [4].

Figure. 4. A principle scheme of studying the balances of grain and products of its processing in the grain products subcomplex of the AIC.*



Source: compiled by the authors.

Table 1. Coefficients of conversion of bread products

Bread products converted into flour, cereals	Coefficient
Bread and bakery products	0,736
Flour of all sorts	1
Cereals of all sorts	1
Pea, bean, other legumes	1
Macaroni products	1,031
Semi-finished products and culinary products from cereals and pasta	0,7
Bread products (flour, cereals) in terms of grain equivalent	**1,330**
Semolina	1,368

Sourse: according to the data of Methodological recommendations for the preparation of forecast balances of supply and demand of food resources, (the order of the Ministry of economy of Ukraine No. 1426 dated 18.12.2009).

In the grain flows logistics, the correct representation of marketing channels of selling grain and leguminous crops is of great importance. The main source of information concerning the sale is the forms of state statistical observations No. 21-gen "The sale of agricultural products for January - _____ 200_" (monthly) and No. 21-gen "The sale of agricultural products for 200_" (annually) [146], which are submitted by all legal persons and their separate units that conduct agricultural activities and sell agricultural products, regardless of their organizational and legal forms and subordination (except small). The sale of agricultural products by agricultural enterprises is the amount of produced products sold by agricultural enterprises in all areas: to processing enterprises, on the market, to the population on account of labor remuneration, to shareholders on account of the rent for land and property shares and in other areas.

Other areas of the sale include selling to other companies and organizations, directly to trading enterprises, sanatoriums, kindergartens, schools, hospitals, rest homes, closed institutions, other households, commercial structures, and foreign countries [4]. Here one takes into account the products sold directly to enterprises, institutions and organizations of all forms of ownership and organizational and legal forms of management, including foreign countries; selling through exchanges and auctions both for the national monetary unit and the currency converted according

146 Instructions for filling out forms of state statistical observations No. 21-gen "The sale of agricultural products in January - _____ 200_ " (monthly) and No. 21-gen "The sale of agricultural products for 200_" (annually) [Electronic resource]. – Retrieved from: http://www.profiwins.com.ua/uk/forms-and-blanks/statistic/414.html.

the current rate of the national currency at the time of transaction for the sale of products; payment of enterprises under conditions of leasing, etc [5].

The analysis of the availability and inflow of grain crops at the enterprises, which were engaged in their storage and processing, is based on the use of appropriate statistical bulletins. The information base, except for the already specified form No. 21-gen, is provided by the form No.1-grain "Availability and inflow of grain crops and oilseeds", which is submitted by enterprises engaged in storage and processing of grain and oil crops (they have their own or rented, adapted for the storage premises and processing power).

The presence of grain crops at the enterprises (according to the submitted statistical reporting) is reflected as of the reporting date, taking into account the balance of the previous years, while the volumes of inflows and average prices – for the reporting period on cumulative total from the beginning of the year.

In the total volumes of inflows, one considers both the purchased crops and those that came from the beginning of the reporting year from agricultural producers, farms, and other commercial structures in the repayment of debts for last years for obtained from the state and regional resources monetary and logistic loans; for industrial processing under a tolling agreement.

The average purchase price is due and payable cost of 1 ton of crops on a cumulative total from the beginning of the year, taking into account allowances (discounts) for the quality of products, but without the overhead expenses of purchasing, transporting and forwarding expenses and VAT. Charges for drying, cleaning and improvement of products to the basic conditions are excluded [147].

The balance method in the proposed algorithm serves mainly to reflect the ratios and proportions of the two groups of interrelated and balanced economic indicators, the results of which should be identical. This method is commonly used in the practice of business accounting and planning, however, we employed the balance method of studying economic phenomena and processes for researching the grain products subcomplex of the AIC; because we believe that, it provides an opportunity to understand the whole logistic chain through the prism of causality in the studied sphere. Along with the dynamic state of the material (grain) flow, which reflects, in the balance production, import, export and use of grain in accordance with the intended purpose (seed, food, fodder grain and grain for industrial processing); it also shows the static state of the material flow, in other words, stocks. The latent influence of the material and technical base of the elevator industry determines the

147 The presence and inflow of grain and oil crops at the enterprises that were engaged in their storage and processing: stat. bull. – K. : State statistics service, 2014. – 52 p.

amount of grain losses directly, which is shown in the balance sheet. In addition, the transitional stocks depend on the parameters of grain-saving capacities in direct proportion and therefore, one cannot neglect the analysis of the grain storage system, which is part of the logistic chain that immediately affects the efficiency of the grain products subcomplex of Ukrainian agro-industrial complex.

We suggest considering only certified enterprises of various forms of ownership and scales of production according to the defined methodology. These enterprises along with grain storage can provide grain processing into flour, cereals and combined fodder, as well as its port transshipment abroad.

The logistic assessment of grain-saving power should cover the indicators characterizing the total capacity and its distribution according to the types of storage (floor, silo storage capacity or storage in bags), as well as power of receiving and shipping with a reflection of the technological characteristics of the means of transport that provide cargo handling. This information, in our opinion, should be presented in terms of regions of Ukraine and then used for calculating the coefficient of the local provision of grain-saving capacities.

To study the proportionality between the grain supply formation and providing storage for it in the context of territory, it is necessary to calculate the volumes of grain crops production in the regions of Ukraine. However, it is advisable not to use absolute measures of the grain production volumes, but employ relative ones – production per unit of territory of the region. Similarly, we can calculate the provision of grain-saving capacity of regions. By comparing the relative values of the grain production, we will receive the coefficient of the local provision of grain-saving capacities. This indicator helps to integrally assess the existing potential of elevator capacities in regions and detect “bottlenecks”, and therefore, determine priority directions for investment.

An important item of expenditure of the balance is the export of grain; the vast majority of export shipments are provided by sea transport, therefore, the analysis of port infrastructure, and transfer of grain is an essential part of the methodology of analyzing the efficiency of the logistic systems functioning in the grain products subcomplex of the AIC.

Quantitative parameters of the grain products subcomplex of the AIC are influenced by both organizational and economic conditions of endogenous nature and the environment conditions. For the systematization of the research, all factors of influence were divided into intra- and extra-systemic, and, in fact, into managed and unmanaged from the standpoint of the logistic system management. This technique involves the analysis of the factors that have relevant influence on the studied

subcomplex in Ukraine with the purpose of revealing the reserves to increase its efficiency.

One needs to pay attention to expert evaluations obtained from the results of field researches (interviews with specialists directly at the objects of the grain products subcomplex of the AIC) or in the process of desk researches (mainly from the results of studying specialized publications and Internet resources). For credibility of expert assessments and criteria of making further decisions concerning the increase of the logistic systems efficiency on the market of grain and products of its processing, it is important to possess the statistical data from official sources, and to use the evaluations of experts, referring to the relevant sources of their origin.

To assess the economic efficiency of logistic systems in the grain products subcomplex of the agricultural sector of Ukraine, it is necessary to define their configuration, which will give an opportunity to understand the main functional spheres of logistics and reflect the key problems and tendencies of development of the grain products subcomplex, in which only on the market of storage and food processing 760 companies are involved as of 2016, and also it will help to take appropriate measures to improve the efficiency of such systems.

The most presentably, in our opinion, the logistic system is reflected by the most powerful state operator on the market of grain storage – a PJSC “SFGCU”, which covers 10% of all elevator capacities of Ukraine and provides port handling of 12% of grain for export. As a vertically integrated national operator, the corporation controls 15% of the domestic market of cereals, flour and combined fodder.

The activities of the PJSC “SFGCU” cover all stages of the grain flow passing through logistic chains, since the corporation performs the purchase of grain, its processing, port transshipment for export, while possessing the linear and port elevators, mills, combine fodder factories and cereal plants, etc. That is why, after examining the logistic system efficiency of the PJSC “SFGCU”, it is possible to develop appropriate criteria measures to increase its efficiency in the whole grain products subcomplex of Ukrainian agricultural sector.

Given the fact that the PJSC “SFGCU” unites 57 branch businesses, the information base for the analysis is their consolidated economic and financial reporting. The sources of information should become public resources, namely an official website of the corporation http://www.pzcu.gov.ua, on which the consolidated reporting of the issuer of securities is presented.

Since the corporation is a private joint-stock company, it is obliged to publish the information about the results of financial and economic activities. Using the

resource smida.gov.ua, people can get the full information on the activities of the object, in which they are interested.

The mentioned information resource belongs to the Stock market infrastructure development agency of Ukraine (SMIDA), which was created in 1998. Since 2007, the institution has been an authorized person for disclosure of information by issuers of securities in a publicly accessible database of the Commission – stockmarket.gov.ua. Over the years of its existence, the agency has become a full information and consultation center for all stakeholders.

The efficiency of the system as a whole depends on the efficiency of using factors of production that form this system, – land, capital (fixed and working capital assets) and labor. The system of estimated figures involves the calculation of partial efficiency of using certain factors of manufacturing that produce an integral effect caused by their interaction, which requires the use of a generalized or integrated indicator of efficiency.

An important component of the economic analysis of enterprises' activities is the study of quantitative and qualitative parameters of fixed assets concerning their availability as well as the extent of use. The schematic interpretation of the methodology of analyzing fixed assets that are involved in the logistic system functioning of the PJSC "SFGCU" is shown in figure 5.

To assess quantitative parameters of a technical and technological component of the logistic system, we will use the following coefficients:

Qualitative characteristics of industrial fixed assets of the PJSC "SFGCU" are represented by the evaluation of capital productivity and capital-output ratio of products, as well as by the coefficient of utilization of the logistic capacity. The latter indicator is crucial in the logistic system evaluation, because the total power of the system is determined by the weakest point, which in its turn depends on the throughput capacity of the equipment serving the given area.

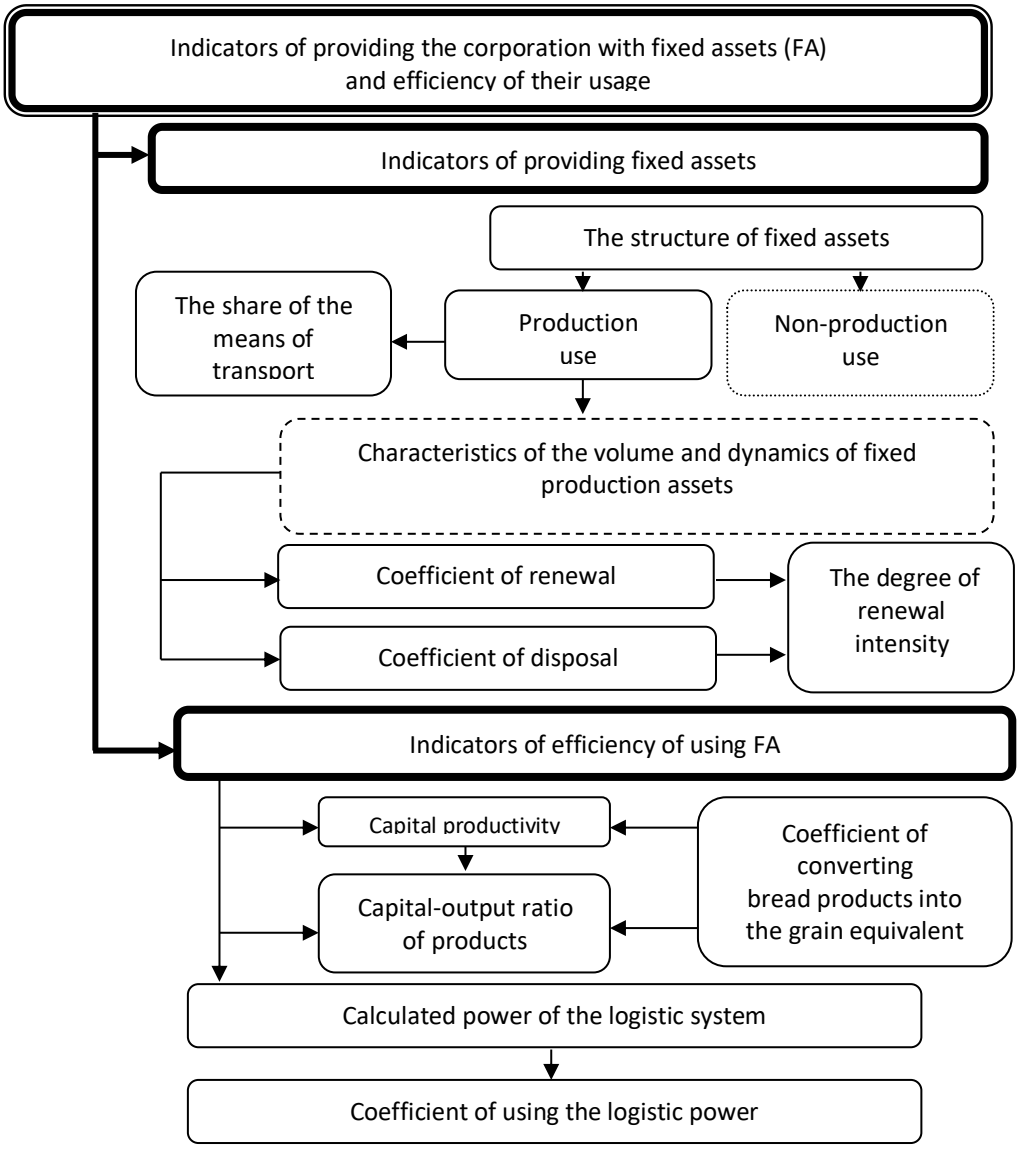
Capital productivity (f) characterizes the efficiency of using means of labor in terms of value, because it determines the quantity of finished products *(Q)*, produced per unit of the average annual value of fixed assets *FA*:

$$f = \frac{Q}{\overline{FA}} \qquad (1)$$

In some cases, in the numerator of formula 1, one can use the volume of production in physical and semi-physical measurements. If there is profit in the numerator, then, in fact, the profitability of fixed assets will be calculated.

The calculation of capital productivity, using values as results, will not adequately reflect the complexity of functional interrelations between the elements of the logistic system.

Figure. 5. The methodology to analyze fixed assets of the logistic system of the object under study.*



Source: compiled by the authors.

We think it is better not to use in the numerator of the formula 2.6 the value expression of the quantity of finished products, but to utilize the natural indicator – the annual amount of grain, which has passed through logistic chains in the

corporation under study, and this indicator is called ***a logistic grain equivalent***. Given the large number of branch businesses and diversification of their activities, we can define the overall framework for the research through the presentation of production and marketing activities of the PJSC "SFGCU" in the grain equivalent. If we know the production volumes of flour, cereals, mixed fodders, as well as the volumes of storage and transshipment of grain, it becomes possible to determine the actual capacity of the logistic system, regardless of the inflow sources and targeted use of grain masses. Moreover, having the coefficients of converting bread products into the grain equivalent (see table 1) we can easily convert the known volumes of grain processing products into grain.

The capital-output ratio characterizes the need for fixed production assets to manufacture a product and it is defined as an inverse indicator to capital productivity. In the proposed technique, the capital-output ratio characterizes the cost of fixed industrial and production assets per 1 t of grain, which has passed through the functional spheres of the logistics in the corporation.

The capital of the company, except for fixed production assets, also covers current assets, which ensure the continuity of the production process. From the standpoint of logistic management, in the structure of current assets, we are interested in distributed stocks (raw materials, basic and auxiliary materials, fuel, packaging, spare parts for repair, etc.), that is, those elements that provide the dynamics of the grain mass. Among the efficiency indicators of using current assets, it is appropriate to employ an index of materials-output ratio, which, within the framework of the presented methodology of the research, will be calculated as the amount of material costs to the annual amount of grain that has gone through logistic chains in the specified corporation (the logistic grain equivalent). The inverse index to the materials-output ratio is return on materials, which characterizes the amount of grain that has passed through logistic chains, with each hryvnia of the consumed material resources.

The presence of the objects and means of labor, which together constitute the means of production, without labor resources will not provide a useful activity of the enterprise. Having physical and mental abilities and knowledge, labor resources are a key factor of production, their quantitative and qualitative content affects directly the efficiency of economic activities. Under conditions of the developed market economy, the reduction of the number of fabrication staff is the result of an increase in the level of mechanization and automation of labor-intensive processes, implementation of labor-saving technologies, etc.

Analyzing the logistic system in the grain products subcomplex of the AIC, we focus more on quantitative and qualitative indicators. The first type of indicators includes the average annual number of employees of the enterprises of the PJSC

"SFGCU", who are directly or indirectly involved in performing logistic functions and the level of their salaries as a means to stimulate efficiency.

The quality group of indicators to evaluate the efficiency of using labor resources includes the capital-labor ratio, which is determined by the ratio of the average annual book value of fixed production assets to the average number of employees. Moreover, we want note that the qualitative improvement of the means of production increases employees' productivity and reduces labor costs and time for their manufacturing.

The most generalized indicator of the efficiency of using labor resources is labor productivity, which is defined in a natural form as the annual amount of grain that has passed through logistic chains (the logistic grain equivalent) per one average worker on the strength, who is employed in manufacturing activities. The units of measurement of this amount are tons per man-year (t/man-year).

The logic of the research presupposes synthesizing evaluative indicators of the effectiveness of using individual factors of production into the integrated indicator. Accumulating all aspects of production and marketing activities, it can detect new features of the estimated value, which are not inherent in the elements that make up the system. This manifestation of emergence as a systemic effect will give the opportunity to assess the factors of production in their interrelations and interdependence more fully.

The efficiency of the logistic system as an integral indicator of efficiency is the ratio of the obtained synergetic effect of the entire system to the total costs of all elements of the logistic chain. The efficiency of the logistic system is set by synergetic connections, which, due to the integrative properties produce an additional effect in the form of logistic synergy.

Profitability is the most summarizing characteristic of the efficiency of enterprises' functioning [148;149]. The activity of the enterprise in the competitive environment depends on profitability of work. After analyzing all the variety of approaches to the generalized evaluation of effectiveness (profitability of property, profitability of assets or profitability of products (selling all products or certain types of them)) we can come to the conclusion that it would be reasonable to use the indicator of profitability of operating activities as an integral indicator of the logistic system efficiency, which is calculated as follows:

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148 Andriichuk V. H. The economics of agricultural enterprises: textbook / V. H. Andriichuk. – K.: KNEU, 2002. – 624 p

149 The economics of enterprises / [Cherevko H. V., Horbonos F. V., Ivanytska, H. B., Pavlenchyk N. F.]. – Lviv: Apriori, 2004. – 384 p.

$$\textbf{Profitability of operational activity} = \frac{\text{Profit from operational activity}}{\text{Production cost of sold goods (work, services)} + \text{Administrative expenses} + \text{Marketing expenses} + \text{Other operational expenses}} \times 100\%$$

It is difficult to evaluate the effectiveness of the logistic system, because it is based on structural and functional relationships between the elements of the logistic chain (elevators, transportation organizations, grain processing enterprises, etc.), which, in their turn, are quite complex systems. Having selected the PJSC "SFGCU" for assessing the logistic system efficiency, we were guided by the fact, that this corporation reflects in the most presentable way the logistics of grain flows from the primary source of raw materials to the consumer of the final product.

In addition, this state operator on the market of storage, processing and transshipment of grain, unites 57 branch businesses, which form the logistic synergy, but are sufficiently heterogeneous to be compared. Therefore, using profitability of the operating activity as a generalized indicator of efficiency, we actually excluded investment and financial activities of the branches from the assessment, and focused, in this case, on performing logistic functions associated with relocation and modification of the grain flow. The integral assessment of the logistic system efficiency in the grain products subcomplex of the AIC on the basis of the profitability of the operating activity will allow:

– determining the profitability of logistic functions, excluding those fixed assets and financial investments that are not part of cash equivalents;

– evaluating the effectiveness of logistic functions of enterprises, eliminating the influence of the size and content of equity and debt capital (financial leverage);

– determining the profitability of services, irrespective of the source of raw materials origin (own or customer-supplied) on the basis of publicly available consolidated financial reporting of the corporation;

– taking into account the structure and range of all products of grain processing.

Conclusions. Thus, the method of analyzing the efficiency of logistic systems functioning in the grain products subcomplex of the AIC determines the algorithm of the analytical study, providing diagnostic and search functions of the analysis. The effectiveness of the system largely depends on the objectivity of the information regarding the structure and trends of grain flows, their quantitative and qualitative parameters, etc. Therefore, a comprehensive analysis of grain balances that aggregate all sources of grain inflows and ways of its usage will present an opportunity to define the parameters of the logistic system functioning through the prism of causality. The proposed ratio of the local provision of grain-saving capacities helps to identify the territorial disparities and priority areas for investment in the construction of elevator enterprises in terms of regions of Ukraine, which ensures the search function of the analysis.

The identified system of indicators of analyzing the logistic system efficiency of the most representative corporation provides an opportunity to evaluate the use of production factors in the logistic supply of grain flows. Given the large number of subsidiaries of the PJSC "SFGCU" and diversity of their activities, one can define a common basis for comparison through the natural indicator – the annual amount of grain, which has passed through the logistic chains in the corporation under study and this indicator is called a logistic grain equivalent.

The proposed integral indicator – profitability of operational activity – allows excluding investment and financial activities of the branches from the assessment, and, in this case, one focuses on performing the logistic functions associated with relocation and modification of the grain flow.

Acknowledgement

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Part 4

STRUCTURAL CHANGES OF THE DEVELOPMENT OF THE NEW ECONOMY UNDER CONDITIONS OF THE EUROPEAN CHOICE

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THE INDUSTRY STRUCTURE OF THE NATIONAL ECONOMY AS A FACTOR OF ITS COMPETITIVENESS FORMATION

Abstract. *The purpose of the paper is analysis of Ukraine's position in the world rankings of competitiveness and a thorough study of the composition and structure of GDP, calculated with using generally accepted methods of calculation based on actual statistical data to identify disparities, which lead to poor competitiveness. In the article, the place of GDP in the national accounts system of Ukraine is explored. This indicator reflects the most important aspects of economic development associated with the production and consumption of products and services, distribution and redistribution of income, the formation of the country's wealthy. The methods of calculating GDP with the help of the current statistical methodology were considered. The contribution of certain economic activities in GDP during 2011-2015 was analyzed. The analysis of the structure of GDP showed the presence of a number of problems and imbalances, which should be overcome by the efforts of authorities at the design and implementation of activities within the government's economic policy. The priority tasks in the area of forming the country's GDP were proposed. Achieving these goals will contribute to the formation of a rational structure of GDP and provide the foundation for further growth of competitiveness of the national economy.*

JEL Classification System: C42, E01, F15, F41, O11, O14.
Key words: Ukraine, national accounts system, GDP, national economy, structure by industries, competitiveness, state policy.

Introduction. Globalization of the world economy and openness of the national economies increase competition, causing the instability of competitive advantages for subjects of international economic relations. This requires finding mechanisms for maintaining and developing competitiveness and mechanisms based on continuous improvement, developing the opportunities, and flexible adaptation to changes in the world conjuncture and the dynamic competitive environment.

Nowadays, the government of Ukraine is declaring a high priority of European integration, which is perceived as a way of modernizing the economy, overcoming technical backwardness, attracting foreign investments and modern technologies, creating new workplaces, increasing the competitiveness of the national manufacturers, entering the world markets, first of all, the market of the EU. The

choice of European integration as the main direction of Ukraine's development is caused by the fact that, as of late, the potential for growth of the national economy on the resource basis has essentially exhausted itself.

The researchers O. Ryaba, H. Shumylo justly note that Ukraine needs dramatic changes in the choice of priorities for economic development in the global competition, and, in order to accomplish that, it is important to realize the meaning and structure of such a fundamental economic category as competitiveness of a country [150]. The competitiveness of an economy, the methods for determining it, and the connection with the growth dynamics at different stages of the economic cycle have been the focus of attention for economists and government members for more than a decade, since the quality of various assessments and the degree to which they correspond to the current economic realities significantly influence the thoroughness of the country's strategic decisions on all the levels of the economy. Researching the competitiveness of the national economy gains special relevance under conditions of European integration, which is developing faster and faster every year.

One of the main indicators of the national accounts system, which reflects the most important aspects of economic development, connected with manufacturing and consumption of goods and services, distribution and redistribution of income, formation of the national wealth of a country, is gross domestic product (GDP). It is an irrational industry structure of GDP that can be recognized as one of the problems, which hinder the competitiveness growth of a country.

A significant contribution into the research on competitiveness has been made by the following foreign and national scientists: P. Krugman, S. Linder, M. Porter, J. Sachs, L. Summers, Ya. Bazylyuk, M. Delyahin, Ya. Zhalilo, V. Inozemtsev, D. Luk'yanenko, S. Menshykov, I. Spyrydonov, R. Fatkhutdinov, T. Tsyhankova and others. Despite considerable achievements in theory and practice of researching competitiveness on the macroeconomic level, we feel that the further research on the connection between the competitiveness of a country in the global environment and the industry structure of its national economy is necessary.

The questions connected with problems of defining GDP are developed in the research of the following scientists: A.F. Mel'nyk, A.Yu. Vasyna, T.L. Zhelyuk, T.M. Popovych [151], Yu.V. Nikolenko [152] and others. The scientists paid close attention to studying the dynamics of the GDP in Ukraine, developing models for its forecasting.

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150 Ryaba O. I., Shumylo N. M. (2010). Competitiveness of Ukraine and ways of its improvement. Herald of Khmelnytsky National University: collection of scientific works. Economic science, 2, vol. 3, 44-47.
151 Melnyk, A.F., Vasy, A.Yu., Zhelyuk, T.L. & Popovych, T.M. (2011). National Economy. Kiev: Znannya.
152 Nikolenko, Yu.V. (2003) Foundations of an economic theory]. Kiev: CzNL.

However, we think that more thorough studies of the structure of the gross domestic product are required, which will make it possible to create a database for further forecasting and planning.

The aim of the research is analysis of the position of Ukraine in the world ratings of competitiveness and a thorough study of the contents and structure of the GDP, calculated with using the generally accepted methods of calculation based on true statistical information, with the aim of revealing disproportions, which lead to the unsatisfactory level of competitiveness.

Researching the concept of "competitiveness" implies clarification of the essence of the category "competition" as they are closely interconnected: competitiveness can only be discussed when there is competition between manufacturers of a certain product (service).

Let us consider the interpretation of the word "competition" that is legally defined in our country. According to the Law of Ukraine "On the Protection of Economic Competition", "economic competition (competition) denotes such a contest among economic entities with a view to gaining advantages over other economic entities thanks to their own achievements that results in the situation where consumers and economic entities have the opportunity to choose from among several sellers, buyers, whereas an individual economic entity is not able to set conditions for the turnover of products on the market" [153].

In order to understand the essence of competition better, it is necessary to consider some of its definitions proposed by well-known authors. The modern American economist P. Heine emphasizes that competition is the desire to meet the criteria for access to rare goods in the best possible manner. F. Knight defines competition as a situation in which there are numerous competing entities, and they are independent. However, according to the author of this article, the most precise definition is the one formulated by M. Porter. The author defines competition as a dynamic process, endlessly changeable foundation for new products and innovative ways of marketing, new manufacturing processes and market segments to emerge [154].

O. Yelets', Ye. Bohdan remark that the modern interpretation of economic competition has its special features: the civilized mode of struggle based on a contest between economic entities; similarity or interchangeability of products offered by

[153]About protection of Economic Competition The law of Ukraine of January 11, 2001 N 2210-III, retrieved from: http://zakon2.rada.gov.ua/laws/show/2210-14 (Accessed 06 February 2017)
[154] Porter, M.E. (ed.) (1986) Competition in Global Industries, Boston : Harvard Business School Press

competing enterprises; identical or similar needs of consumers for which the competitive struggle occurs; managing one's own competitive advantage; commonality, similarity of the goal due to which competition arises; limited ability of each of the competing parties to influence conditions for the turnover of products on the market as a result of independent actions of other parties [155].

The Great economic dictionary gives a rather general interpretation: "Competitiveness is an attribute of a product on the same level as the existing similar products, services, or competing subjects of market relations" [156].

At the micro-level, competitiveness is often defined as a complex category, the advantages of which are eventually realized through trade, but the basis of a competitive advantage is created in all branches of social production, including, to a large degree, with the help of structural rebuilding and effective economic policy [157].

The most substantial contribution towards the research of the problems of competitiveness of countries was made by M. Porter [158], the author of the theory of competitive advantages, according to which competitiveness in the national economy is determined by the ability to maintain labour productivity on a level that is significantly higher than that of the competitors, by continuous introduction of innovations. The author notes that a country achieves high competitiveness not in all the branches of its economy, but only in those in which it has competitive advantage.

V.Behlytsya remarks that, according to criteria indicators of competitiveness, their essence of the macrolevel will consist of the following: this is a possibility to promptly change the mode of functioning at the world level, adapting to its challenges, providing a stable position of a country on the domestic and international market, and increasing wellbeing of the population [159].

L. Shudra states that competitiveness of any country is based on its ability to maintain stable positions in certain segments of the world market with the presence of economic potential, which ensures dynamic implementation of innovative

155 Yelecz, O.P., Bogdan, Ye.V. (2016) The essence of competition and competitive ability of an enterprise] Economic Bulletin of Zaporizhia State Engineering Academy, 7, Retrieved from: http://www.zgia.zp.ua/gazeta/evzdia_7_082.pdf

156 Azriliyan, A.N. (ed.) (2007) The Great economic dictionary. Moscow: INE

157 Rybakova O.V. (2009) Competition and competitiveness: economic essence and factors of improvement. Scientific Bulletin Academy of Municipal Administration: collection of scientific works. Series "Economics", 7, Retrieved from : http://archive.nbuv.gov.ua

158 Porter, M. (1990) The Competitive Advantage of Nations, The Free Press, A Division of Macmillan.

159 Behlytsya V.P. (2010) Competitiveness as a category of the market economy. Proceedings of the Kiev National Economic University, 12, 92-96.

technologies [160]. At the same time, necessary conditions for success are a developed system of market institutions, an ability to react to changes in the world conjuncture, which allows providing maximum possible realization of the national interests. Developing a concept of increasing the competitiveness of the Ukrainian economy is a necessary condition for overcoming the crisis and solving the existing problems. Only high competitiveness of the economy both on the domestic and on the international market is capable of creating a solid foundation for raising the standard of living for the population.

The competitiveness of an economy consists in its ability to achieve and maintain stable positions in certain segments of the market, particularly, due to: strong economic potential; stable growth of the economy on the basis of innovations; a developed system of market institutions; possession of intellectual capital and investment resources; a flexible system of reacting to changes in the world conjuncture.

The field of research called "competitiveness of nations" is covered in the research of the experts of the IMD World Competitiveness Center. It means that enterprises operate in the national environment, which enhances or hinders their ability to compete domestically or internationally. The IMD World Competitiveness Center draws up the World Competitiveness Yearbook. It ranks and analyzes the ability of nations to create and maintain the environment, in which enterprises can compete.

The IMD World Competitiveness Center, a research group within IMD business school, has published the ranking each year since 1989 and it is widely regarded as the foremost annual assessment of the countries' competitiveness.

The rankings are based on two types of data:

- Hard data (2/3): statistics are taken from international organizations (IMF, World Bank, OECD, ILO, etc.), private institutions (Cushmam & Wakefield, Mercer HR Consulting, PriceWaterhouseCoopers. etc) and national sources through the network of Partner Institutes.
- Survey data (1/3): Each year business executives in top or middle management are asked to assess the situation in their own country by completing a questionnaire.

[160] Shudra, L.O. (2013) Competition and its essence. Competitiveness of Ukraine at the level of the world economy] Development Management, 19, 41-44.

Table 1. Ukraine's overall ranking and factors according to the World Competitiveness Yearbook in 2012-2016

Year	2012	2013	2014	2015	2016
Overall Rank	56	49	49	60	59
Economic Performance	48	30	48	60	60
Government Efficiency	56	57	52	59	57
Business Efficiency	55	51	49	55	60
Infrastructure	51	45	44	48	50

Source: Compiled by the authors based on the source [161]

The methodology of the IMD World Competitiveness Center divides the national environment into four main factors [162]:

- Economic Performance
- Government Efficiency
- Business Efficiency
- Infrastructure

The overall ranking of Ukraine and factors according to the World Competitiveness Yearbook in 2012-2016 are in the Table 1.

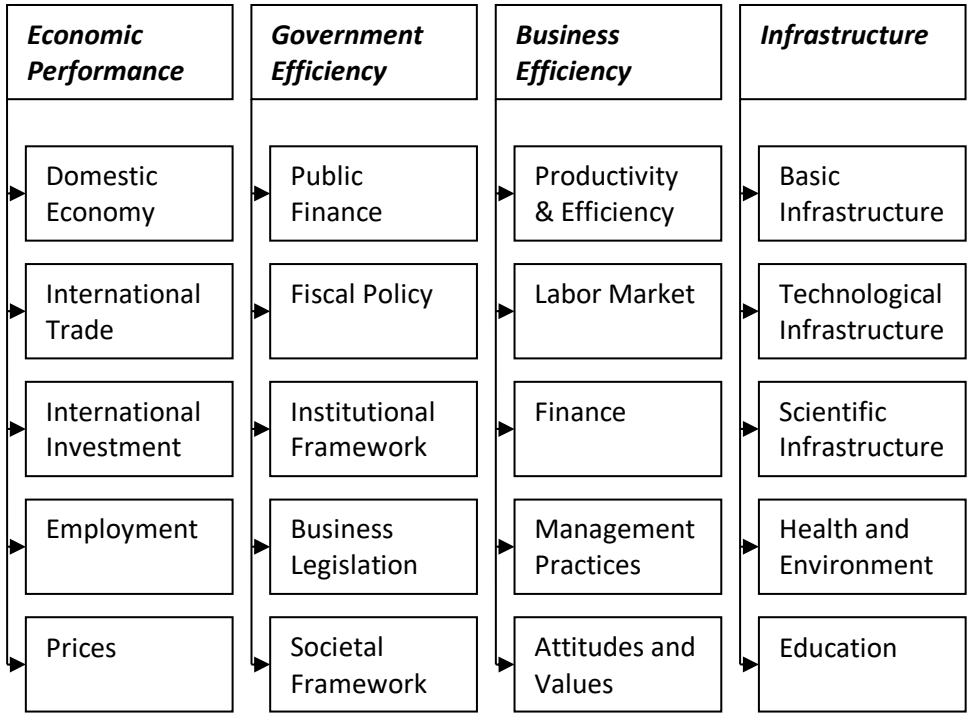
The table shows that the overall rank of Ukraine has gone down over 2012-2016 by 3 positions. The ranks of Economic Performance, Government Efficiency and Business Efficiency went down by 2 positions, 1 position and 5 positions respectively. The improvement by 1 position is observed only for the rank of Infrastructure of Ukraine.

In its turn, each of these factors is divided into 5 sub-factors, which highlight every facet of the areas analyzed. Altogether, the World Competitiveness Yearbook features 20 of such sub-factors. These sub-factors can be shown on the Figure 1. These 20 sub-factors comprise more than 340 criteria. Each sub-factor, independently of the number of criteria it contains, has the same weight in the overall consolidation of results, which is 5%.

[161] IMD World Competitiveness Yearbook 2016 Results. (2016) Lausanne : IMD World Competitiveness Center, retrieved from: http://www.imd.org/wcc/news-wcy-ranking/ (Accessed 06 February 2017)

[162] Site of World Competitiveness Center, retrieved from: http://www.imd.org/wcc/research-methodology/ (Accessed 06 February 2017)

Figure 1. The sub-factors of the countries' competitiveness according to the IMD World Competitiveness Center methodology.



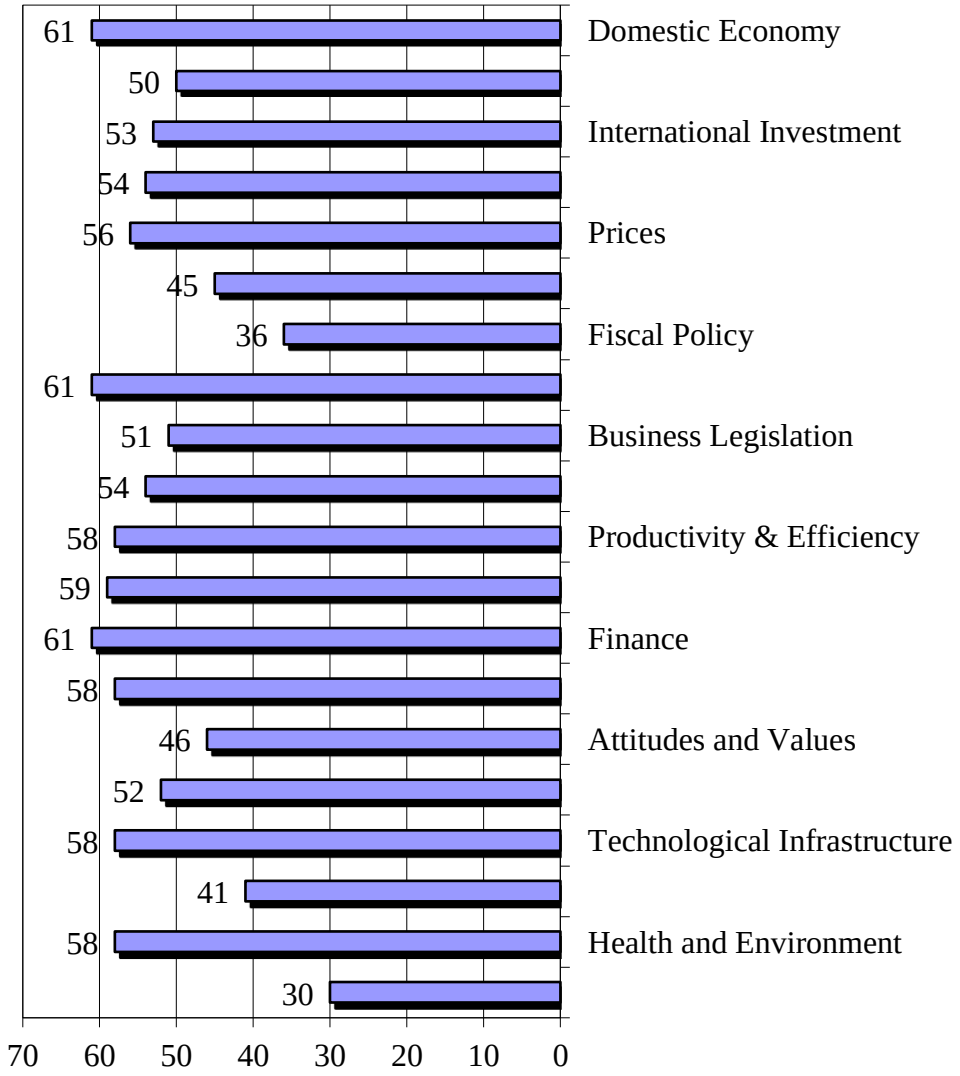
Source: compiled by the authors on [163]

The Figure 2 shows the competitiveness landscape of Ukraine for 2016.

Another research on countries' competitiveness is the Global Competitiveness Index – a global study and the accompanying ranking of countries in terms of economic competitiveness by the World Economic Forum. The Global Competitiveness Index (GCI) shows that, to date, progress in creating the enabling environment for innovation remains the advantage of only a few economies. Finally yet importantly, future growth will also depend on the ability of economies to safeguard the benefits of openness to trade and investment that has led to record reductions in poverty rates in recent decades.

[163] Site of World Competitiveness Center, retrieved from: http://www.imd.org/wcc/research-methodology/ (Accessed 06 February 2017)

Figure 2. The competitiveness landscape of Ukraine for 2016 according to the IMD World Competitiveness Center methodology



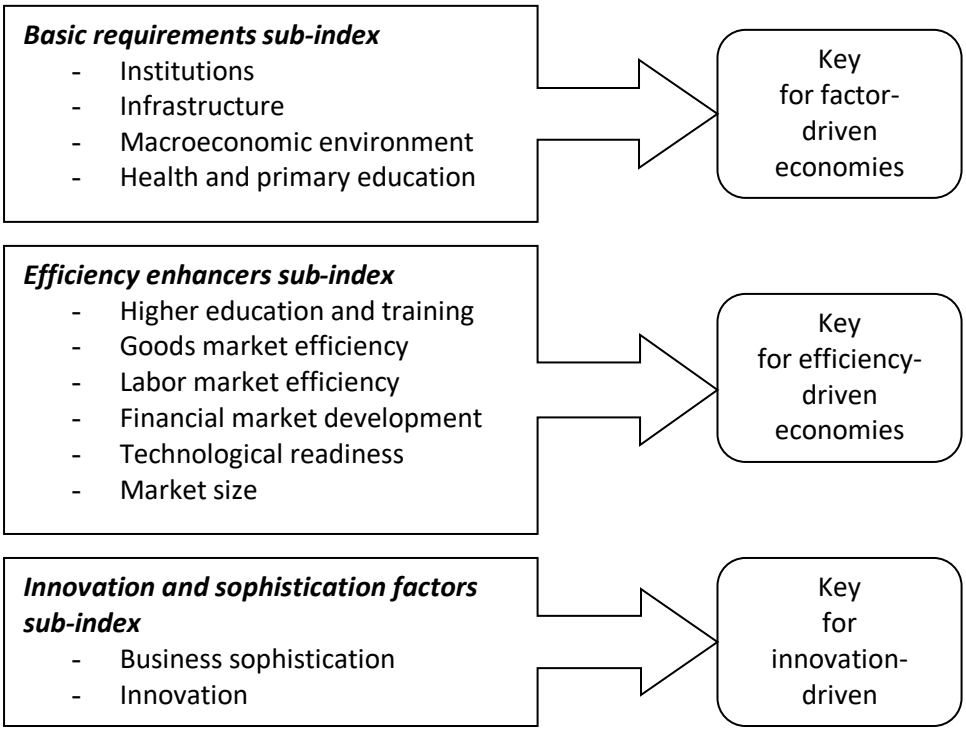
Source: Compiled by the authors based on the source [164]

The experts of the World Economic Forum define competitiveness as a set of institutions, policies, and factors that determine the level of productivity of an economy, which in its turn sets the level of prosperity that the country can achieve.

[164] *IMD World Competitiveness Yearbook 2016 Results*. (2016) Lausanne : IMD World Competitiveness Center, retrieved from: http://www.imd.org/wcc/news-wcy-ranking/ (Accessed 06 February 2017)

The GCI combines 114 indicators, which include concepts that matter to productivity and long-term prosperity. These indicators are grouped into 12 pillars (Figure 3): institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labor market efficiency, financial market development, technological readiness, market size, business sophistication, and innovation.

Figure 3. The pillars of the GCI (World Economic Forum)



Source: Compiled by the authors based on the source [165]

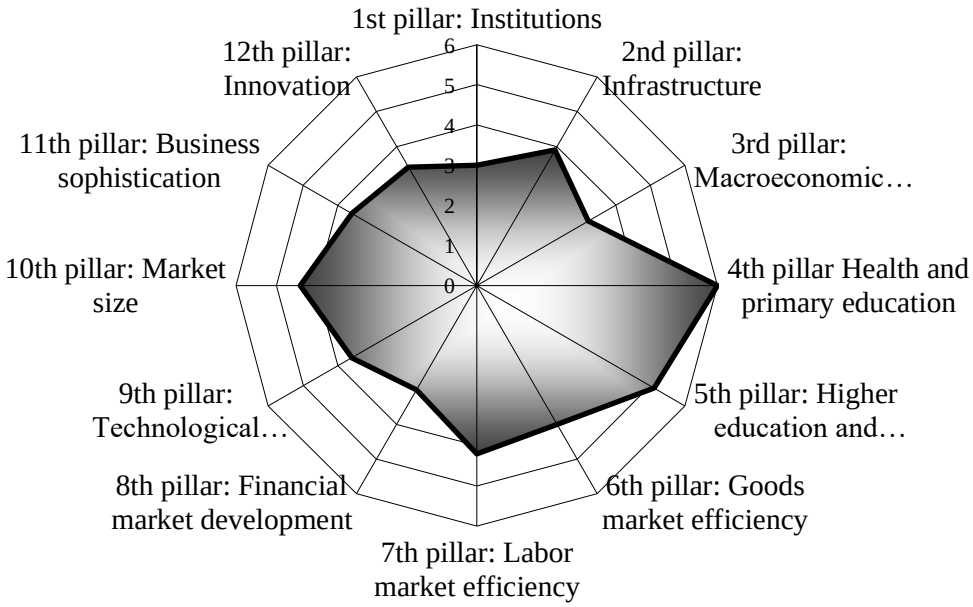
The GCI includes statistical data from the internationally recognized organizations, notably the International Monetary Fund (IMF); the World Bank; and various United Nations' specialized agencies, including the International Telecommunication Union, UNESCO, and the World Health Organization. The Index also includes indicators derived from the World Economic Forum's Executive Opinion

[165] Schwab, K. (2016) The Global Competitiveness Report 2016–2017. Geneva: World Economic Forum, retrieved from: https://www.weforum.org/reports/the-global-competitiveness-report-2016-2017-1 (Accessed 06 February 2017)

Survey that reflect qualitative aspects of competitiveness, or for which comprehensive and comparable statistical data are not available for a sufficiently large number of economies.

Figure 4 shows the profile of Ukraine according to the Global Competitiveness Report for 2016-2017.

Figure 4. The profile of Ukraine (The Global Competitiveness Report for 2016-2017)



Source: Compiled by the authors based on the Source: [166]

For 2016-2017 Ukraine have had such scores: 1st pillar: Institutions – 3.0 (ranks the 129th); 2nd pillar: Infrastructure – 3.9 (ranks the 75th); 3rd pillar: Macroeconomic environment – 3.2 (ranks the 128th); 4th pillar Health and primary education – 6.0 (ranks the 54th); 5th pillar: Higher education and training – 5.1 (ranks the 33rd); 6th pillar: Goods market efficiency – 4.0 (ranks the 108th); 7th pillar: Labor market efficiency – 4.2 (ranks the 73rd); 8th pillar: Financial market development – 3.0 (ranks

166 Schwab, K. (2016) The Global Competitiveness Report 2016–2017. Geneva: World Economic Forum, retrieved from: https://www.weforum.org/reports/the-global-competitiveness-report-2016-2017-1 (Accessed 06 February 2017)

the 130th); 9th pillar: Technological readiness – 3.6 (ranks the 85th); 10th pillar: Market size – 4.4 (ranks the 47th); 11th pillar: Business sophistication – 3.6 (ranks the 98th); 12th pillar: Innovation – 3.4 (ranks the 52nd).

Ukraine ranks the 102nd by the Subindex A: Basic requirements, the 74th by the Subindex B: Efficiency enhancers, the 73rd by the Subindex C: Innovation and sophistication factors, with the scores 4.0, and 4.0 and 3.5 accordingly. For the last five years, Ukraine has moved from 73rd to 85th place, which indicates a decrease in competitiveness of our country.

There are many reasons for the decline of competitiveness of Ukraine, but one of the main is the presence of disparities in the structure of GDP.

Gross domestic product (GDP) is one of the most important indices of economic development, which characterizes the result of the production activity of resident units in material and non-material production areas.

This index is the primary indicator of economic development that fully characterizes the goods and services production volume over a certain period. It is worth mentioning that the GDP dynamics and structure analysis forms the information background for the further estimate of the economic state of the country and the living standards of its citizens.

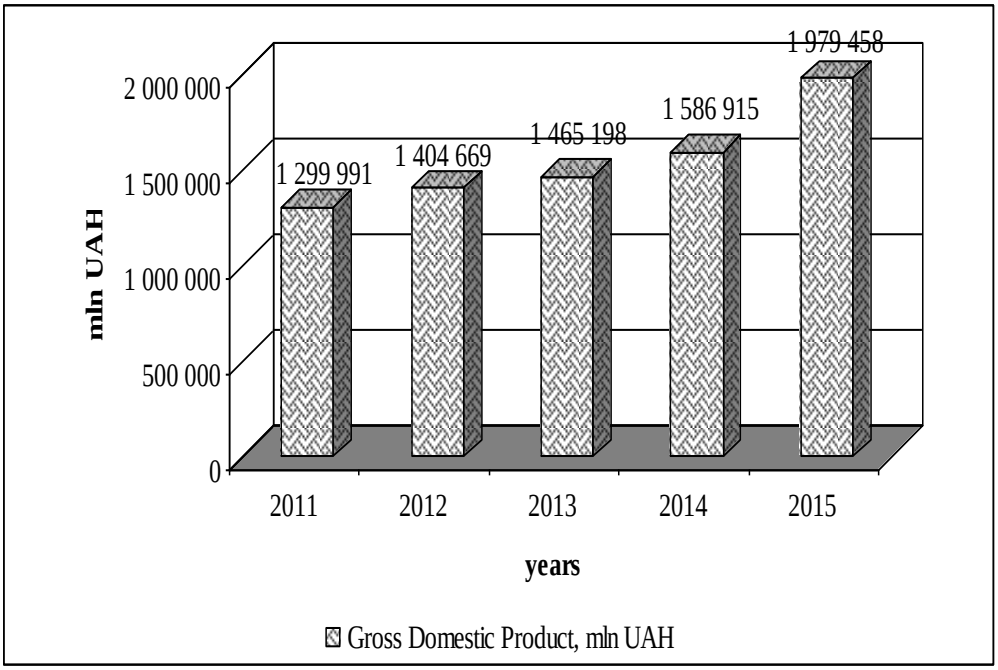
Figure 5 shows the dynamics of the GDP of Ukraine over 2011-2015 in actual prices. As can be seen from the data shown in figure, the GDP of Ukraine in actual prices has a rather stable tendency towards growth. Thus, over 5 years the GDP volume has increased by 679,467 million UAH or by 52.27%. At the same time, the mean annual GDP growth rate in actual prices amounts to only 111.08%, whereas the mean price growth rate over the same period makes up 115.75%. Therefore, the actual growth of GDP volume in Ukraine is currently out of question.

For the GDP evaluation, three following methods are used: production, incomes and final consumption. Let us look into each of these methods.

On the basis of the income approach (distributive method), different incomes of those, who invested human and financial resources in the production of certain goods are summed up during the GDP calculation. According to the methodological guidelines of the State Statistics Committee, the stage of income formation at the GDP level is characterized by the following indices: employee labor remuneration, taxes and subsidies for production and import (at the gross added value level - by other taxes and subsidies related to production), and gross (net) profit [167].

[167] Pankratova, N.Ye., Smyshlyayeva, N.M., Solovjova, N.S. Zapolska, G.G. (2004) The method of calculation of GDP by production and income. Kiev: State Statistic Service of Ukraine.

Figure. 5. The dynamics of the GDP of Ukraine over 2011-2015



Source: compiled by the authors based on the source [168]

As statistical data shows, the main share in the GDP is occupied by the employee labor remuneration (46.97% in 2011 and 39.34% in 2015) and by gross profit and mixed income (39.08% and 44.28% respectively). In these circumstances, some structural changes were made in the GDP structure in favor of the latter. In addition, the share of taxes grew excluding subsidies for production and import.

In 2011-2015, the rate of employee labor remuneration increased by 168,059 million UAH or by 27.52%, the amount of taxes excluding subsidies for production and import increased by 142,942 million UAH or by 78.83%, and gross profit, mixed income rose by 368,466 million UAH or by 72.53%. A more significant rise in taxes and gross profit resulted in structural changes in the GDP. Thus, over 2011-2015 the employee labor remuneration share has decreased by 7.63%, and the taxes share excluding subsidies for production and import as well as gross profit, mixed income grew by 2.43% and 5.20% respectively.

[168] The official site of State Statistic Service of Ukraine (2017), retrieved from: http://www.ukrstat.gov.ua (Accessed 06 February 2017).

Table 2. The GDP structure and components according to the distributive method

Contribution to GDP forming	2011	2012	2013	2014	2015
GDP components (mln UAH)					
Employee labor remuneration	610,615	705,837	730,653	734,943	778,674
Taxes excluding subsidies for production and import	181,330	180,815	184,323	204,191	324,272
Gross profit, mixed income	508,046	518,017	550,222	647,781	876,512
GDP	1,299,991	1,404,669	1,465,198	1,586,915	1,979,458
Share in GDP (%)					
Employee labor remuneration	46.97	50.25	49.87	46.31	39.34
Taxes excluding subsidies for production and import	13.95	12.87	12.58	12.87	16.38
Gross profit, mixed income	39.08	36.88	37.55	40.82	44.28
GDP	100.00	100.00	100.00	100.00	100.00

Source: compiled by the authors based on the source [169]

The data in table 3 show that at the stage of usage, GDP is calculated as the sum of final consumption of goods and services, gross accumulation and balance of goods and services export/import.

Following the respective methodological guidelines, the final consumption of goods and services consists of household expenditures on their own final consumption, governmental institutions expenditures on satisfying individual and collective needs of society, and expenditures on the individual final consumption by non-commercial organizations that provide services for households [170].

Table 3. The GDP components according to the method of final consumption, mln UAH

Contribution to GDP forming	2011	2012	2013	2014	2015
1. Final consumption expenditure of	1,094,231	1,221,163	1,329,632	1,429,959	1,715,636
Households	858,905	950,212	1,047,096	1,120,876	1,325,535

[169] The official site of State Statistic Service of Ukraine (2017), retrieved from: http://www.ukrstat.gov.ua (Accessed 06 February 2017).

[170] Moskvinyj, O.O., Snigirova, V.A., Tryputen, O.M., Berezovska, O.S., Martynenko, Yu.M. & Naboka, G.V. (2006) Methodological provisions for calculating the annual gross domestic product by uses. Kiev: State Statistic Service of Ukraine.

non-commercial organizations that provide services for households	9,619	8,984	10,265	12,873	13,300
general public administration sector	225,707	261,967	272,271	296,210	376,801
individual consumption expenditure	147,603	174,615	184,189	183,008	227,166
collective consumption expenditure	78,104	87,352	88,082	113,202	149,635
2. Gross accumulation	291,678	305,031	270,895	212,591	303,297
Gross accumulation of the basic capital	229,403	266,795	247,054	224,327	262,917
change of the material circulating assets stock	61,774	37,508	23,641	-12,077	40,268
purchasing excluding disposal of values	501	728	200	341	112
3. Goods and services export	647,608	670,319	629,401	771,129	1,044,541
4. Goods and services import	-733,526	-791,844	-764,730	-826,764	-1,084,016
GDP	1,299,991	1,404,669	1,465,198	1,586,915	1,979,458

Source: compiled by the authors based on the source [171]

With regard to the above mentioned, the biggest one among the GDP items identified by the method of final consumption is the final consumption expenditure of households (858,905 million UAH in 2011 and 1,325,535 million UAH in 2015).

Among the peculiarities of the economy of Ukraine, attention should be given to an excess of import over export i.e. foreign trade deficit. Such a situation is attributable to the current export volume not satisfying the capabilities of the domestic goods producers and the needs of the state for foreign currency inflow, which is required for economy stabilization as well as the inflation rate and budget expenditure decrease.

The GDP structure according to the method of final consumption is shown in Table 4. The provided data suggest that final consumption expenditure has the biggest share in the GDP (84.17% in 2011 and 86.67% in 2015) including final consumption expenditure of households (66.07% and 66.96% respectively).

[171] The official site of State Statistic Service of Ukraine (2017), retrieved from: http://www.ukrstat.gov.ua (Accessed 06 February 2017).

Table 4. The GDP structure according to the method of final consumption,%

Contribution to GDP forming	2011	2012	2013	2014	2015
1. Final consumption expenditure of	84.17	86.94	90.75	90.11	86.67
Households	66.07	67.65	71.46	70.63	66.96
non-commercial organizations that provide services for households	0.74	0.64	0.70	0.81	0.67
general public administration sector	17.36	18.65	18.58	18.67	19.04
individual consumption expenditure	11.35	12.43	12.57	11.53	11.48
collective consumption expenditure	6.01	6.22	6.01	7.13	7.56
2. Gross accumulation	22.44	21.72	18.49	13.40	15.32
Gross accumulation of the basic capital	17.65	18.99	16.86	14.14	13.28
change of the material circulating assets stock	4.75	2.67	1.61	-0.76	2.03
purchasing excluding disposal of values	0.04	0.05	0.01	0.02	0.01
3. Goods and services export	49.82	47.72	42.96	48.59	52.77
4. Goods and services import	-56.43	-56.37	-52.19	-52.10	-54.76
GDP	100	100	100	100	100

Source: compiled by the authors based on the source [172]

Gross accumulation has quite an insignificant share in the GDP and is constantly decreasing (from 22.44% in 2011 to 15.32% in 2015). The export of goods and services constitutes 49.82% of the GDP at the beginning of the period under study and 52.77% at the end of this period, while import amounts to 56.43% and 54.76% respectively.

[172] The official site of State Statistic Service of Ukraine (2017), retrieved from: http://www.ukrstat.gov.ua (Accessed 06 February 2017).

Table 5. The GDP components according to the production method, mln UAH

Contribution to GDP forming	2011	2012	2013	2014	2015
Agriculture, forestry and fishery	106,555	109,785	128,738	161,145	236,003
Mining industry and quarry development	84,872	81,660	81,259	79,120	94,824
Process industry	154,675	173,912	165,055	194,050	239,066
Electrical energy, gas, steam and conditioned air supply	39,994	43,491	42,366	44,836	54,155
Water supply, wastewater disposal, waste handling	7,302	6,625	6,573	7,236	9,523
Construction	39,575	39,049	36,902	36,876	44,671
Wholesale and retail trade, automotive and motorcycle maintenance	193,357	200,763	212,090	233,702	288,096
Transport, warehousing, mail and delivery services	103,179	98,859	104,483	100,889	131,209
Temporary accommodation provision and catering	10,256	10,122	10,150	9,927	11,531
Information and telecommunications	38,390	43,379	48,372	52,724	67,822
Financial and insurance activity	58,213	61,055	66,232	70,601	61,334
Real estate operations	69,035	83,502	95,272	99,144	110,434
Professional, scientific and technical activity	30,471	41,966	47,712	47,139	53,847
Activity in administrative and supplementary service area	14,300	16,135	17,715	18,061	20,786
Public administration and defense; compulsory social insurance	53,464	59,752	68,225	78,731	94,294
Education	59,377	71,771	77,986	76,068	83,285
Healthcare and social service provision	41,855	49,234	48,247	46,250	55,628
Art, sports, entertainment and leisure	7,161	9,727	12,704	12,339	12,258
Provision of other services	10,527	12,282	13,731	13,881	12,606
Product taxes excluding subsidies for products	177,433	191,600	181,386	204,196	298,086
GDP	1299991	1404669	1465198	1586915	1979458

Source: compiled by the authors based on the source [173]

[173] The official site of State Statistic Service of Ukraine (2017), retrieved from: http://www.ukrstat.gov.ua (Accessed 06 February 2017).

Close attention in relation to ensuring the competitiveness of the national economy should be paid to the research into the gross added value structure and its components. Table 5 provides the components of the GDP of Ukraine over 2011-2015 according to the production method.

As can be seen from the data in the table, a great contribution to the formation of the GDP of Ukraine is steadily made by such economic activities as retail trade, automotive and motorcycle maintenance, process industry, agriculture, forestry and fishery, transport, warehousing, mail and delivery services, mining industry and quarry development, real estate operations. The enterprises in these economic activity areas form more than half of Ukrainian GDP, which is demonstrated by the data in Table 6.

Table 6. The GDP structure according to the production method,%

Contribution to GDP forming	2011	2012	2013	2014	2015
Agriculture, forestry and fishery	8.20	7.82	8.79	10.15	11.92
Mining industry and quarry development	6.53	5.81	5.55	4.99	4.79
Process industry	11.90	12.38	11.27	12.23	12.08
Electrical energy, gas, steam and conditioned air supply	3.08	3.10	2.89	2.83	2.74
Water supply, wastewater disposal, waste handling	0.56	0.47	0.45	0.46	0.48
Construction	3.04	2.78	2.52	2.32	2.26
Wholesale and retail trade, automotive and motorcycle maintenance	14.87	14.29	14.48	14.73	14.55
Transport, warehousing, mail and delivery services	7.94	7.04	7.13	6.36	6.63
Temporary accommodation provision and catering	0.79	0.72	0.69	0.63	0.58
Information and telecommunications	2.95	3.09	3.30	3.32	3.43
Financial and insurance activity	4.48	4.35	4.52	4.45	3.10
Real estate operations	5.31	5.94	6.50	6.25	5.58
Professional, scientific and technical activity	2.34	2.99	3.26	2.97	2.72
Activity in administrative and supplementary service area	1.10	1.15	1.21	1.14	1.05
Public administration and defense; compulsory social insurance	4.11	4.25	4.66	4.96	4.76
Education	4.57	5.11	5.32	4.79	4.21
Healthcare and social service provision	3.22	3.51	3.29	2.91	2.81
Art, sports, entertainment and leisure	0.55	0.69	0.87	0.78	0.62
Provision of other services	0.81	0.87	0.94	0.87	0.64
Product taxes excluding subsidies for products	13.65	13.64	12.38	12.87	15.06
GDP	100.00	100.00	100.00	100.00	100.00

Source: compiled by the authors based on the source [174]

[174] The official site of State Statistic Service of Ukraine (2017), retrieved from: http://www.ukrstat.gov.ua (Accessed 06 February 2017).

According to the data provided in Table 6, the biggest share in the GDP of Ukraine is occupied by wholesale and retail trade; automotive and motorcycle maintenance (14.87% at the beginning and 14.55% at the end of the studied period), process industry (11.90% and 12.08%), agriculture, forestry and fishery (8.20% and 11.92%), transport, warehousing, mail and delivery services (7.94% and 6.62%), mining industry and quarry development (6.53% and 4.79%).

The next table contains data on the dynamics of the Ukrainian GDP structure and components over 2011-2015 according to the production method.

The data show that the GDP volume in actual prices has grown by 392,543 million UAH or by 24.74% over the last year of the studied period, and by 679,467 million UAH or by 68.0% over 2011-2015.

At the same time, it should be mentioned that the Ukrainian GDP growth over the last year was mainly caused by the increase in the amount of gross added value in such industries as agriculture, forestry and fishery (by 74,858 million UAH or by 46.45%), wholesale and retail trade; automotive and motorcycle maintenance (by 54,394 million UAH or by 23.27%), process industry (by 45,016 million UAH or by 23.20%), transport, warehousing, mail and delivery services (by 30,320 million UAH or by 30.05%). There was a significant rise of this index in mining industry and quarry development (15,704 million UAH or 19.85%) as well as in such economic activities as public administration and defense; compulsory social insurance (15,563 million UAH or 19.77%), information and telecommunications (15,098 million UAH or 28.64%). There was a decrease in the contribution to the GDP of such activities as finance and insurance (by 9,267 million UAH or by 13.13%), art, sports, entertainment and leisure (by 81 million UAH or by 0.66%) and provision of other services (by 1,275 million UAH or by 9.19%).

Notwithstanding the fact that the increase in the gross added value amount in 2015 in comparison with the previous year was observed in most economic activities, the growth rate exceeded inflation index (143.3%) only in agriculture, forestry and fishery (46.45%), which indicates the real growth of gross added value amount in this kind of economic activity. Instead, in all other economic activities the nominal growth, unfortunately, was not accompanied by the real one.

Over the whole period under study, the GDP of Ukraine increased mainly due to the growth of gross added value in agriculture, forestry and fishery (by 129,448 million UAH or by 121.48%), wholesale and retail trade; automotive and motorcycle maintenance (by 94,739 million UAH or by 49.0%), process industry (by 84,391 million UAH or by 54.56%). In all other kinds of economic activity, the growth of gross added value was much less significant.

Table 7.The dynamics of the GDP structure and components (the production method)

Contribution to GDP forming	Absolute, mln UAH		Relative,%		By the share,%	
	2015 compared to 2014	2015 compared to 2011	2015 compared to 2014	2015 compared to 2011	2015 compared to 2014	2015 compared to 2011
Agriculture, forestry and fishery	74,858	129,448	46.45	121.48	1.77	3.73
Mining industry and quarry development	15,704	9,952	19.85	11.73	-0.20	-1.74
Process industry	45,016	84,391	23.20	54.56	-0.15	0.18
Electrical energy, gas, steam and conditioned air supply	9,319	14,161	20.78	35.41	-0.09	-0.34
Water supply, wastewater disposal, waste handling	2,287	2,221	31.61	30.42	0.03	-0.08
Construction	7,795	5,096	21.14	12.88	-0.07	-0.79
Wholesale and retail trade, automotive and motorcycle maintenance	54,394	94,739	23.27	49.00	-0.17	-0.32
Transport, warehousing, mail and delivery services	30,320	28,030	30.05	27.17	0.27	-1.31
Temporary accommodation provision and catering	1,604	1,275	16.16	12.43	-0.04	-0.21
Information and telecommunications	15,098	29,432	28.64	76.67	0.10	0.47
Financial and insurance activity	-9,267	3,121	-13.13	5.36	-1.35	-1.38
Real estate operations	11,290	41,399	11.39	59.97	-0.67	0.27
Professional, scientific and technical activity	6,708	23,376	14.23	76.72	-0.25	0.38
Activity in administrative and supplementary service area	2,725	6,486	15.09	45.36	-0.09	-0.05
Public administration and defense; compulsory social insurance	15,563	40,830	19.77	76.37	-0.20	0.65
Education	7,217	23,908	9.49	40.26	-0.59	-0.36
Healthcare and social service provision	9,378	13,773	20.28	32.91	-0.10	-0.41
Art, sports, entertainment and leisure	-81	5,097	-0.66	71.18	-0.16	0.07
Provision of other services	-1,275	2,079	-9.19	19.75	-0.24	-0.17
Product taxes excluding subsidies for products	93,890	120,653	45.98	68.00	2.19	1.41
GDP	392,543	679,467	24.74	52.27	0.00	0.00

Source: compiled by the authors based on the source [175]

[175] The official site of State Statistic Service of Ukraine (2017), retrieved from: http://www.ukrstat.gov.ua (Accessed 06 February 2017).

Financial and insurance activity was characterized by the gross added value decrease over 2011-2015. It is worth mentioning that in none of the economic activities the mean growth rate of the GDP volume over 2011-2015 exceeded the mean inflation index over the same period. It means that the GDP growth by its components resulted from the inflation process spreading the decrease in the actual volume of product manufacturing and service provision.

Conclusions. Therefore, in this research, the position of Ukraine in the world rankings of competitiveness was analyzed and the composition and structure of GDP, calculated using generally accepted methods of calculation based on actual statistical data was studied. It was found that the competitiveness of Ukraine is unsatisfactory. This is due to the presence of a number of problems, one of which is an unsatisfactory industry structure of the GDP.

It should be noted that in Ukraine there are disproportions between production and service provision industries. On the basis of the above mentioned data, their share (the contribution to GDP forming) was calculated. It should be emphasized that the contribution of production industry branches to the GDP production remains quite low (about 30-31%). In our opinion, this is one of the main factors of the decrease in competitiveness of the country as it is the production industry branch that has the most significant export potential, tends more to innovation mastering and implementation, and that is distinguished by a higher norm of added value.

For the domestic economy transition to a brand new level of development and for the increase of the country’s competitiveness, it is necessary to develop an effective system of public administration (conceptions, development strategies, programs, mechanisms etc.) directed at the implementation of the resource redistribution policy in favor of the production industry branches (in the first place, knowledge intensive industries), which will provide opportunities for the innovative development acceleration and for strengthening the country's positions on the global market. This can become the background for the rise of the competitiveness of the Ukrainian national economy on the overseas markets.

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THE EFFECT OF THE SPACE BASED ECONOMIC STRUCTURE ON COMPETITIVENESS IN EUROPEAN REGIONS

Abstract. *The European Union (EU) provides support for less developed regions of member states to increase their competitiveness and to help them to improve development indicators. The regions of NUST2 with the GDP per capita level less than 75% of the EU average are eligible for funding from structural funds of the central EU budget. Despite the numerous efforts of the EU government, the inequality in terms of economic performance and infrastructural development of the regions remains high. A smart specialization strategy was introduced to promote local entrepreneurial processes and support the technological upgrading of the regions based on existing industrial capabilities. A region with a high value-added economic structure is able to achieve a higher level of competitiveness. In this paper, we test the effects of high and low value-added sectors on competitiveness for the NUTS2 regional level (273 regions). We analyze the effects of the employment structure on Regional Competitiveness Index (RCI) for the two groups of regions based on the criteria below and above 75% of the EU average income. The effects were tested for the total economic employment distribution and for the regional structure of manufacturing. The main results show that the RCI is negatively influenced by the high share of employment in low value-added sectors. A positive influence on regional competitiveness was proved for sectors with high value added. In contrast to the developed regions, the share of employment in professional, scientific and technical activities in the less developed regions is not associated with higher competitiveness. The less developed regions need to strengthen their competitiveness with extra-regional knowledge and networking pipelines mainly through participation in the international supply chains.*

JEL Classification System: J40, O14, R11
Key words: regional competitiveness, EU regions, NUTS 2, economic structure, high value added sector, low value added sector, panel regression

Introduction. Many countries, especially those who are large in size, face the problem of different economic and infrastructural development of particular regions. Among the reasons in most of the cases are distribution of natural resources, historical, geographical, demographical peculiarities, climate and possibilities of trans-border trade with adjacent regions of neighboring countries. In case of the European Union (EU), the differences are particularly huge, because many countries (predominantly new members, who left communist block at the edge of 1980th and 90th) have far lower economic and infrastructural development than the leading

countries[176]. Despite the numerous efforts of the EU authorities, the inequality in terms of economic performance and infrastructural development of the regions remains high.

Space-based policies are often used to support growth and convergence in structurally week regions[177]. European Structural Funds assist the EU regions in increasing competitiveness and employment[178]. Less developed regions, and especially those in Eastern Europe, have a relatively greater need to develop innovation processes while at the same time they face a lower capacity to successfully absorb development funding[179].

The approach of smart specialization states a movement away from regional development policies that were focused on high-technology initiatives or the support of infrastructure development. The new strategy is aimed at development via the promotion of local entrepreneurial processes and the technological upgrading of the region base on existing industrial capabilities[180]. The strategy of smart specialization introduced a structural revolution to the innovation policies[181]. First of all, innovation activity is no longer associated with R&D expenditure. Secondly, the strategy rejects the culture of 'picking winners' only on an industrial basis. Thirdly, smart specialization is aimed at developing public–private partnership of 'entrepreneurial discovery' and learning. However, concerning the policy prioritization, the smart specialization strategy needs a detailed analysis of the current regional economic structure. Many policies of regional development appear to have multiple or often too many goals, while others have stated objectives (such as raising GDP)[182].

There is a general agreement (consensus) in the literature, that the increase in the high value added sector is a principal driver of economic growth[183]. Thus, the

[176] Cassiman, B., Golovko, E., & Martínez-Ros, E. (2010). Innovation, exports and productivity. International Journal of Industrial Organization, 28(4), 372-376.
[177] Becker, S. O., Egger, P. H., & Ehrlich, M. V. (2016). *Effects of EU Regional Policy: 1989-2013* (No. 271). Competitive Advantage in the Global Economy (CAGE).
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[180] McCann, P., & Ortega-Argilés, R. (2016). Smart specialisation, entrepreneurship and SMEs: issues and challenges for a results-oriented EU regional policy. *Small Business Economics*, *46*(4), 537-552.
[181] Capello, R., & Kroll, H. (2016). From theory to practice in smart specialization strategy: emerging limits and possible future trajectories. European Planning Studies, 1-14.
[182] McCann, P., & Ortega-Argilés, R. (2016).
[183] Moreno, R., Paci, R., & Usai, S. (2005). Geographical and sectoral clusters of innovation in Europe. The Annals of Regional Science, 39(4), 715-739

structure of economy determines its efficiency[184] and competitiveness. The activation of an innovative process could be the consequence of not only geographical concentration of production, but also the development of specialized technological clusters in neighboring regions of different countries[185]. It was empirically proved, that economic growth in a given region not only improves the economic environment in itself but also stimulates growth in neighboring regions of adjacent countries (in the framework of so-called institutional space) due to the increase of trade values, investments and the acceleration of technological diffusion[186].

On the other hand, based on the data obtained from 153 European regions in the period 1989-1996, it was concluded, that national borders are a serious obstacle to spreading the technologies and the means of this spread are mainly private companies[187]. Economic growth in less effective European regions is held back by the backward production structure (with a high share of agriculture) and the lack of possibilities for innovations[188]. The research of Teräs, et al. (2015)[189] analyzes sparsely populated regions of the EU and provides recommendations to strengthen their competitiveness with extra-regional knowledge and networking pipelines. The authors support a place-based approach with careful consideration of the economic, social, and institutional contexts.

The majority of available studies analyze the effect of regional economic indicators on competitiveness[190] while the differences between the specific economic sectors are not fully covered. The significant disparities between the regions at different stages of development at the structural level could be observed. However, in order to apply more effective policy instruments, the structural determinants of competitiveness and economic performance need to be determined.

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184 Brock, P. L., & Turnovsky, S. J. (1994). The Dependent-Economy Model with both Traded and Nontraded Capital Goods. Review of International Economics, 2(3), 306-325.

185 Moreno, R., Paci, R., & Usai, S. (2005). Geographical and sectoral clusters of innovation in Europe. The Annals of Regional Science, 39(4), 715-739.

186 Ying, L. G. (2005). From physical to general spaces: A spatial econometric analysis of cross-country economic growth and institutions. The Annals of Regional Science, 39(2), 393-418.

187 Greunz, L. (2003). Geographically and technologically mediated knowledge spillovers between European regions. The Annals of Regional Science, 37(4), 657-680.

188 Cappelen, A., Castellacci, F., Fagerberg, J., & Verspagen, B. (2003). The impact of EU regional support on growth and convergence in the European Union. JCMS: Journal of Common Market Studies, 41(4), 621-644.

189 Teräs, J., Dubois, A., Sörvik, J., & Pertoldi, M. (2015). Implementing Smart Specialisation in Sparsely Populated Areas (No. 10). S3 Working Paper Series.

190 Thissen, M., van Oort, F., Diodato, D., & Ruijs, A. (2013). Regional Competitiveness and Smart Specialization in Europe: Place-based development in international economic networks. Edward Elgar Publishing.

The high value-added economic structure is often discussed in the literature as an important indicator of competitiveness[191]. Moreover, new opportunities for economic performance have those regions that intensify corresponding structural changes in the structure of industrial production and services[192]. Especially the importance of competitiveness growth was reinforced after the world economic crisis of 2008-2009 and downfalls of orientation mainly towards cost reduction. It is important to understand from a policy perspective how low- and high value-added sectors affect regional competitiveness and how the results differ across the EU regions in response to policy and external shocks. A region that develops high-tech sectors is able to achieve a higher level of competitiveness and consequently economic development[193]. The orientation towards low-value-added sectors absorbs the capital that potentially could be used by high-value-added sectors, they do not require the employment of R&D, and typically, they are sensitive to a price factor. This does not stimulate worker's incentives to accumulate knowledge and it delays technological progress[194].

The research question to be addressed in the paper is: What are the effects of the economic structure on regional competitiveness of the EU regions. In this paper, we test the effects of the share of high and low value-added sectors on regional competitiveness.

Working hypothesis: the development of high value-added sectors supports regional competitiveness and *vice versa,* the high share of low value-added sectors reflects low competitiveness. Thus, we hypothesize, that economic performance and the level of development of the particular region depend directly on the share of high value-added and that they are negatively influenced by low-value added sectors of economy (as a share of employees involved in an appropriate sector).

As it was shown previously in our research on example of Ukraine[195] and by other authors[196], the results are expected to confirm that the complexity of the economic structure is beneficial for economic growth. The low value added sectors

[191] Peneder, M. (2003). Industrial structure and aggregate growth. Structural change and economic dynamics, 14(4), 427-448.
[192] Dettmann, E., Brachert, M., & Titze, M. (2016). Identifying the Effects of Place-Based Policies-Causal Evidence from Germany (No. 5901). CESifo Group Munich.
[193] Bobeica, E., Esteves, P. S., Rua, A., & Staehr, K. (2016). Exports and domestic demand pressure: a dynamic panel data model for the euro area countries. Review of World Economics, 152(1), 107-125.
[194] Roaf, M. J., Atoyan, R., Joshi, B., & Krogulski, M. K. (2014). Regional Economic Issues--Special Report 25 Years of Transition: Post-Communist Europe and the IMF. International Monetary Fund.
[195] Cherkas, N. (2012): Structural-Sectoral Model of Export: Objective Factors of Ukraine's Economic Growth. Actual Problems of Economics, 1(127), 111-119
[196] Greenaway, D., Morgan, W., & Wright, P. (1999). Exports, export composition and growth. Journal of International Trade & Economic Development, 8(1), 41-51.

often are the subject of significant price and demand fluctuations[197] that leads to macroeconomic shocks[198]. High dependence on low value-added sectors may cause GDP fluctuations and limit the inflow of investments[199].

The aim of the paper is, based on the proposed model, to analyze and compare the effects of the economic structure on regional competitiveness of the EU regions that differ in development stages and to assess the impact of high value-added and low value-added sectors on regional competitiveness.

The following specific questions will be addressed: 1) the development of an econometric model of the economic structure with high value added and low value added sectors in the regional context; 2) empirical determinants of regional competitiveness in the EU regions.

The methodological approach

The nature of differences between the EU regions is extremely complex and this requires sophisticated approaches to the analysis. To identify structurally weak and strong EU regions we used the Eurostat Statistical Atlas methodology of regions division into development stages. The regional development level classification is based on average GDP per capita in PPS[200], in the EU-27 index (100):

- 1 development stage – GDP per capita <50;
- 2 development stage – GDP per capita <50-75;
- 3 development stage – GDP per capita <75-90;
- 4 development stage – GDP per capita <90-110;
- 5 development stage – GDP per capita >=110.

Based on this methodology for the empirical analysis, we use the following three groups of regions:

1) All data of the EU regions (273 units);

2) The EU regions of development stages 3-5 (167 units);

3) The EU regions of development stages 1-2 (106 units).

The data for the empirical analysis are used from several sources. The main outcome variable is the Regional Competitiveness Index (RCI) from Eurostat Statistics.

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[197] Sachs, J. D., & Warner, A. M. (1999). The big push, natural resource booms and growth. Journal of development economics, 59(1), 43-76.

[198] Cherkas, N. (2014): Empirical Analysis of Structural Developments in Ukraine's Export. In: Methods and Models for Analyzing and Forecasting Economic Processes. Theory and Practice, Cracow University of Economics, 28-44.

[199] Peneder, M. (2003). Industrial structure and aggregate growth. Structural change and economic dynamics, 14(4), 427-448.

[200] Stiglitz, J., Sen, A., & Fitoussi, J. P. (2009). The measurement of economic performance and social progress revisited. Reflections and overview. Commission on the Measurement of Economic Performance and Social Progress, Paris.

The data are used for NUTS2[201] regional level (273 regions) for the latest year available (2013) from the European Commission.

The pattern of distribution of the regions according to the level of competitiveness has some typical tendencies (Figure 1), for example East-West and South-North directions of competitiveness increase, areas around the big administrative and financial centers (most typically country capitals) have a higher RCI and more densely populated areas and tend to be also more competitive. The regions of adjacent countries that are neighbours with highly competitive regions also tend to have a higher RCI compared to others, but the country borders seem to be the main "barrier" for competitiveness diffusion[202].

The RCI measures the level of competitiveness of an individual region[203]. It is a weighted composite measure of multiple dimensions (or pillars). Eleven dimensions are aggregated into three sub-indices and then into an overall composite competiveness index. These eleven dimensions and three groups are the following (Figure 2):

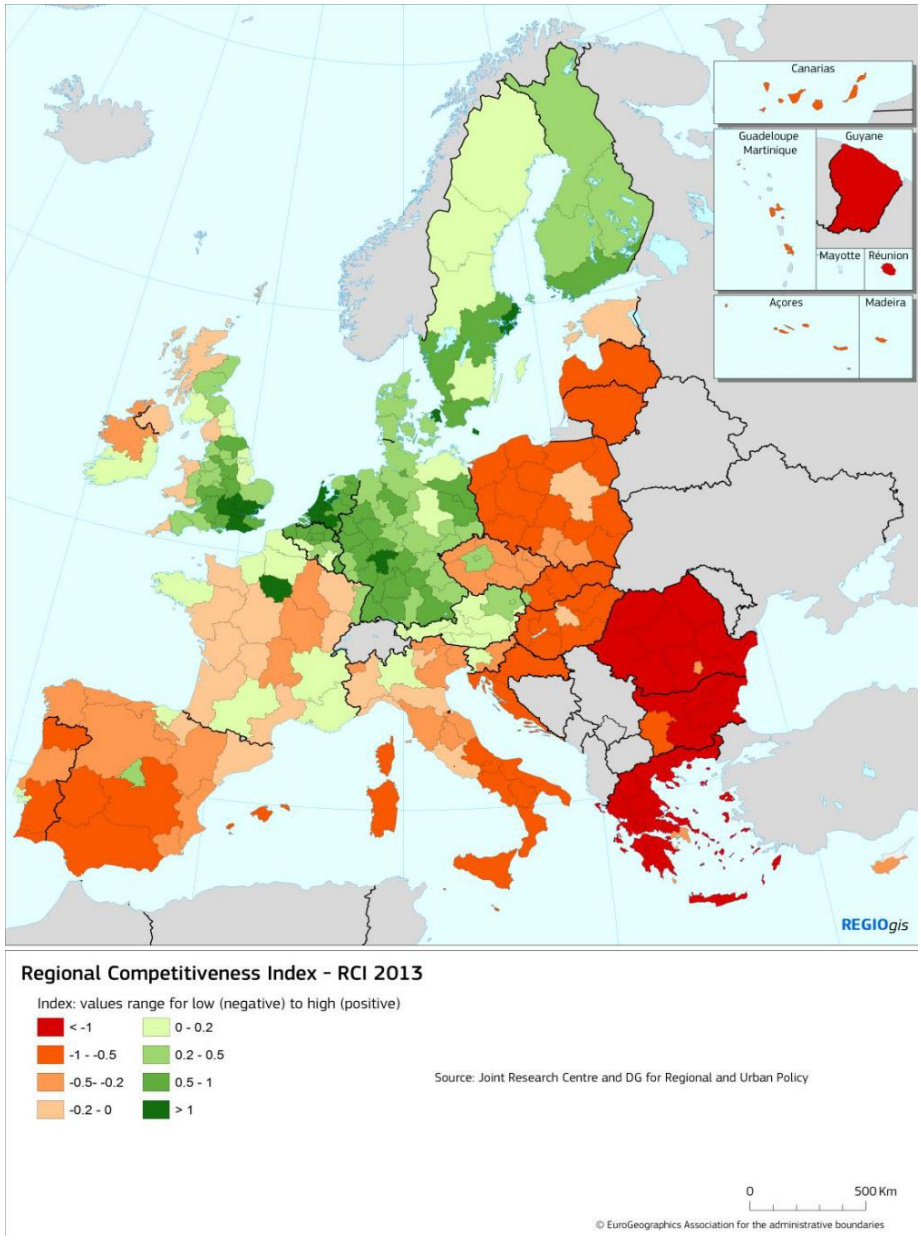
The dimensions of competitiveness are linked with each other. If a region has 'good performance' in the innovation sub-index, it is expected to have 'good performance' in the efficiency and the basic sub-index, as each sub-index is considered instrumental along the way of increasing the levels of competitiveness. Socioeconomic conditions of regions change over time and some of the competitiveness dimensions become more important.

[201] The Nomenclature of Territorial Units for Statistics or Nomenclature of Units for Territorial Statistics. Group of NUTS 2 - Region/Province/State/Prefecture (including: autonomous type).

[202] Martin, R. L. (2003). A study on the factors of regional competitiveness. Retrieved from: http://ec. europa. eu/regional_policy/sources/docgener/studies/pdf.

[203] Dijkstra, L., Annoni, P., & Kozovska, K. (2011). A new regional competitiveness index: Theory, methods and findings (Vol. 2, p. 2011). Working Paper.

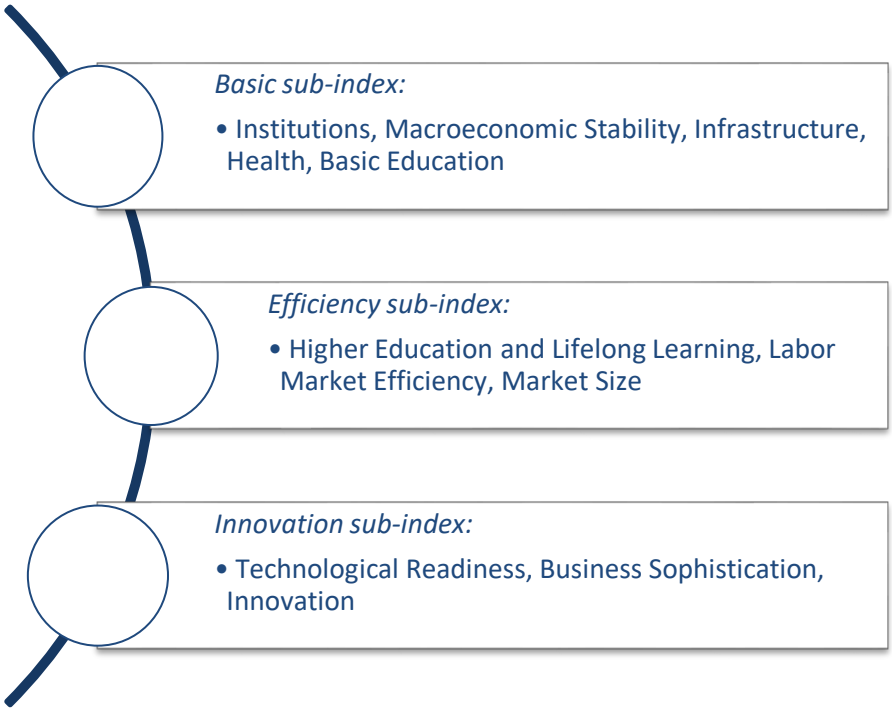
Figure. 1. The distribution of RCI 2013 scores across the EU regions



Source: EU regional competitiveness index[204].

[204] Annoni, P., & Dijkstra, L. (2013). EU regional competitiveness index. Luxembourg, Europe.

Figure. 2. The structural components of the Regional Competitiveness Index



Source: compiled by the author on[205]

As it could be expected, among the top ten most competitive regions there are important business and financial centers with powerful universities, mainly the areas of and around London in the United Kingdom (UK), Amsterdam in the Netherlands and Stockholm in Sweden, where headquarters of banks and big transnational companies are located (Table 1). These are areas of highest development of infrastructure (airports, rail- and roadways, relative proximity to ports) and high density of top-level research centers and universities. These areas attract qualified workforce and provide excellent opportunities for innovative activity[206]. As the UK has recently decided to exit the EU, it would be of great interest to track if this will influence the competitiveness of its leading regions after Brexit.

[205] Annoni, P., & Dijkstra, L. (2013). EU regional competitiveness index. Luxembourg, Europe.
[206] Shevchuk, V., Cherkas, N. (2008): The impact of regional industrial production and foreign trade geography on technological exports. In: Regional economy, 2, 34-43.

Table 1. Top 10 most competitive regions in the EU-28, by NUTS 2 regions, 2013 (index, 0–100)

	COUNTRY NAME	NUTS CODE	NUTS NAME	RCI 2013		Index
				scores	ranks	
1	The Netherlands	NL31	Utrecht	1,358	1	100,0
2	The United Kingdom	UKH2	Bedfordshire and Hertfordshire	1,192	2	94,2
3	The United Kingdom	UKH3	Essex	1,192	2	94,2
4	The United Kingdom	UKI1	Inner London	1,192	2	94,2
5	The United Kingdom	UKI2	Outer London	1,192	2	94,2
6	The United Kingdom	UKJ1	Berkshire, Buckinghamshire and Oxfordshire	1,174	3	93,5
7	Sweden	SE11	Stockholm	1,149	4	92,6
8	The United Kingdom	UKJ2	Surrey, East and West Sussex	1,093	5	90,7
9	The Netherlands	NL23	Flevoland	1,078	6	90,1
10	The Netherlands	NL32	Noord-Holland	1,078	6	90,1

Source: compiled by the authors on the data from Eurostat

Practically all the least developed and competitive regions of the EU are located in three countries – Greece, Bulgaria and Romania (Table 2). Two last countries only in 2007 joined the EU, while Greece is deeply affected by its debt crisis[207]. Despite significant support of the EU and financial aids, the competitiveness of these regions remains low and it is not realistic to expect their rapid development without qualitative transformation and creation of an innovative medium led by research and industry. Even though the number of universities and students in these regions is not low, the lack of companies-technological leaders causes outflow of qualified labor and employment of workers in low value-added industries (agriculture, mining, services etc.). The situation similar to the previously described "depression trap"[208] takes place.

[207] Korol, O., Cherkas, N. (2015): The economic impact of foreign debt in Greece. In: The Baltic Journal of Economic Studies, 1, 105-112.

[208] Shevchuk, V., Cherkas, N. (2006): The depression „trap" of border regions as a barrier to improving its competitiveness. Proceedings of the XV Intern. Scien. conf. "Strategic development of regions: economic growth and integration", 131-134.

Table 2. Top 10 least competitive regions in the EU-28, by NUTS 2 regions, 2013 (index, 0–100)

n	COUNTRY NAME	NUTS CODE	NUTS NAME	RCI 2013		Index
				scores	ranks	
1	Greece	GR25	Peloponnisos	-1,337	253	5,1
2	Romania	RO41	Sud-Vest Oltenia	-1,360	254	4,2
3	Romania	RO12	Centru	-1,362	255	4,2
4	Greece	GR11	Anatoliki Makedonia, Thraki	-1,371	256	3,9
5	Greece	GR42	Notio Aigaio	-1,376	257	3,7
6	Greece	GR13	Dytiki Makedonia	-1,403	258	2,8
7	Bulgaria	BG34	Yugoiztochen	-1,403	259	2,7
8	Greece	GR24	Sterea Ellada	-1,417	260	2,2
9	Romania	RO22	Sud-Est	-1,479	261	0,1
10	Bulgaria	BG31	Severozapaden	-1,481	262	0,0

Source: compiled by the authors on the data from Eurostat

The gap between the most and the least competitive regions remains huge and conventional approaches to stimulate innovative activity demonstrated lower than expected efficiency: competitive regions mostly remain competitive, while less developed regions develop slowly and are not likely to improve their position in the ranking any time soon[209].

The sectoral structure. In order to analyze the high value added and low value added sectors of the economy we used the data on sectoral employment that were collected from Eurostat Regional Yearbook:

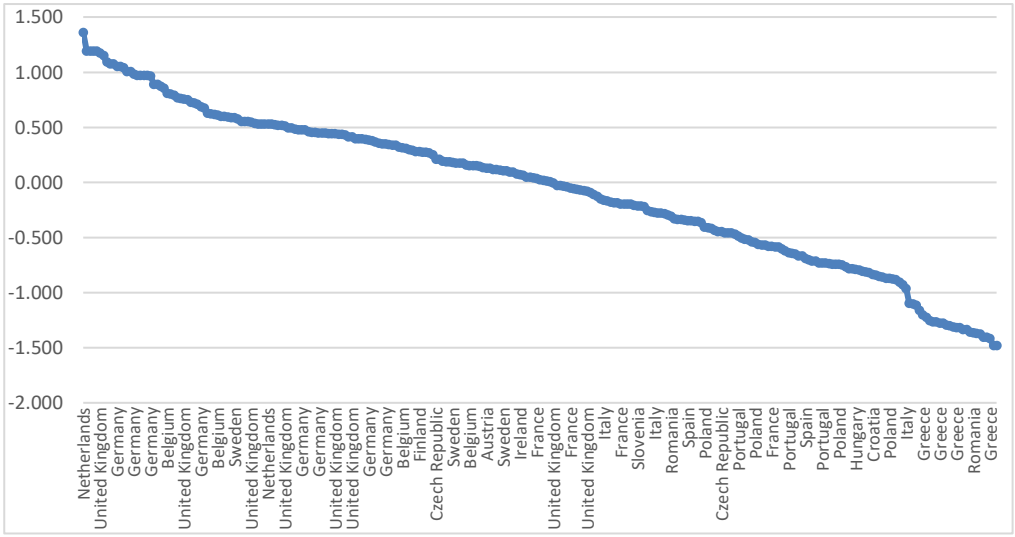
– Ind_Empl_t is an employment share of the industrial economy (NACE Sections B–E), by NUTS 2 regions, (% of the non-financial business economy);

– $Serv\_Empl_t$ is an employment share of the non-financial services economy (NACE Sections G–N and Division 95, excluding Section K), by NUTS 2 regions, (% of the non-financial business economy);

– $Income_t$ is a primary income of private households relative to the population size, by NUTS 2 regions.

[209] Cherkas, N. (2013) Structural shifts in the exports and industrial production effects in Ukraine. In: Proceedings of the 7th Professor Aleksander Zelias International Conference on Modelling and Forecasting of Socio-Economic Phenomena, 41-48.

Figure. 3. The Regional Competitiveness Index, 273 EU regions, NUTS2



Source: compiled by the authors on [210]

These data reflect the most important issues of the employment structure (low and high value-added industries) and income of the population of the regions and directly influence the economic performance and competitiveness.

Table 3. Descriptive Statistics

	Statistics	Ind_Empl_t	$Serv\_Empl_t$	RCI_t	$INCOME_t$
All EU regions	Valid N	200	200	273	269
	Mean	25,87	64,07	-0,05	16925,73
	Min	2,6	41,092	-1,481	4824,426
	Max	48,24	93,8	1,36	37521
	Std.Dev.	10,16	10,963	0,679	5693,23
Regions of development stage 3-5	Valid N	143	143	203	200
	Mean	21,88	68,06	0,21	19081,48
	Min	2,600	48,312	-1,417	8954,181
	Max	41,01	93,80	1,36	37521,00
	Std.Dev.	7,761	9,179	0,557	4658,820

[210] Eurostat: Regional competitiveness statistics. Retrieved from: http://ec.europa.eu/eurostat/statistics-explained/index.php/Regional_competitiveness_ statistics.

Regions of development stage 1-2	Valid N	56	56	69	68
	Mean	36,28	53,67	-0,82	10610,00
	Min	16,144	41,092	-1,481	4824,426
	Max	48,24	74,11	-0,01	22069,72
	Std.Dev.	7,980	7,971	0,351	3284,380

Source: estimated by the authors on the data from Eurostat

Before we proceed with the regression analysis, Table 3 provides descriptive statistics of the variables used in our first regression. In particular, the table displays the distribution of all variables – the mean, the minimum, the maximum and the standard deviation. The outcome variable is the RCI for three groups of regions.

The economic structure. For the analysis of the regional sectoral structure, we have taken the data of the total economic employment distribution as used in Navarro et al, 2014[211]. The ten major sectors based on the Eurostat's regional economic accounts (NACE rev2) are used: 1) Agriculture, forestry and fishing; 2) Industry (except construction); 3) Construction; Trade, transportation, accommodation and food service activities; 4) Information and communication, 5) Financial and insurance activities; 6) Real estate activities; 7) Professional, scientific, technical, administration and support service activities; 8) Public administration; 9) Defense, education, human health and social work activities; 10) Arts, entertainment, recreation and other services (see Table 5 for the descriptive statistics). By reviewing the literature that analyzed the determinants of regional competitiveness (Bristow, 2005[212]; Kitson, Martin & Tyler, 2004)[213], we identified the following dimensions: 1) innovations, 2) investment, 3) infrastructural capital, 4) social-institutional capital, 5) productive capital.

For obtaining an overall estimation for the proposed groups of countries, an analysis of panel data was conducted. We estimated a regression in the following form:

$$RCI_{it} = a_0 + a_1 Income_{it} + a_2 S_{it} + \lambda_i + \varepsilon_i, \quad (1)$$

where a_0, a_1, a_2 are coefficients, $Income_t$ is a primary income of private households relative to the population size, S_t is a variable for a low value added sector

[211] Navarro, M., Gibaja, J. J., Franco, S., Murciego, A., Gianelle, C., Kleibrink, A., & Hegyi, F. B. (2014). Regional benchmarking in the smart specialisation process: Identification of reference regions based on structural similarity (No. JRC89819). Institute for Prospective and Technological Studies, Joint Research Centre.

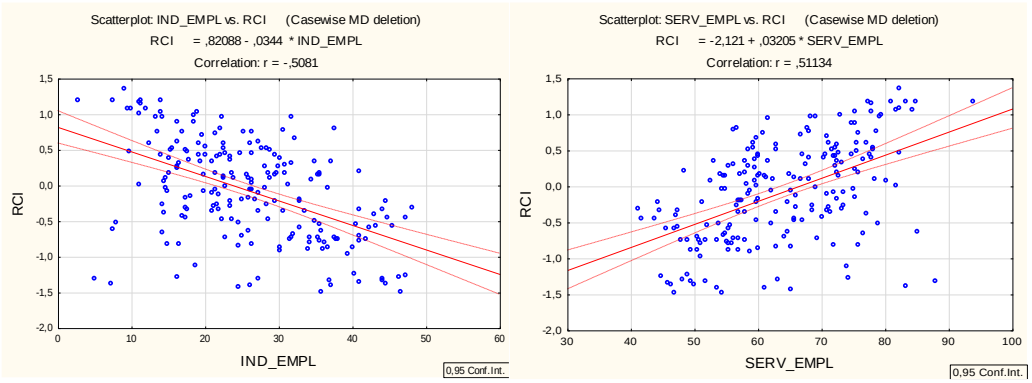
[212] Bristow, G. (2005). Everyone's a 'winner': problematising the discourse of regional competitiveness. Journal of Economic Geography, 5(3), 285-304.

[213] Kitson, M., Martin, R., & Tyler, P. (2004). Regional competitiveness: an elusive yet key concept? Regional studies, 38(9), 991-999.

(the employment share of the industrial economy) or high value added sector (the employment share of the non-financial services economy), $\boldsymbol{\lambda_i}$ is a region's specific effect, that may be fixed or random, $\boldsymbol{\varepsilon_i}$ is a heteroskedastic disturbance term. For econometric testing we used a panel data model. In order to test for differences between the fixed effects (FE) and random effects (RE) a Hausman test was applied. According to the test results, the FE model was recommended.

The Econometric Results and Interpretation. In order to test the basic principles of the proposed theoretical model, the correlation analysis was done. The results presented in the figure 4 indicate clearly that a higher share of industrial employment is associated with lower rates of competitiveness. In contrast, a higher share of labor involved in a services sector is associated with higher rates of competitiveness.

Figure. 4. The correlation scatterplot of the RCI and a) Ind_Empl_t (the employment share of the industrial economy); b) $Serv\_Empl_t$ (the employment share of the non-financial services economy) for all EU regions NUTS2.



a) b)

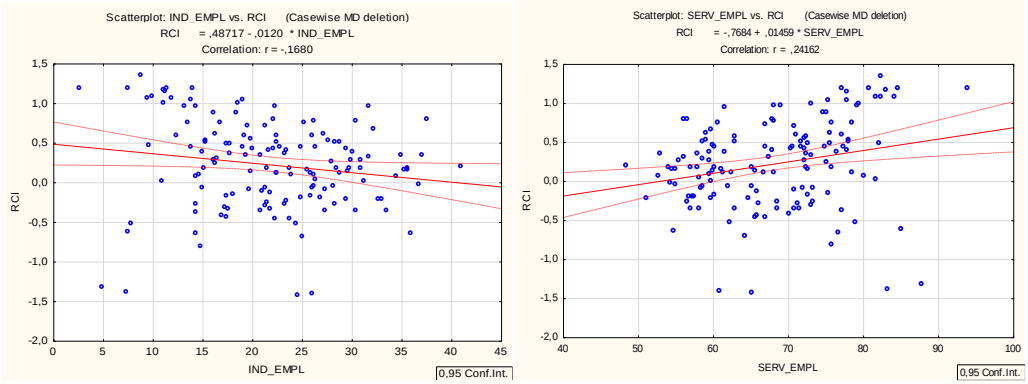
Source: estimated by the authors on the data from Eurostat [214] using econometric software package Statistica

Results of correlations scatterplot for the regions of development stage 3-5 are presented in the figure 5 and represent the same impact as for the all EU regions. Employment in the sector of services contribute to the growth of regional competitiveness, while employment in industrial sector causes decrease of the RCI.

[214] Based on Eurostat data http://ec.europa.eu/eurostat

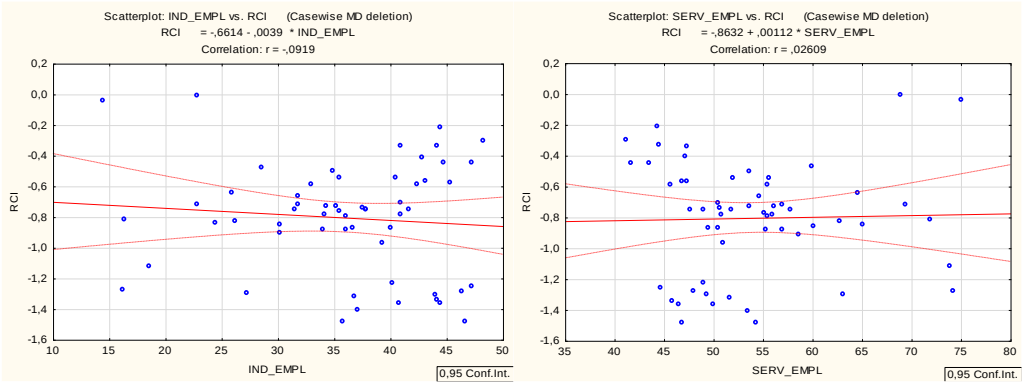
The same tendencies could be observed for the for the regions of development stage 1-2 (Figure 6), but the statistical significance of the results is not high due to lower number of observations.

Figure. 5. The correlation scatterplot of the RCI and a) *Ind_Empl*$_t$ (the employment share of the industrial economy); b) *Serv_Empl*$_t$ (the employment share of the non-financial services economy) for the EU regions of development stages 3-5.



a) b)

Figure. 6. The correlation scatterplot of the RCI and a) *Ind_Empl*$_t$ (the employment share of the industrial economy); b) *Serv_Empl*$_t$ (the employment share of the non-financial services economy) for the EU regions of development stages 1-2.



Source: estimated by the authors on the data from Eurostat using econometric software package Statistica

Table 4 summarizes our findings for six different equations. The results display the following pattern: the income level has a significant effect on the RCI in all specifications. The level of employment in an industrial sector (low- and middle-

qualification work with the level of wages that is rather low, at least in comparison to high-skilled professionals) shows a negative impact on regional competitiveness for all the regions and the regions of development stages 3-5. In contrast, the level of employment in a sector of services provides the results of a negative impact on the RCI. The results for the regions of development stages 1-2 are not significant for the Ind_Empl_t and $Serv\_Empl_t$, but display opposite signs as for the previous two groups of regions. The disadvantaged regions of the EU that qualify for structural funds show slower economic performance. According to the results of Becker, Egger and Ehrlich (2010)[215], there is a positive per capita growth effect, but no employment growth effect of grants and aids.

Table 4 .The estimation results including employment in industry and services (dependent variable RCI)

Independent variables	All regions		Regions of development stages 3-5		Regions of development stages 1-2	
n	205	205	142	142	56	56
Constant	-12,87 (-14,68***)	-13,66 (-18,37***)	-1,05 (-5,98***)	-2,10 (-7,44***)	-1,39 (-5,33***)	-0,96 (-3,13***)
$Income_t$	0,74 (15,67***)	0,72 (15,91***)	0,66 (10,62***)	0,65 (10,53***)	0,43 (3,40***)	0,43 (3,47***)
Ind_Empl_t	-0,15 (3,14***)		-0,16 (2,58***)		0,08 (0,61)	
$Serv\_Empl_t$		0,18 (3,94***)		0,20 (3,28***)		-0,13 (-1,05)
adj. R^2	0,66	0,67	0,45	0,47	0,15	0,16

Notes: ***, **, *, denote statistical significance at the 1%, 5%, and 10% level, respectively. The sample consists of 205 EU NUTS2 regions for all regions 142 for the regions of development stages 3-5 and 56 for the regions of development stages 1-2 due to some missing variables.

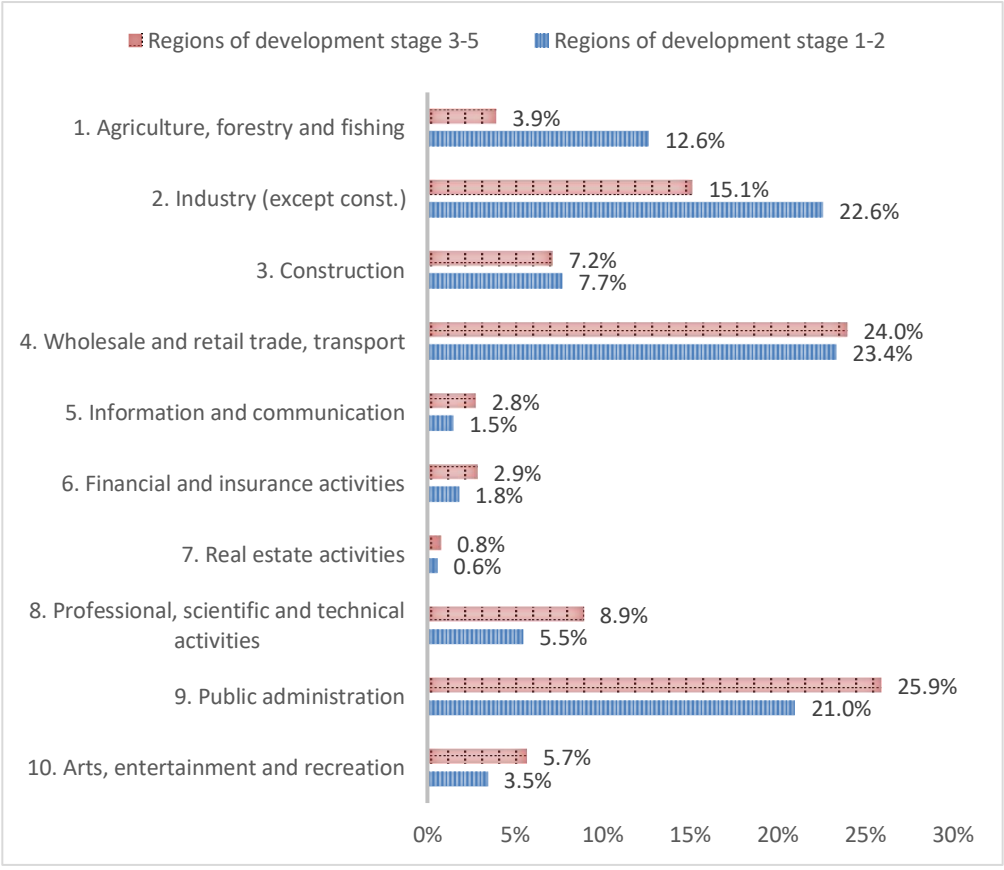
The regression results in the table include coefficients and *t*-Statistics provided in parentheses with significance level.

Source: estimated by the authors on the data from Eurostat using econometric software package Statistica

[215] Becker, S. O., Egger, P. H., & Von Ehrlich, M. (2010). Going NUTS: The effect of EU Structural Funds on regional performance. Journal of Public Economics, 94(9), 578-590.

Next, we check the results for different sectors of the economy. Figure 7 represents the employment according to the economy's sectoral distribution in the EU-28 for regions of 1-2 development stages and 3-5. Lagging regions (1-2 stages) have higher labor force concentration in the agriculture, forestry and fishing and industry (these industries as a rule require low- and middle- qualification employees and expected wages are also relatively low). The shares of construction, transportation and retail sector employees are considered to be approximately at the same level in both groups, however the shares of high-skilled employees in information/communication, financial/insurance, professional, scientific and technical activities, public administration, arts, entertainment and recreation are higher in more developed regions.

Figure. 7. The economy's sectoral distribution in the EU-28, by NUTS2 regions



Source: compiled by the authors on the data from Eurostat

The descriptive statistics of regional economic structure is summarized in the table 5. The data distribution presented in figure 7 and table 5 confirms that regions of development stage 1-2 specialize in activities with lower value added. This is consistent with our theoretical prediction and model that high value-added industries and services, which require highly skilled employees, generate higher revenues and lead to economic growth and the increase in competitiveness of the region through the increase of consumption in response to a high income. However, these data and observations require further empirical estimation and confirmation of suggested relationships.

Table 5 .Descriptive statistics of regional economic structure (includes 10 sectors based on Eurostat's regional economic accounts) [216]

		1	2	3	4	5	6	7	8	9	10
All EU regions	Valid N	205	205	205	205	205	205	205	205	205	205
	Mean	0,07	0,17	0,07	0,24	0,02	0,03	0,01	0,08	0,24	0,05
	Min	0,00	0,04	0,03	0,14	0,01	0,00	0,00	0,02	0,11	0,02
	Max	0,48	0,36	0,12	0,43	0,08	0,12	0,03	0,18	0,39	0,13
	Std.Dev	0,08	0,07	0,02	0,05	0,01	0,01	0,00	0,03	0,06	0,02
Regions of develop-ment stage 3-5	Valid N	143	143	143	143	143	143	143	143	143	143
	Mean	0,04	0,15	0,07	0,24	0,03	0,03	0,01	0,09	0,26	0,06
	Min	0,00	0,04	0,03	0,14	0,01	0,00	0,00	0,04	0,15	0,02
	Max	0,30	0,29	0,12	0,43	0,08	0,12	0,02	0,18	0,39	0,13
	Std.Dev	0,04	0,06	0,02	0,05	0,02	0,01	0,00	0,02	0,05	0,02
Regions of develop-ment stage 1-2	Valid N	62	62	62	62	62	62	62	62	62	62
	Mean	0,13	0,23	0,08	0,23	0,01	0,02	0,01	0,05	0,21	0,03
	Min	0,02	0,08	0,04	0,14	0,01	0,01	0,00	0,02	0,11	0,02
	Max	0,48	0,36	0,12	0,32	0,05	0,03	0,03	0,11	0,32	0,08
	Std.Dev	0,10	0,08	0,02	0,03	0,01	0,01	0,00	0,02	0,05	0,01

Source: estimated by the authors on the data from Eurostat

[216] 1 – Agriculture, forestry and fishing; 2 – Industry (except construction); 3 – Construction; Trade, transportation, accommodation and food service; 4 – Information and communication, 5 – Financial and insurance activities; 6 – Real estate activities; 7 – Professional, scientific, technical, administration and support service activities; 8 – Public administration; 9 – Defense, education, human health and social work activities; 10 – Arts, entertainment, recreation and other services.

According to the described above methodological approach in order to obtain the estimation of the effects of the economy's sectoral distribution on the RCI we conducted the analysis of the following regression:

$$RCI_{it} = b_0 + b_1 A_{1,it} + \ldots + b_{10} A_{10,it} + \theta_i + \upsilon_i, \quad (2)$$

where b_0, b_1, b_2 are coefficients, A_{1it} - A_{10it} are variables of the economy sectoral distribution, ϑ_i is a region-specific effect (fixed or random), υ_i is a heteroskedastic disturbance term.

The effects of the economy's sectoral distribution on the RCI are presented in table 6.

Table 6.The estimation results including the regional economic structure (dependent variable RCI)

Independent variables	All regions	Regions of develop-ment stages 3-5	Regions of develop-ment stages 1-2
n	205	142	62
Constant	2,34 (7,69***)	2,11 (7,23***)	8,63 (1,33)
1. Agriculture, forestry and fishing	-0,58 (-11,72***)	-0,44 (-8,00***)	-2,95 (-1,64)
2. Industry (except const.)	-0,30 (-6,47***)	-0,15 (-3,07***)	-1,89 (-1,36)
3. Construction	-0,07 (-1,72*)	-0,12 (-2,19***)	-0,30 (-0,10)
4. Wholesale and retail trade, transport	-0,45 (-11,34***)	-0,42 (-7,28***)	-1,40 (-2,27**)
5. Information and communication	0,02 (0,36)	0,01 (0,11)	-0,06 (-0,70)
6. Financial and insurance activities	*0,10 (2,13**)*	*0,10 (1,75*)*	0,18 (0,18)
7. Real estate activities	-0,03 (0,66)	0,04 (0,71)	0,01 (0,91)
8. Professional, scientific and technical activities	*0,21 (3,11***)*	*0,19 (2,53***)*	-0,53 (0,19)
9. Public administration	-0,10 (-2,23***)	-0,10 (-1,67*)	-0,97 (-0,22)
10. Arts, entertainment and recreation	-0,11 (-2,45***)	-0,22 (-4,45***)	-0,10 (-0,40)
adj. R^2	0,78	0,74	0,68

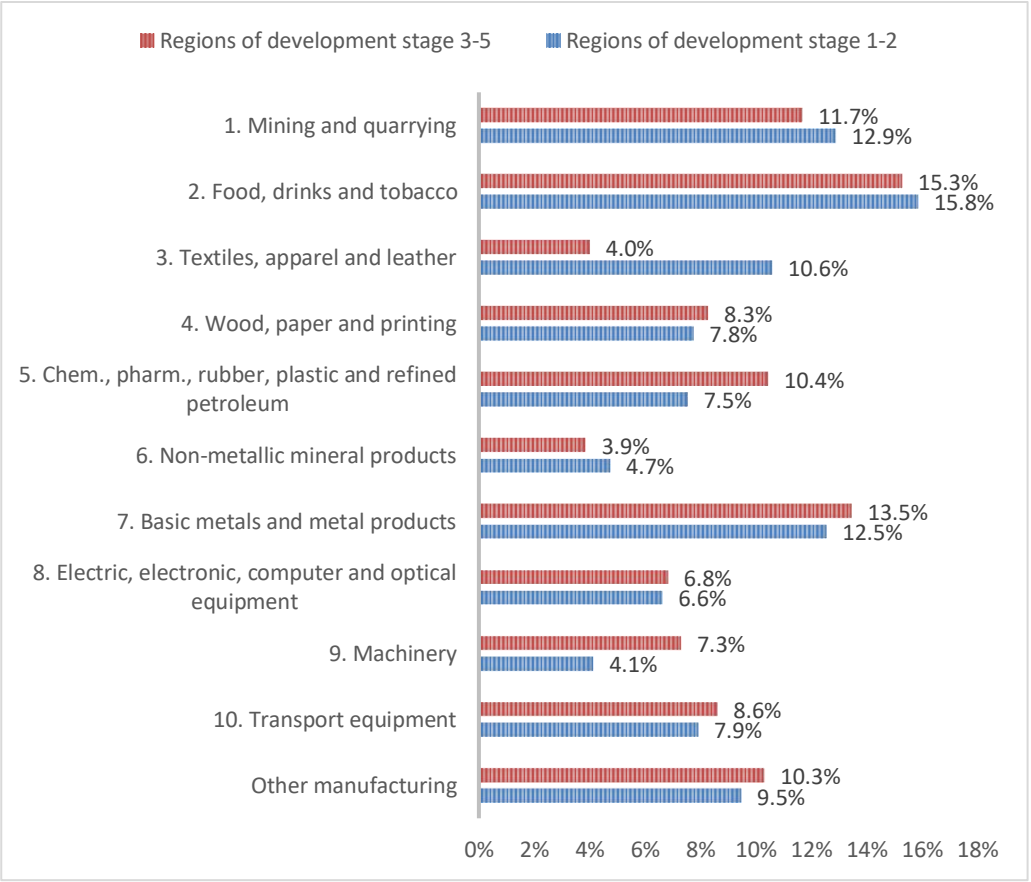
Notes: ***, **, *, denote statistical significance at the 1%, 5%, and 10% level, respectively.

The regression results in the table include coefficients and *t*-Statistics provided in parentheses with significance level.

Source: estimated by the authors on the data from Eurostat using econometric software package Statistica

The employment shares in Financial and insurance activities as well as Professional, scientific and technical activities have a positive significant impact on RCI. The obtained results indicate that that the issue of high wages is among the most important factors contributing to economic performance. This creates the stimuli for qualified workforce immigration, while low wages – *vice versa*, lead to the "depression trap" development and qualified workforce outflow. All independent variables were checked for Multicollinearity. The results showed that the independent variables were not highly correlated with each other.

Figure. 8. The regional structure of manufacturing in the EU-28, by NUTS2 regions, 2013



Source: compiled by the authors on the data from Eurostat[217]

Since the manufacturing sector itself is highly heterogeneous[218] (it includes

[217] Based on Eurostat data http://ec.europa.eu/eurostat

both high and low value added production that requires respectively high and low-qualified workforce) a more detailed analysis is needed. In our further analysis of the effects of the regional structure (in manufacturing) of employment according to the sector of industry (with the division into principal categories) on the RCI, we estimated the following regression:

$$RCI_{it} = c_0 + c_1 B_{1,it} + \ldots + c_{10} B_{10,it} + \varphi_i + \delta_i, \quad (3)$$

where b_0, b_1, b_2 are coefficients, B_{1it} - B_{10it} are variables of the regional structure of manufacturing, φ_i is a region-specific effect (fixed or random), δ_i is a heteroskedastic disturbance term.

Table 7.The estimation results including the regional structure of manufacturing

Independent variables	All regions	Regions of development stages 3-5	Regions of development stages 1-2
n	205	143	62
Constant	2,03 (3,02***)	2,24 (3,26***)	-1,75 (-1,44)
1. Mining and quarrying	-0,30 (-3,78***)	-0,33 (-3,29***)	0,13 (0,60)
2. Food, drinks and tobacco	-0,42 (-4,37***)	-0,47 (-4,09***)	-0,25 (-0,80)
3. Textiles, apparel and leather	-0,60 (-6,96***)	-0,39 (-4,49***)	-0,17 (-0,52)
4. Wood, paper and printing	-0,08 (-1,20)	-0,15 (-1,87*)	0,51 (2,58**)
5. Chem., pharm., rubber, plastic and refined petroleum	0,10 (1,38)	0,05 (0,57)	0,20 (1,19)
6. Non-metallic mineral products	-0,22 (-4,12***)	-0,24 (-3,43***)	0,06 (0,46)
7. Basic metals and metal products	-0,27 (-3,73***)	-0,33 (-3,61***)	0,27 (1,35)
8. Electric, electronic, computer and optical equipment	-0,15 (-2,19**)	-0,05 (0,64)	0,35 (1,75*)
9. Machinery	0,09 (1,32)	-0,01 (-0,07)	0,01 (0,06)

[218] Martin, R. L. (2003). A study on the factors of regional competitiveness. Retrieved from: http://ec. europa. eu/regional_policy/sources/docgener/studies/pdf.

10. Transport equipment	-0,13 (-1,75*)	-0,13 (-1,33)	0,03 (0,13)
adj. R^2	0,57	0,49	0,68

Notes: ***, **, *, denote statistical significance at the 1%, 5%, and 10% level, respectively.

The regression results in the table include coefficients and *t*-Statistics provided in parentheses with significance level. All independent variables were checked for Multicollinearity. The results showed that the independent variables were not highly correlated with each other.

Source: estimated by the authors on the data from Eurostat using econometric software package Statistica.

It is worth noting that the coefficients of manufacturing (Table 7) are either negative (mining/quarrying, food/drinks/tobacco sector, textiles, wood/paper/ printing, basic metals, non-metallic mineral products and transport equipment) or insignificant (chemical/pharmaceutical, rubber, plastic and refined petroleum, electric, electronic, computer and optical equipment, and machinery) for the developed regions and for the less developed regions there are often opposite influences. These, in part, surprising results indicate that technological companies move their production units to the regions with lower labor and raw material costs, as well as, at least in some cases, with less strict requirements concerning the environment protection (as indicated in Becker, Egger & Ehrlich, 2016[219]).

At the same time, R&D facilities often remain in the direct proximity to headquarters and administrative units. Hence, this kind of "technology transfer" improves the employment rates and overall economic performance and competitiveness (at least in comparison to the condition before production facilities were established) and does cause qualitative improvement. The employment in a production sector in this regard does not stimulate personal development of knowledge and skills of employees and preserves "depression trap" persistence. Interestingly, a relatively high number of universities and students in these regions do often not correspond to the competitiveness, possibly due to lower "quality" of education and the lack of developed infrastructure needed for successful implementation of researches into production.

The limitations of the research could be summarized as follows. There are some regions in the study that may not perfectly fit to the proposed hypothesis, like some regions of Scandinavian countries. They are major exporters of oil and natural gas and the rise of commodity prices since the end of nineties led to their vigorous economic growth. The regions specializing mainly in low-value added goods will have periods of

[219] Becker, S. O., Egger, P. H., & Ehrlich, M. V. (2016). Effects of EU Regional Policy: 1989-2013 (No. 271). Competitive Advantage in the Global Economy (CAGE).

good performance and high competitiveness, when commodity prices are growing, and a high susceptibility to crises, when the prices are getting low.

The other issue arises from heterogeneity of industrial sectors, where companies belonging to one sector could have dramatic differences in quality, value added and, therefore, competitiveness. The same refers to the wages, which may significantly vary within the regions of the same sector.

Conclusions. In the paper estimation of the effects of economic structure on the competitiveness for the EU regions NUTS2 was performed. Our results brought us to the following conclusion.

1. A high share of employment in industry was found to be associated with relatively low efficiency of industrial productions in particular regions. High value-added and efficient production relies mainly on the quality of work force rather than on the number of employees.
2. Regional competitiveness index is negatively influenced by high share of employment in low value-added sectors (agriculture, forestry and fishing, industry, construction, wholesale and retail trade, transport, public administration and arts, entertainment and recreation).
3. A positive influence on regional competitiveness was exerted by the employment in financial, insurance activities and professional, scientific and technical activities, with high value added.
4. In contrast to developed regions, the share of employment in professional, scientific and technical activities in less developed regions is not associated with higher competitiveness. This points out that the quality and /or efficiency of R&D in these regions are low.

Future research directions include analyzing the competitiveness of European countries through participation in global production networks of high value added sectors.

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FINANCIAL INSTRUMENTS OF INTERNATIONAL SCIENTIFIC AND TECHNICAL COOPERATION

Abstract. *In the scientific article, the modern state of international technical and scientific cooperation on the basis of financial instruments in Ukraine is analyzed. The dynamics of the research-intensity of GDP, the dynamics and structure of financing scientific and technical and research activities by attracting foreign resources are presented. Basic financial instruments of promoting international technical and scientific cooperation are systematized. Key elements of financial, international technical and scientific cooperation with the EU countries, the USA, Canada, international financial funds are outlined. Key reasons for the low development of international scientific and technical cooperation are summarized. It is proved that only the promotion of international cooperation by the state is the key to the successful solution for problems of bilateral and interstate relations of Ukraine. The recommendations of scientists are summarized and variants of financial instruments for the promotion and expansion of international activity of scientific and technical institutions are proposed.*

JEL Classification System: F 360, O 190, O 330
Key words: financial instruments, international scientific and technical cooperation, research-intensity of GDP.

Introduction. International scientific and technical cooperation is a component of cooperation of countries in the scientific and technical sector, including in the financial sphere. Within the framework of international cooperation, the trade in licenses, implementation of technical projects, construction of factories and other facilities are carried out, joint researches and development and the training of national personnel are conducted, the exchange of general scientific and technical information takes place etc. Diversification of forms of international scientific and technical cooperation of Ukraine promotes development of international cooperation in the sphere of science, education and production and it is the key to innovative development of the economy. In Ukraine, today there is a decrease in the volume of

financing for science from the state. This situation makes the development of international scientific and technical cooperation and the use of modern financial instruments for its support, especially given Ukraine's ambitions to join the EU, extremely important.

The analysis of recent researches and publications suggests the relevance and importance of the issue of financial support for scientific research and development. A significant number of works of both domestic and foreign authors are devoted to the problems of financing for scientific, scientific and technical activities. Scientists have attempted to identify a quantitative benchmark of budget financing of scientific and technical activity in Ukraine. Considerable attention is given to stimulating private investment in the innovation process[220].

Some aspects of international cooperation of Ukraine in the scientific and technical sphere were the subject of such domestic and foreign lawyers and scientists as O. Hashutina[221], L. Fedulova [222]. and others. While acknowledging existing developments, we believe, it is necessary to pay attention to the study of international cooperation of Ukraine with the EU and NATO in the scientific and technical field in more detail. The aim of our study is to summarize the views of scientists on financial instruments of international scientific and technical cooperation.

The current level of the inclusion of Ukraine in international scientific and technical cooperation is extremely low, the extent of cooperation does not correspond fully to scientific and technical and economic potential of our state, and the participation of Ukraine in innovative cooperation with other states is poorly diversified[223].

This is evidenced by the indicators of the research-intensity of GDP of the state (spending on science by all sources in percent to GDP), which in 2015 amounted to 0,62%. Thus, according to 2014, the share of expenditure on research and development in the GDP of the EU-28 on average was 2.03%. The shares of expenditure on research and development were more than the average in such

[220] Bulkin I. O. To the question of determining the quantitative benchmark of the volume of budget financing for scientific and technical activity in Ukraine / I. O. Bulkin / / Problems of science. – 2011. – No. 6. – P. 2-10.

[221]Hashutina O. E. Actual problems of integration of the scientific and technical sphere of Ukraine into the world and European scientific and technical space / O. E. Hashutina II Theory and practice of public administration. – 2013. – Vol. 4 (43). – P 262-266.

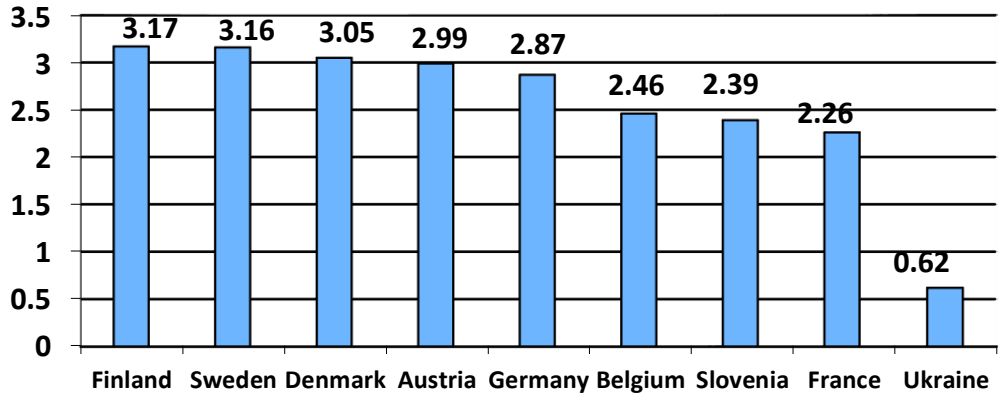
[222] Fedulova, L.I. (2008) Strategy of technological development: microeconomic approach. Bulletin Nat. Univ. "Lviv Polytechnic". Series "Problems of Economics and Management", no. 628, pp. 674-681 (In Ukrainian).

[223] Poruchnyk A. Innovative potential of Ukraine and its implementation in international scientific and technical cooperation / A. Poruchnyk // International economic policy. – 2004. –No. 1.–P. 94-121.

countries as Finland – 3,17%, Sweden – 3,16%, Denmark -3,05%, Austria – 2,99%, Germany – 2,87%, Belgium – 2,46%, Slovenia – 2,39%, France – 2.26% (see Fig. 1.)[224]

In addition, there is a low total amount of financing of scientific, scientific and technical activity in Ukraine at the expense of all sources (in 2015, this amount was 12223,16 mln. including at the expense of foreign states – 2224,165 million UAH.), in comparison with the EU countries.

Figure. 1. Research-intensity of GDP in Europe and in Ukraine in 2014.

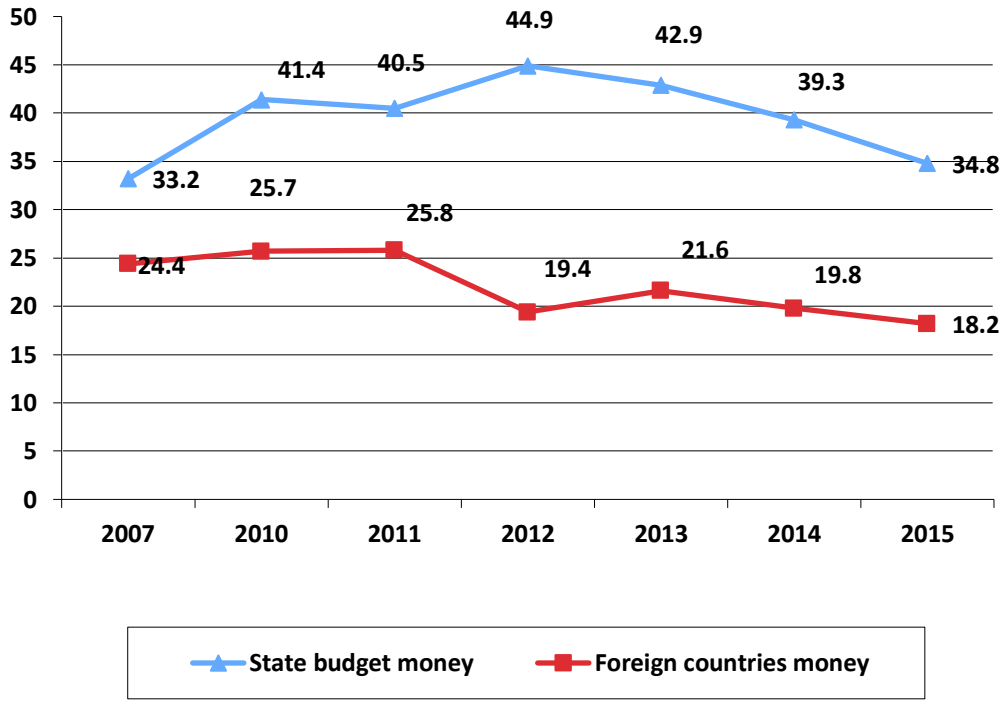


Source: compiled by the author based on [212]

Low levels of scientific and technical cooperation can be shown by the indicators of the financial participation of foreign countries in scientific and technical activities, particularly, the share of funds of foreign states in the total amount of financing has been fluctuating in different years, from 25.8% to 18.2% (in 2015) (See Fig. 2.).

[224] Gross domestic expenditure on R&D (GERD)% of GDP [Electronic resource]. – Retrieved from: http://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab= table&plugm=1&pcode=t2020_20&language=en

Figure. 2. Dynamics of the structure of financing for scientific and technical and research activities by sources, %

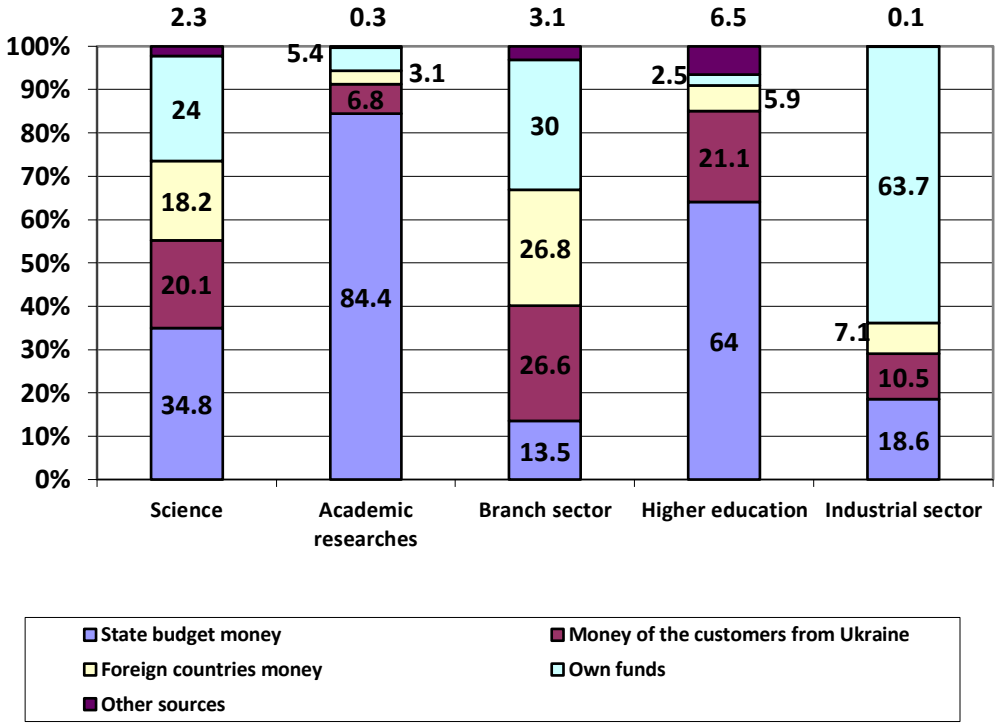


Source: compiled by the author based on [225]

Besides, in recent years, there has been a marked decline in the share of foreign investments in the total amount of financing for scientific and technical activities. The largest share of funding at the expense of foreign states belongs to industry directions – 26.8% and to science – 18.2%. The production acquired only 7.1% of foreign capital. The factory sector was mostly financed by own funds for 63.7% (see Fig. 3.).

[225]Scientific and innovative activity in Ukraine: Statistical compendium – K.: State statistics service of Ukraine, 2012. – 305 p.

Fig. 3. The structure of financing for scientific, scientific and technical activity by the sources and sectors of science in 2015,%



Source: compiled by the author based on [213]

In general, if we analyze international scientific and technological connections of Ukraine, today the closest ties in scientific and technical and educational cooperation of Ukraine are established with the United States, the European Union and CIS countries, with which Ukraine signed more than thirty intergovernmental deals, defining the principles of such cooperation. Thus, in Ukraine, the EU initiatives in the field of scientific and technical development of the programmes TACIS, Copernicus, etc. have been implemented[226].

Ukraine maintains international scientific and technical cooperation within the framework of numerous international organizations, both universal and regional in

[226] Malitskyi B. A., Popovich A. S., Soloviov V. P., etc. Rational financing of science as a prerequisite for the development of a knowledgeable society in Ukraine / Malitskyi B. A., Popovich A. S., Soloviov V. P. – K.: Fenix, 2004

nature (the UNO, UNESCO, the Council of Europe etc.). However, the corresponding cooperation with the EU and NATO is the most continuous and comprehensive. We can distinguish several forms of scientific and technical cooperation of Ukraine with the EU, which are successfully implemented in practice. It is cooperation, which is realized by implementing this collaboration through bilateral agreements on cooperation, and coordination, which takes place during the involvement in the Framework programme for research and innovation Horizon 2020, EUREKA, ERASMUS+ and other programmes, the coordinator of which is the EU[227].

Between Ukraine and the European Community in 2014, the Agreement on scientific and technological cooperation was signed. Scientific and technological cooperation between Ukraine and Germany is based on the Joint Declaration of the Ukrainian State Committee for science and technology and the Federal Ministry of Research and Technology of the Federal Republic of Germany on Scientific and Technical Relations from June 10, 1993, which has the status of an interagency agreement. Since 1997, with the support of the Ukrainian and German sides about 160 Ukrainian-German research projects have been carried out. According to the results of the last contest, 12 joint projects were implemented. On June 11, 2014, in Kiev, the Tenth meeting of the joint Ukrainian-German working group on scientific and technical cooperation was held.

In addition to considering questions regarding the current state of development of scientific and technical cooperation between Ukraine and Germany, special attention was paid to the discussion of existing and possible cooperation mechanisms with attracting investment of public and private sectors. With the purpose of their further use, the most acceptable for both parties cooperation instruments were determined and competition of joint Ukrainian-German scientific and technical projects was announced[228].

One of the world leaders in some of the most research-intensive and technologically sophisticated industries in the field of nuclear energy, the production of aviation and space technology and modern telecommunication systems, in the fields of biotechnology and pharmacy, is Canada. Canadian investments account for about 1.3% of the total volume of foreign investments in Ukraine, among the priority directions is industry - 72.9%, including engineering – only 8.8%.

[227] On the implementation of the Association Agreement between Ukraine, of the one part, and the European Union, the European Atomic Energy Community and their Member States, of the other part: the Order of the Cabinet of Ministers of Ukraine dated 17 September 2014, [Electronic resource]. – Retrieved from: http://zakon2.rada.gov.ua/laws/show/847-2014-%D1%80.

[228] Scientific and technical cooperation between Ukraine and Germany, the Embassy of Ukraine in the Federal Republic of Germany http://germany.mfa.gov.ua/ua/ukraine–de/science

The key governmental body of Canada, which is responsible for the implementation of technical cooperation with other countries is the Canadian international development Agency (CIDA). Cooperation with CIDA played a vital role in the formation and development of Ukrainian-Canadian scientific and technical cooperation, interaction in the legal sphere; it facilitated the establishment of contacts between many government agencies, scientific and educational institutions of Ukraine and Canada. As of today, CIDA (together with other donors) coordinates fully or partially 35 active projects of international assistance to Ukraine. According to the latest Canadian data, the total amount of Canadian technical assistance to Ukraine since 1991, is more than $383 million[229].

Regarding cooperation with the United States, it is mainly carried out through the American international funds, through the NATO science programmes, etc. According to such programmes, Ukraine regularly receives financial support for the development of domestic science: the implementation of the programmes of cooperation with NATO allowed Ukrainian scientists to draw more than 480 grants, in addition, the participation of 300 scholars of Ukraine in scientific forums of NATO has been funded. However, the total amount of financing for international scientific and technical activity of Ukraine is insufficient and that is why it cannot have a positive impact on the socio-economic development of our country. On July 9, 1997 Ukraine and NATO signed a Charter on a distinctive partnership, one of the spheres of consultation and/or cooperation of which, is scientific and technological issues. For further implementation of the provisions of the Charter between NATO and Ukraine, the National programmes of cooperation were created; according to these programmes separate measures concerning technical and scientific cooperation were taken. Today there is the Annual national cooperation program NATO – Ukraine for 2016 (hereinafter – the Programme) [230]. According to the Programme, "taking into account the long-term goal of joining the European security system, which is based on NATO, Ukraine will deepen its cooperation with NATO with the aim of achieving the criteria necessary for acquiring membership in this organization" in the direction of cooperation in the field of science and technology[231].

[229] Scientific and technical cooperation between Ukraine and Canada, the Embassy of Ukraine in Canada http://canada.mfa.gov.ua/ua/ukraine–%D1%81%D0%B0/science.

[230] On approving the Annual national cooperation program NATO – Ukraine for 2016: the Decree of the President of Ukraine from 12 February 2016 No.45/2016 [Electronic resource]. – Retrieved from: http://zakon3.rada.gov.ua/laws/show/45/2016

[231] Fetisenko V. O. International cooperation of Ukraine with the European Union and the North Atlantic Treaty Organization in the scientific and technical sphere: legal issues / V. O. Fetisenko // Comparative and analytical law No4, 2016, p. 277-280

Unfortunately, the current level of Ukraine's participation in international scientific and technical cooperation is low, especially in the field of science and technology in the creation, modernization and operation of industrial enterprises and social infrastructure; exchange of technologies, licenses, design and project materials, etc. At the same time, one of the main forms of international scientific and technical cooperation of our state is the fact that scientific workers go abroad, international conferences are held and grants are given from foreign foundations[232].

According to the OECD, among the top 50 largest recipients of international aid in the world, Ukraine occupies the 45th place. Among the developing countries of the European region, Ukraine ranks second after Turkey. In 2014, we received $1.4 billion or 16% of all the aid, allocated to the region. This is two times more than in 2013. Unfortunately, the Ministry of economy now does not collect official statistics for loans from international financial institutions. And not all grants are recorded in the Ministry of economy. Usually, large grants and those, which need benefits from paying VAT and customs fees, are recorded. Therefore, about 30-40% of the projects are not registered with the MEDT (Ministry of economic development and trade of Ukraine). Furthermore, Ukraine has no unified database on international assistance projects[233].

Recently, in scientific, scientific and technical policy of Ukraine, there have been some targeted changes, but the decline of the scientific and technical branch of social production continues, and the production itself remains the one, which adopts little innovation. This, in particular, is shown by the following trends: 1) a sharp decrease in demand of the manufacturing sector for scientific and technical developments; 2) the decrease of state support for science in all economic programmes; 3) the destruction of the system of logistic support for scientific research; 4) the difficulty of forming the national systems of science and technology control; 5) a sharp decline in the prestige of scientific work; 6) weak social protection of scientific workers, which is accompanied by the “drain” of intellectual potential of the country, staff reductions, previously existing and new “technological” delays and obstacles to scientific research and career development.[234]

[232]Hashutina O. E. Actual problems of integration of the scientific and technical sphere of Ukraine into the world and European scientific and technical space / O. E. Hashutina II Theory and practice of public administration. – 2013. – Vol. 4 (43). – P 262-266.

[233] Shkarpova O., Ostapchuk, D. Free of charge, but not free. What is wrong with international aid to Ukraine? [Electronic resource]. – Retrieved from: http://voxukraine.org/2016/05/13/bezoplatno-ale-na-zadarma-ua/

[234] On the implementation of the Association Agreement between Ukraine, of the one part, and the European Union, the European Atomic Energy Community and their Member States, of the other part:

In our opinion, the government should encourage all kinds of involvement in international technical and scientific cooperation of not only academic institutions but also the productive sector in all its diversity. We have summarized the recommendations of scientists and we want to offer the following financial instruments for the promotion and expansion of international activities of scientific and technical structures[235][236]:

- the system of grants as a funding tool on an irrevocable basis;
- development and implementation of the system of stimulating foreign investments in the industrial sector depending on the priority of investment objects of innovation, the volume of investment, and their duration;
- improvement in the tax policy towards providing innovative development, which is associated with the improvement of the appropriate legal framework; the introduction of the preferential taxation system depending on the volume and duration of foreign investment, because the current system takes this into account not enough; tax benefits to companies and organizations that introduce the latest techniques and technologies, carry out the transfer of the research-intensity products;
- exempting the import of scientific equipment, devices and materials from customs and other obligatory payments;
- specifying the solution to the problem of financing for research and innovation activity – to shift from science financing based on the residual principle to providing an economically viable level of funding for the entire cycle of the innovation process, from basic researches to implementation of innovations in production. All the stimulating incentives – tax, customs, credit, etc. should be allocated for this cycle;
- leasing of expensive equipment;
- financial support through the mechanisms of venture financing;

the Order of the Cabinet of Ministers of Ukraine dated 17 September 2014, [Electronic resource]. – Retrieved from: http://zakon2.rada.gov.ua/laws/show/847–2014–%D1%80

[235]Kryvutsa A.V. Internal preconditions and problems of inclusion of Ukraine in the international technology exchange / Kryvutsa A. V. // Economics, management, business. No. 1-2, 2011, pp. 46-51. http://www.nbuv.gov.ua/old_jrn/Soc_Gum/Emb/2011_1-2/krivuza.pdf.

[236] Chumachenko H. Topical issues of international economic cooperation of Ukraine in the scientific and technical sphere / H. Chumachenko// Journal of Law #7/2004. [Electronic resource]. – Retrieved from: http://justinian.com.ua/print.php?id=1303

- the exemption from the mandatory sale on the interbank currency market of Ukraine of proceeds in the foreign currency according to international technical programmes and projects;
- primary, urgent payment of expenses, connected with implementation of international technical programmes and projects that are carried out by state research institutions and higher educational institutions.

The multi-sorced mechanism of funding the scientific and innovation sphere requires the independence of support funds (Innovation Fund, Foundation for fundamental research, etc.) from departmental interests. For mastering domestic and international technology markets, it is necessary to promote the commercialization of the R&D results, create and revitalize the activity of domestic financial and industrial groups and transnational corporations and stimulate innovative entrepreneurship, venture business and the leasing of expensive modern equipment[237].

It is reasonable to introduce the state register of innovative projects and the state register of innovative structures. It is also advisable to provide a business entity with tax percentage (e.g. 30% of the value added tax and income tax) that will be used exclusively for innovative, scientific and technical activity and development of own scientific and technological, research and experimental bases[238]. It is necessary to learn how to distribute a certain amount of money according to the system of grants[239].

Conclusions. Analyzing the state of scientific and technical cooperation, we can talk about the reduction of financing for scientific, scientific and technical works at the expense of foreign countries. This indicates that Ukraine lags behind significantly in innovative development. Only the promotion of international cooperation by the state is the key to the successful solution for problems of bilateral and interstate relations of Ukraine. An important component should be the normatively set financial tools of promoting international technical and scientific cooperation. Thus, for the further development of international scientific and technical cooperation, Ukraine should develop the state mechanism for supporting innovation and facilitating the entry of foreign capital to the markets of Ukraine,

[237] Bulkin I. O. To the question of determining the quantitative benchmark of the volume of budget financing for scientific and technical activity in Ukraine / I. O. Bulkin / / Problems of science. – 2011. – No. 6. – pp. 2-10.

[238] Kryvutsa A.V. Internal preconditions and problems of inclusion of Ukraine in the international technology exchange / Kryvutsa A. V. // Economics, management, business. No. 1-2, 2011, pp. 46-51. http://www.nbuv.gov.ua/old_jrn/Soc_Gum/Emb/2011_1-2/krivuza.pdf.

[239] Chumachenko H. Topical issues of international economic cooperation of Ukraine in the scientific and technical sphere / H. Chumachenko// Journal of Law #7/2004. [Electronic resource]. – Retrieved from: http://justinian.com.ua/print.php?id=1303

because the underestimation of the role of scientific research hinders the economic development of Ukraine. From the point of view of further research, we consider the analysis of projection data regarding future financial, technical and scientific cooperation and possibilities of its expansion in subsequent years, to be promising.

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TRANSNATIONAL INTEGRATION OF THE AGRARIAN SECTOR OF THE ECONOMY OF UKRAINE

Abstract. *The article is dedicated to investigation of the essence and theoretical basis of transnational integration of the agrarian sector of the economy. The main motives of transnationalization of the agrarian sector of the economy of Ukraine are generalized. The principles of implementation of transnational integration, its organizational and economic bases of construction and development are defined. The technique for estimating the level and global efficiency of the sectorial economy transnationalization is shown. The dynamics of the international ratings of Ukraine are analyzed, the condition and tendencies of foreign direct investment in the agrarian sector of the economy are estimated. It is shown that the influence of transnational integration on the national development is mostly destructive, it menaces the national security of Ukraine. The actions for effective public and private partnership, the regulation of excessive expansive transnationalization and increasing the global competitiveness level of Ukraine are outlined*.

JEL Classification System: E20, F15, Q13
Keywords: transnational integration, internationalization, transnational corporations, agrarian sector of the economy, investment attractiveness, international competitiveness.

Introduction. The agrarian sector of the economy is one of strategic backbone segments of the national economy of Ukraine, which forms a considerable part of the income of the state budget, defines bases of food security and provides preservation of a rural way and mentality. Further development of the agrarian sector demands the high-quality system transformations aimed at providing its sustainable development in the conditions of globalization. The increase in efficiency of an economic mechanism and its intensification are possible with the help of creating the favorable investment climate and business environment for socially oriented transnational integration.

The problem of internationalization of agro-industrial production aggravated in Ukraine with declaration of independence. By then, the production cyclicity increased considerably, disproportions in development of separate branches of the economy and the interindustry relations amplified. Constant violation of reproduction

processes, the ideology of submission of villages to industry, and the planned character of all spheres of the economic relations were the cornerstone of it.

In other countries of the world, since 1950s, the economy has developed based on monopoly or state-monopoly capitalism that integrally led to the appearance of several superlarge operators in the branch of commodity markets. Their further growth was impossible in national scales without production diversification. At the same time, vertical concentration of the capital and extension of the nomenclature of the made production demanded active development of new segments of the market, which were already occupied by the same monopolies. The unique exit from such a situation in conditions of preservation of the advantages of specialized agro-industrial production is transferring its part on the territory of the countries with less developed system of economic mechanisms.

Thus, the process of internationalization of agro-industrial production means establishment of such relations between the enterprises of the different countries when the production of one certain state becomes a part of the world production [240, p. 142]. The implementation of internationalization in the form of transnational corporations (TNC) represents transnationalization or transnational integration of the agrarian sector of the economy.

Despite a set of researches, the theory of transnationalization was developed only in the mid-sixties of the XX century. Considerable volumes of the foreign direct investments generated by TNCs and their influence on the economies of developing countries became a push to it. Hitherto, such companies were called the enterprises with foreign investment, the multinational enterprises or multiterritorial firms.

The representatives of the school of the industrial organization of the firm such as P. Buckley, M. Casson and R. Caves saw the essence of the TNC's mechanism in replacement of market transactions by intraeconomic ones. At the same time, internalization gives the chance to reduce transaction costs, to optimize streams of the company [241, p. 1-24]. The scientist R. Caves, in addition, divided TNCs into horizontally integrated, vertically integrated and diversified. It gave him the chance to find out that the organizational strategy of integration defines the course of information streams, the internalization of which creates competitive advantages on

240 Maksimova, M. M., Shenaev, V. N. & Yudanov Yu. I. (ed.). (1983). World Capitalistic Market and Problems of Internationalization of the Business Life. Moscow: Mysl; Frankfurt am Main: Marksistishe bletter.

241 Buckley, P. J. & Casson M. (2010). The Multinational Enterprise Revisited. The Essential Buckley and Casson. New York: Palgrave Macmillan.

the market [242, p. 68-85]. Analyzing the united views of researchers on the concept of foreign direct investments and the strategy of internalization, K. Kojima concluded, that all international capital investments were of two types: the trade directed and anti-trade investment [243]. The first of them significantly increases the export potential of the recipient country; promotes the change of the production structure in it on the basis of the international division of labor. The second one, on the contrary, limits this potential, making the country dependent on import or turning it into a raw appendage of developed countries.

In the 1980s, J. Dunning formulated an eclectic paradigm of transnational integration. The advantages of property, internalization and placement of production were its basis. Moreover, the decision to open a branch in this or that country is made by the ultimate company of TNC, considering the natural and resource potential, labor cost, a condition of social, economic and political development in the state, etc. [244, p. 39-58]. As O. Rohach notes, adherents of the theory of the global value chains critically appreciated the TNC's concept of J. Dunning, as not all dispersions of production could be invested in the logic of the strategic choice of corporations [245, p. 27]. At the same time, the separate ideas of the scientist gained further development in the resource theory of TNC.

With the advent of the network theory of transnational integration not only the resource strategy of TNC were explained, but also the place of outsourcing and insourcing operations, nonstock and subcontract relations are defined. The overall aim of the activity of TNCs is to maximize synergies across the network structure. These researches became a basis for development of the new economic geography concept by P. Krugman [246, 247]. The scientist divided all countries into industrial advanced countries ("center") and also developing and underdeveloped countries ("periphery"). In view of transportation costs and the movement of labor between regions P. Krugman proved that agglomeration forces generate concentration of the capital and production, however in the advanced countries they also result in a glut of

242 Caves, R. E. (2007). Multinational Enterprise and Economic Analysis [3rd ed.]. Cambridge: Cambridge University Press.
243 Kojima, K. (2013). Direct Foreign Investment: A Japanese Model of Multinational Business Operation. London: Routledge.
244 Dunning, J. H. (1998). The Theory of International Production. The International Trade Journal, vol. III, no. 1, 21-66.
245 Rohach, O. & Kosmina, V. (2016). Transnational Corporations and Export of New Industrial Asian Countries. Kyiv: Centre of educational literature.
246 Krugman, P. (1991). Increasing Returns and Economic Geography. Journal of Political Economy, vol. 99, no. 3, 483-499.
247 Krugman, P. & Venables, A. J. (1995). Globalization and the Inequality of Nations. The Quarterly Journal of Economics, vol. CX, issue 4, 857-880.

the resource markets, then processes of aggravation of the competition and dispersion become more active. As a result, if benefits from use of cheap labor and natural resources exceed transportation costs, production will move from “center” to the “peripheral” country. However making a decision on relocation is based on elasticity of goods substitutes and is mainly positive at its low level and vice versa.

Except for the aforementioned theories, heretofore the scientists have created the theories of regional TNCs, the exchange of concentration for proximity, the international fragmentation of production, the concept of intra-corporate centralization, a paradigm of “the flying geese”, etc. However, they are not a subject of our research and therefore we will not go into detail.

In view of versatility of transnational integration forms, now the criteria of referring companies to transnational are debatable. We agree with Yu. Umantsiv’s conclusion that contrary to a large number of very contradictory theories about the reasons and essence of a TNC’s phenomenon, there is no unity of signs and definitions for transnational corporation, a steady terminology, which is needed to describe such international integrated structures; the national legislation of all countries in the world does not contain accurate signs of TNC [248, p. 133]. The most widespread and authoritative is the practice of the United Nations Conference on Trade and Development (UNCTAD), where transnational corporations are those companies that have branches or the affiliated enterprises with a high sales level and a share of the corporate rights over 10% more than in six countries of the world.

Transnational integration is carried out on global (megalevel), national (macrolevel), branch (mesolevel) and corporate (microlevel) levels. The system of all hierarchical levels is interconnected and complementary. Transnationalization of production cannot exist only on a particular level, because the manufacturing process serves as a basis of the dialectic of TNCs. This process is inextricably linked to an enterprise and the spatial basis of productive forces. Exceptions are concepts that consider transregional national organizations, illegally identifying them with TNC.

The economic activity of a transnational corporation is estimated by such indicators: the general assets of TNC (*TA*); TNC’s assets in foreign countries (*FA*); the total sales of TNC (*TS*); TNC’s sales in foreign countries (*FS*); the number of employees of TNC (*TE*), including those employed in its foreign branches and representative offices (*FE*); the number of branches and representative offices of TNC (*TAF*), including those in foreign countries (*FAF*). On its basis, scientists estimate TNC’s activity in the world, counting the indexes of corporate transnationalization (*TNI*),

248 Umantsiv, Yu. M. (2012). Corporate Organizations in Global Competitive Space. Kyiv: NSC “Institute of Agrarian Economics”.

internationalization (*II*) and the scale of the affiliation network (*NSI*) [249, p. 21]:

$$TNI = \frac{\left(\frac{FA}{TA} + \frac{FS}{TS} + \frac{FE}{TE}\right)}{3} \times 100\%,$$
$$II = \frac{FAF}{TAF} \times 100\%, \quad (1)$$
$$NSI = \frac{N_{FDI}}{N_{TNC} - 1} \times 100\%,$$

where N_{FDI} – is the number of the countries in the world that have foreign direct investments in economy; N_{TNC} – the number of the countries in the world, in which there are affiliated enterprises of TNC.

The national economy transnationalization level (*ETNI*) is determined as:

$$ETNI = \frac{\left(\frac{FDI}{CI} + \frac{FDI}{GDP} + \frac{TO_{TNC}}{GDP} + \frac{FE_{TNC}}{NE}\right)}{4} \times 100\%, \quad (2)$$

where *FDI* – is the volume of foreign direct investments in the country; *CI* – the total amount of capital investments in the country; *GDP* – a gross domestic product of the country; TO_{TNC} – the total output of the TNC's affiliated enterprises placed in the recipient country; FE_{TNC} – the number of employees of the TNC, who are employed in the affiliated enterprises in the recipient country; *NE* – the total amount of man-power employed in the country.

By the formula (2) it is also possible to evaluate the transnationalization level at the branch level, in view of the fact that GDP will be estimated as gross value added.

The studies of I. Kelaru convincingly demonstrate that in 2013 the level of transnationalization of Ukraine's economy was 10.0% and exceeded similar values of the most developed countries in the world such as the USA, Japan, Italy, Germany, etc. [250, p. 7-8]. Its reasons are covered in the strategy of Ukraine's export orientation, the high and constantly increasing level of dependence of the main sectors of the economy on the import of raw materials, materials and technologies.

Considering fluctuations of the corporate internationalization level during 2007-2013 within 23.6-29.8%, the domestic enterprises have a considerable reserve for integration into the world production, using those opportunities, which are available after signing the Association agreement between the European Union and

249 Transnational Corporations. (1998). Geneva: United Nations Conference on Trade and Development, vol. 7, no. 1.

250 Kelaru, I. O. (2014). Transnationalization and Competitive Development of the Ukrainian Economy]. Extended Abstract of Candidate's Thesis. Kyiv: Kyiv National Economics University named after Vadym Hetman.

its Member States, on the one side, and Ukraine, on the other side.

The main motives for transnationalization of the agrarian sector of the economy of Ukraine are:

1. Marketing development by the TNCs. The increase in the efficiency of TNC's activity is reached by the growth of global competitiveness and further concentration of the capital that is possible only because of the international economic relations and cross-border cooperation.

2. Lower labor costs in the recipient countries. With other equal conditions, TNC's profit maximization is reached due to the optimization of labor cost and capital inputs. Thus, in 2015, the average annual nominal salary of the workers employed in the agricultural production in Ukraine was more than 15 times lower than the average one in Europe, and with such countries as Germany, France, the Netherlands and Luxembourg, almost thirtyfold gap is observed. Whereby, we proved that compensation of hired workers in Ukraine is much lower than its productivity in comparison with an organic capital structure of the German agro-industrial holding BayWa AG and native Kernel Holding S.A. [[251], p. 124]. Thus, the objective conditions for receiving additional super-profit by TNC's owners due to assignment of an unpaid part of newly made production value are created.

3. Lower land value and other natural resources cost in the recipient countries. It is known that in agriculture the land is the main means of production and spatial basis for productive forces placement. The agrarian policy of the vast majority of the developed countries in the world is directed at preventing inappropriate land using and a quick change of their owners or tenants. Because of a cumulative influence of economic factors, the agricultural lands value remains high. Hence, according to the Eurostat, in 2009 (the year of the last inspection of land values) one hectare of arable land in Denmark cost 27.0 thsd. euros, in Spain – 12.5 thsd. euros, in the Netherlands – over 47.6 thsd. euros. The rent for this type of lands cost respectively 534.77, 189.00 and 496.53 euros per hectare. As of 2016, January 1, the average rent for land shares in Ukraine cost 862.00 hrn/ha or 35.58 euros/ha; the standard monetary value of 1 hectare of an arable land respectively equalled 30927.77 hrn/ha or 1276.50 euros/ha. It is completely obvious that the Ukrainian indicators, despite a time lag, are more than ten times lower, than the European ones.

4. TNC's transaction costs minimization. The increase in scales of the agro-industrial formations' activity involves the proportional growth of the number of different agreements and expenses connected with their service. The expenditure on

[251] Gutorov, A. O. (2011). Vertically Integrated Entities in Agriculture: Economic Principles of Organization and Laws of Development. Economy and Forecasting, *1*, 120-130.

the execution of lease agreements for land plots is a considerable part of transaction costs. As the parceling level in Ukraine is much lower, than in those countries, where family farms and small farms are the cornerstone of the agrarian system, the formation of the necessary land size of an enterprise costs cheaper. Besides, there are options to affiliate or rent the complete property complexes (farms) sized over 3 thsd. ha.

5. The decrease in transportation costs and customs payments. Moving a part of production to the recipient countries allows TNC to reduce considerably transportation costs of goods to consumers. The differences in the systems of the customs legislation create opportunities for minimization the corresponding collecting and payments, overcoming embargo or standards of the antitrust law, etc.

6. Getting access to programs of the state support for agriculture development. Placing the production capacities in Ukraine through subsidiaries, TNCs have the right of preferential financing the purchase of agricultural machinery or the construction of new farms and complexes, planting down permanent crops, VAT refund, receiving state support funds for production of separate types of crops and livestock products, etc.

7. Tax optimization. The differentiation of tax types and their rates over the countries in the world gives TNC the chance to choose that territory, where a tax burden will be the smallest for production placement, and the tax law is more liberal. The most widespread mechanisms of decreasing a tax burden is using the transfer pricing, offshore zones and zones of special jurisdiction, the preferential modes of the taxation for agricultural producers (the fixed agricultural tax), the existence of tax benefits and tax holidays for foreign investors. It is also necessary to mention a priority of chosing those countries, where the cost of subsoil use and penalties for environment pollution are the lowest.

8. Diversification of risks. Internationalization of production acts as a peculiar instrument of decreasing natural, production, market, currency and other types of risks of economic activity. At the same time, the political situation and the level of civil society formation are powerful sources of receiving a political rent and preferences for a transnational corporation.

The transnational integration, in our opinion, has to take into account such basic principles:

- profitability – the activity of the TNC and all its divisions submits to the common economic targets, providing development of association based on the expanded reproduction;
- complexity and rational-sized – the TNC's formation has to be based on the optimization of sizes of all affiliated enterprises and their production capacities for

ensuring the highest productivity of the whole economical mechanism;

- balance – the TNC's structure has to be the additional cost balanced throughout all the stages of the value chain;
- systemacity – for reaching synergies of integration the TNC's activity has to be provided systemically, considering the latest developments of science and practices of administration, corporate and financial management;
- controllability – all structures of the TNC have to be constructed and optimized by the criterion of management rationality without creating obstacles for quick making reasonable managerial decisions;
- corporate social responsibility – for a corporate image and brand formation, the TNC has to meet the highest standards of corporate management and social responsibility of business;
- transparency of property – the structure of TNC's property has to be not affiliated from the national legislation and it should not give the chance to track its hierarchy in the direction "from bottom to top"; at the same time it has to remain transparent and flexible for management and association of various spheres of business, providing solid reputation, giving the chance to optimize financial streams, to promote a uniform brand or a trademark onto the market.

The rent-seeking behavior and the law of vertical integration as zero profitability of all intermediate production represent the basis of the economic mechanism of the TNC's activity in the agrarian sector of the economy of Ukraine.

Due to a large scale of activity and a stock of financial and economic durability, transnational corporations significantly influence the development of rural territories, the economy of the recipient countries, and they can form an agrarian lobby in the government. Despite a significant amount of researches on the TNC's activity, there is no definite answer about the nature of their influence on the agrarian sector of the economy until nowadays. Therefore, the agro-industrial production in major developing countries versus developed ones is characterized by the lower level of technical and technological support and is unattractive to investment. Production technologies and methods of managing the renewal and quality of agricultural production increase to the level of the international standards because of transnational integration. Selling goods outside the recipient country is an export in the national measurement, the growth of which leads to increasing the international position of the country, receiving funds from paying customs duties and expenses. On the other hand, the presence of such a powerful player as a TNC increases the supply on the national agrarian market, strengthens the competition on it, forcing out small and average agricultural producers. The rent-seeking economic behavior of the TNC is

often directed at maximizing benefits in the short term that leads to impoverishment of soil, excessive chemicalixation of agriculture, the drop in the production of low-profitable types of agricultural products, causes damage to the environment and rural territories, leads to capital outflow abroad.

As it was shown in the scientific researches of the NSC "Institute of Agrarian Economics", in the agrarian sector of developing countries some separate economic actions and operations of transnational corporations are the subject for obligatory government regulation. Hence, at a horizontal integration the negative impact of a TNC is shown through the specific segmentation of the market, the discontinuity between production deliveries and the breach of the foreign trade contracts, overpricing for import and, respectively, undercutting for export. At a vertical integration, the refusal to cooperate, speculative and discrimination pricing, dumping, the abuse of the transfer prices, etc. are possible [[252], p. 29]. For neutralizing these influences, the national government directs the actions towards establishment of export restrictions, the antimonopoly and anti-dumping regulation, limits currency transactions by TNCs, and obliges them to carry out continuous production, use domestic raw materials and to sell some part of production on the domestic market.

According to the UNCTAD in the world in 2009, there were about 82 thsd. transnational corporations, which united 810 thsd. affiliated enterprises, providing jobs for over 77 mln. people. The export volume of a TNC accounts for about a third of the total cost of goods, works and services, which are exported in the world [[253]]. In the agrarian sector of the economy, the TNC began the vigorous activity at the end of XIX century, but certain researchers claim that the first agrarian international corporations existed at the time of the Great Silk Road. Nowadays according to the different estimates, from 75 to 90% of the agricultural commodities market, about 78% of patents for new agricultural machinery are under control of TNCs. The main kind of TNC is the consolidation in one legal entity of all stages of the agro-food value chain.

The realization of the transnational integration relations has bilateral and interdependent influence on the economy of Ukraine in general, and particularly on the agrarian sector. The choice of the country for TNC's capacities placement is carried out by taking into account a geopolitical and macroeconomic situation. Every year these factors fully evaluate the different international organizations. The most authoritative are the ratings of the World Economic Forum, the World Bank and the

[252] Dukhnytskyi, B. V., Pugachov, M. I. & Sabluk, V. P. (2013). Transnational Corporations in the Agrarian Sector of the Economy]. Kyiv: NSC "Institute of Agrarian Economics".
[253] World Investment Report 2009: Transnational Corporations, Agricultural Production and Development. (2009). Geneva: United Nations Publications.

conservative non-governmental organization, which conducts a research of political problems, "The Heritage Foundation".

The business climate in Ukraine in general has improved over 2006-2016 (tab. 1).

Table 1. The Rank of Doing Business in Ukraine

Rank Components	Years							
	2006	2008	2010	2012	2013	2014	2015	2016
Starting a business	58.2	66.4	69.8	81.7	85.6	87.3	87.4	93.9
Dealing with Construction Permits	4.0	11.8	4.0	14.7	16.8	62.9	61.3	61.4
Getting Electricity	N/A	N/A	32.3	32.4	32.5	52.0	54.6	54.8
Registering Property	44.8	49.9	51.3	47.9	55.9	68.2	69.0	69.4
Getting Credit	56.3	56.3	56.3	81.3	81.3	87.5	75.0	75.0
Protecting Minority Investors	33.3	33.3	40.0	40.0	40.0	40.0	50.0	50.0
Paying Taxes	18.0	18.3	18.0	20.1	49.1	54.9	70.6	73.0
Trading Across Borders	29.7	40.1	48.3	48.8	51.0	53.4	65.2	65.2
Enforcing Contracts	68.7	66.9	67.2	67.2	67.2	66.3	57.1	57.1
Resolving Insolvency	9.1	9.8	9.9	9.6	9.4	27.8	28.1	27.9
Doing Business Global Ukraine's Rank	124/155	139/178	142/183	152/185	137/185	112/189	96/189	83/189

Notes. The estimates of the rank components are given in an absolute value. According to the methodology of their calculations, the highest value describes the best the state of affairs. The evaluation of the general rank of Ukraine among the countries in the world is relative. It is constructed on the basis of ranking. The numerator is the place of Ukraine in the ranked array; the denominator is the number of countries in the world, which were ranked.
Legend. N/A – not available or not calculated by the World Bank.
Source: compiled by the authors based on the World Bank's data [254]

Therefore, the experts of the World Bank estimate the level of doing business by ten groups of factors. In an absolute value, the rank represents a frontier measure of the national economy from the most effective value (front) accepted as 100. The best conditions for doing business in 2016 were in New Zealand, Denmark, Singapore, the Republic of Korea and Hong Kong.

However, from 2014 and onwards, the procedures of obtaining construction licenses, property registration and customs clearance of cargoes have became more bureaucratized and a tax burden on businessmen has considerably increased. The simplified tax system in agriculture was transformed, and since 2017, January 1, is

[254] Doing Business. The World Bank. Retrieved from: http://www.doingbusiness.org/data/exploreeconomies/ukraine.

completely abolished. By the rank component “Dealing with Construction Permits”, Ukraine in 2016, took the 137th place, leaving behind such countries as Niger, Libya, Liberia, Cambodia, Afghanistan, etc. Still the situation was the worst concerning opportunities of getting electricity, according to which Ukraine took the 140th place. Low points also characterize the national system of protecting minority investors’ interests and a condition of trading across borders. The last one relatively worsened due to the conflict with the Russian Federation.

A slightly different methodology of the integrated assessment of the economy is used by a non-governmental organization “The Heritage Foundation”. The basic difference is in the application of the closed 100-points ranking scale, where zero stands for the worst state, and 100 points stand for the best one. In 2016, Hong Kong, Singapore, New Zealand, Switzerland and Australia had the highest level of economic freedom, but Cuba and North Korea had the lowest one.

In general, the dynamics of the economic freedom ranks of Ukraine confirm and specify the results of doing business rating (tab. 2).

On the scale accepted by “The Heritage Foundation”, the native economic freedom is characterized as repressed. The worst situation is observed only in 16 countries of the world, among which there are Chad, Zimbabwe, the Republic of Congo, Equatorial Guinea, North Korea, etc. It is remarkable that the condition of the property right sphere in Ukraine worsened in 2014-2016 even by 1995. In addition, the level of investment freedom decreased and the financial dependence increased. Positive changes, which promote the improvement of the investment and business climate in Ukraine, are a high trade freedom, monetary freedom, and the transparency of the fiscal system.

The analysts of the World Economic Forum calculate the global competitiveness level of the national economy on the basis of 104 indicators of socioeconomic development, which are united in 12 pillars: institutions; infrastructure; macroeconomic environment; health and primary education; higher education and training; goods market efficiency; labor market efficiency; financial market development; technological readiness; market size; business sophistication; innovation. According to each of these groups, experts determine a rank of a 7-mark scale, which is averaged then by using a statistical scales system and reduced to the general rating of the country. After that, all countries of the universal set are ranging in descending order with defining the place of each state in the ranged array.

Table 2. The Rank of Economic Freedom of Ukraine

Rank Components	Years							
	1995	2000	2005	2010	2013	2014	2015	2016
Rule of Law								
Property Rights	30.0	30.0	30.0	30.0	30.0	30.0	20.0	25.0
Freedom from Corruption	10.0	28.0	23.0	25.0	23.0	21.9	25.0	26.0
Limited Government								
Fiscal Freedom	61.8	62.3	83.0	77.9	78.2	79.1	78.7	78.6
Government Spending	47.1	41.9	78.6	41.1	29.4	37.5	28.0	30.6
Regulatory Efficiency								
Business Freedom	55.0	55.0	55.0	38.7	47.6	59.8	59.3	56.8
Labor Freedom	N/A	N/A	55.8	57.7	49.9	49.8	48.2	47.9
Monetary Freedom	0.0	63.0	76.2	61.2	71.0	78.7	78.6	66.9
Open Markets								
Trade Freedom	55.0	70.0	76.2	82.6	84.4	86.2	85.8	85.8
Investment Freedom	50.0	50.0	30.0	20.0	20.0	20.0	15.0	20.0
Financial Freedom	50.0	30.0	50.0	30.0	30.0	30.0	30.0	30.0
Economic Freedom Global	96	129	88	162	161	155	162	162
Ukraine's Rank	101	160	161	179	177	178	178	178

Notes. The estimates of the rank components are given in an absolute value. According to the methodology of their calculations, the highest value corresponds to the best state of affairs. The evaluation of the general rank of Ukraine among the countries of the world is relative. It is constructed on the basis of ranking. The numerator is the place of Ukraine in the ranked array; the denominator is the number of countries in the world, which were ranked.
Legend: N/A – not available or not calculated by the Heritage Foundation.
Source: compiled by the authors on the basis of the Heritage Foundation's data [255]

The economy of Ukraine in 2000 was on the 57th place from 59 countries by the global competitiveness level. Until 2015, the situation has improved as evidenced by the shift of our country upon the 79th place from the 140th [256]. The high level of corruption, the complicated access to financial resources, high inflation, the instability of regulatory and tax policy, etc. remain the most problematic aspects now.

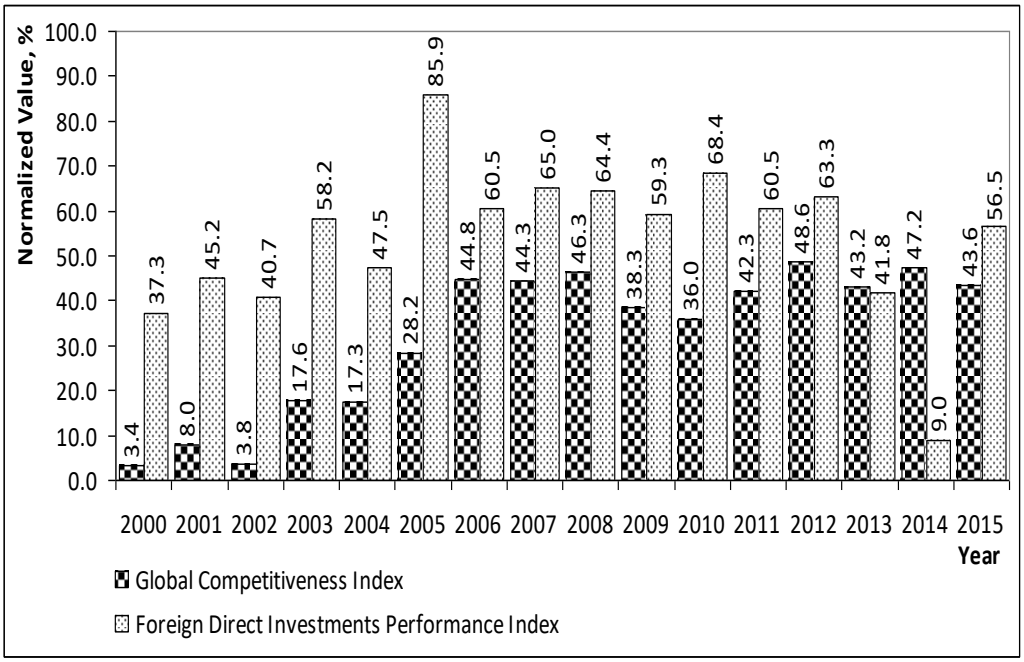
[255] Index of Economic Freedom. The Heritage Foundation. Retrieved from: http://www.heritage.org/index/country/ukraine.
[256] Global Competitiveness Index. World Economic Forum. Retrieved from: http://reports.weforum.org/global-competitiveness-report-2015-2016/economies/#indexId=GCI&economy=UKR.

Because of the global competitiveness index is annually defined for the different number of countries in the world, we carried out the normalization of the source data according to the formula (3) for inter-temporal comparisons of the ranks of Ukraine. These results are shown in the figure 1.

$$GCI_S = \left(1 - \frac{R}{\max R}\right) \times 100\%, \quad (3)$$

where GCI_S – the normalized value of a global competitiveness rank of Ukraine,%; R – a rank of Ukraine by the global competitiveness index among the countries of the world; $maxR$ – the number of the countries in the world, which were ranked (the maximum value of a rank).

Figure 1. The Dynamics of the Global Competitiveness Index and Foreign Direct Investments Performance Index of Ukraine



Source: compiled by the authors on the basis of the data of the World Economic Forum and the UNCTAD.

The represented data demonstrate that dynamics of Ukraine's global competitiveness have no accurate trend. Until 2002, it has been extremely low; in 2003-2006, the undertaken institutional reforms have considerably improved the state's international position, which remained stable for three years. The influence of the world economic crisis and the destabilization of a political situation over time in general affected the rating of the country in the world in any case.

One of the main indicators of the economy appeal for TNC is the investment climate. Besides, the capital internationalization level estimates the dynamics of foreign direct investments.

According to the current version of the "Balance of Payments and International Investment Position Manual", the direct investment is a category of cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is a resident in another economy. All other transactions between a direct investor and a direct investment enterprise are classified as direct investment. Immediate direct investment relationships arise when a direct investor directly owns equity that entitles him or her to have 10% or more of the voting power at the direct investment enterprise. The control is determined to exist, if the direct investor owns more than 50% of the voting power in the direct investment enterprise. A significant degree of influence is determined to exist if the direct investor owns from 10 to 50% of the voting power in the direct investment enterprise [[257], p. 14-15].

The account of foreign direct investments is kept by the National Bank of Ukraine according to the methodology of the International Monetary Fund, and by the State Statistics Service of Ukraine cumulatively since 1994. The technique of the State Statistics Service of Ukraine also varies in the difference between the market capitalization and stocks at par of the direct investors.

During 1994-2015 over 77.0 bln. dollars of foreign direct investments in the economy of Ukraine were totally mobilized, which make 80.2% of GDP in 2015(fig. 2).

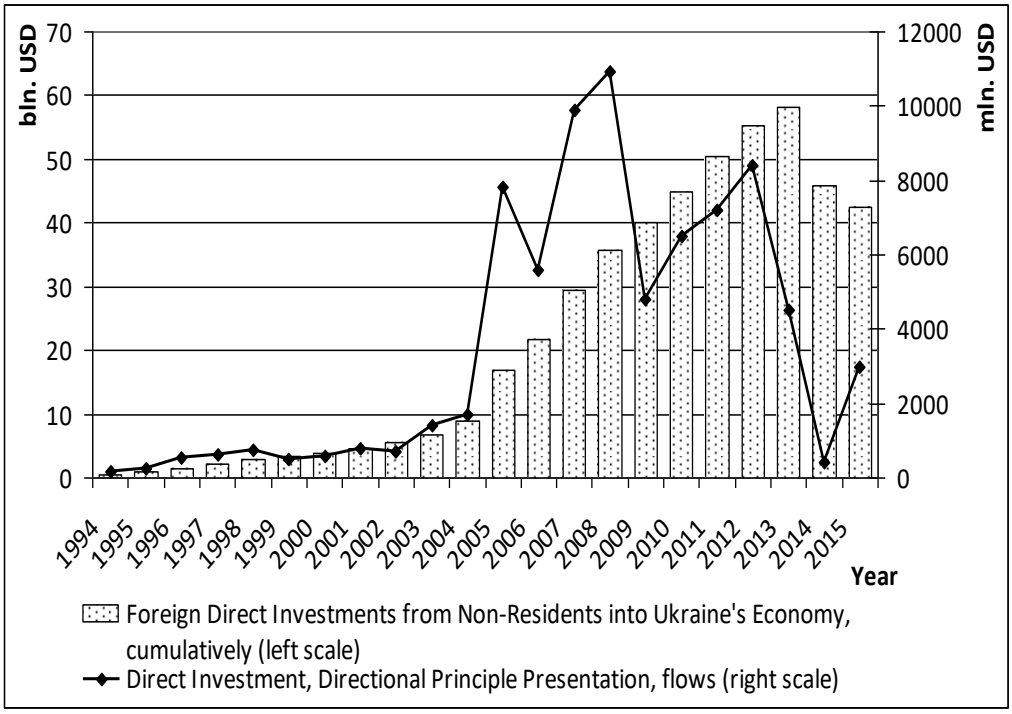
However, because of decapitalization of the national enterprises, which began in 2006 and accelerated in 2014-2015, the direct investment from nonresidents calculated cumulatively was only 42.5 bln. dollars or 44.3% of GDP.

The dynamics of the direct investment in the economy of Ukraine has a clearly expressed time lag, the objective reason of which is the term of public and private partnership agreements, the investment projects implementation period and a frequency of fixed capital updating an the enterprises as the recipients of funds. The average annual accession rate of inward foreign direct investments in 1995-2015 was 21.3%, including in the agrarian sector of the economy – 17.8%, in the overworking and food industry – 16.5%. The equity capital value of nonresidents for the studied period increased by 56.9 times and in 2015 amounted to 994.72 dollars per capita of the actual population in Ukraine. Such an increase in agriculture is less considerable

[257] Methodological Commentary on External Sector Of Ukraine Statistics (according to the Sixth Edition of the Balance of Payments and International Investment Position Manual). National Bank of Ukraine. Retrieved from: https://bank.gov.ua/doccatalog/document?id=20004345.

(by 33.4 times) as well as the investment and labor ratio of the actual rural population – 38.12 dollars per capita.

Figure 2. The Volumes of Foreign Direct Investments in the Economy of Ukraine



Note. The information for 2014-2015 excludes the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and a part of the zone, where the anti-terrorist operation takes place.

Source: compiled by the authors on the basis of the data of the State Statistics Service of Ukraine and the National Bank of Ukraine.

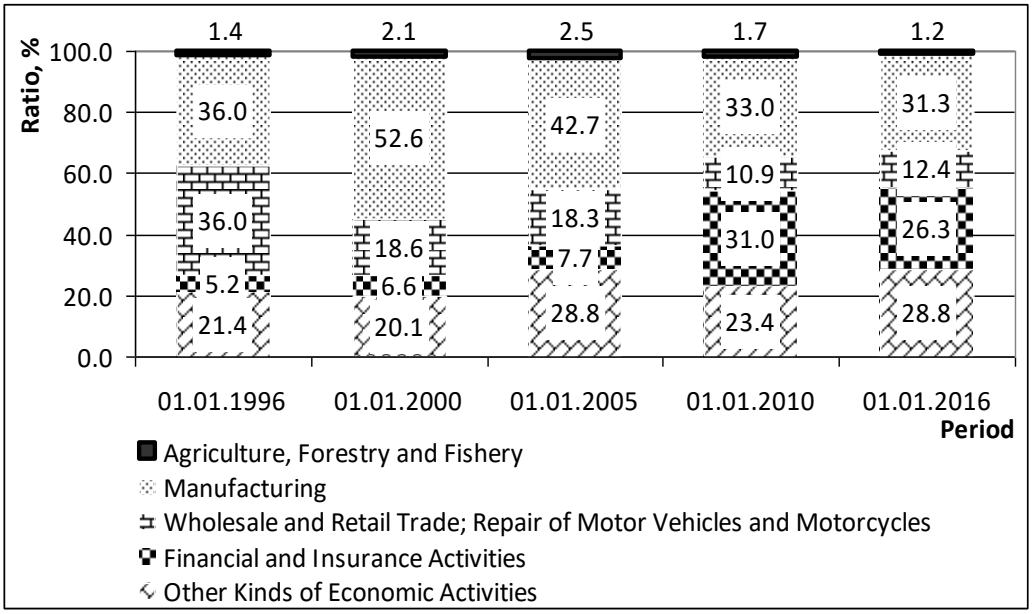
The structure of inward foreign direct investments also varies considerably during this time (fig. 3).

Therefore, in 1995, 73.4% of the nonresidents' capital were in the real sector of the economy, and then in 2015, its structural ratio was 44.9%. The change of priorities of foreign investors led to the redistribution of funds from agriculture, forestry and fishery, manufacturing, wholesale and retail trade into the financial, insurance and banking activities.

The source of the foreign capital origin is mainly the offshore zones and zones of special jurisdiction, the list of which in Ukraine is approved by the Cabinet of Ministers of Ukraine in execution of the subparagraph 39.2.1.2 of the Tax Code of

Ukraine. The offshore zones and zones of special jurisdiction include states (territories), which have a corporate tax rate by 5 and more percentage points lower, than in Ukraine; the states, which signed international agreements on information exchange without Ukraine; the states, the competent authorities of which do not provide a timely and global exchange of tax and financial information on inquiries of the central executive authority of Ukraine of the state tax and customs policy [258]. The mentioned criteria in 2015 corresponded to 65 countries (territories) of the world [259].

Figure 3. Structural Changes of Foreign Direct Investment (Equity Capital) in the Economy of Ukraine by Types of Economic Activity



Note. The information as of 2016, January 1 excludes the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and a part of the zone where the anti-terrorist operation takes place.

Source: compiled by the authors on the basis of the data of the State Statistics Service of Ukraine.

Over a period of 2009-2015 about 30-40% of foreign direct investments have come to the economy of Ukrain Figure 4. The Structure of the Foreign Direct Investment into the

[258]The Tax Code of Ukraine: Code of Ukraine № 2755-VI form 02.12.2010 (with amendments) (2010, December 2). Retrieved from: http://zakon.rada.gov.ua/laws/show/2755-17.

[259] The Ordinance of the Cabinet of Ministers of Ukraine on Approval of the Countries (Territories) List that Match Criteria of the Subparagraph no. 39.2.1.2 of the Subparagraph no. 39.2.1 of the Paragraph no. 39.2 of the Article no. 39 of the Tax Code of Ukraine]. (2015, September 16). Retrieved from: http://sfs.gov.ua/diyalnist-/mijnarodne-/normativno-pravovi-atty/224139.html.

Ukrainian economy through Offshore Zones and Zones of Special Jurisdictione from the offshore zones (fig. 4). The foreign investment of producers in the agrarian sector of the economy is even more off-shored because of the activity of transnational corporations and national agriholdings.

Special jurisdiction gives the chance to the integrated organizations to apply a few legal and semi-legal schemes of goods and funds turnover. According to the State Service of the Financial Monitoring of Ukraine, there are schemes of artificial overstating the tax credit so that the companies have the right to VAT refund of carried out export operation, etc.

The Russian Federation, the USA and Germany, the shares of which in the total amount are 75.8%, were the main countries of origin of the foreign capital directed at the agrarian sector of the economy of Ukraine in 1995 (fig. 5).

During 1995-2015, there were considerable transformations of a geopolitical situation and priorities of TNCs that resulted in changes of the territorial structure of foreign direct investments. Cyprus, Denmark and Great Britain, the share of which in the total amount in 2015 is of 55.7%, became the main donor countries at the same time.

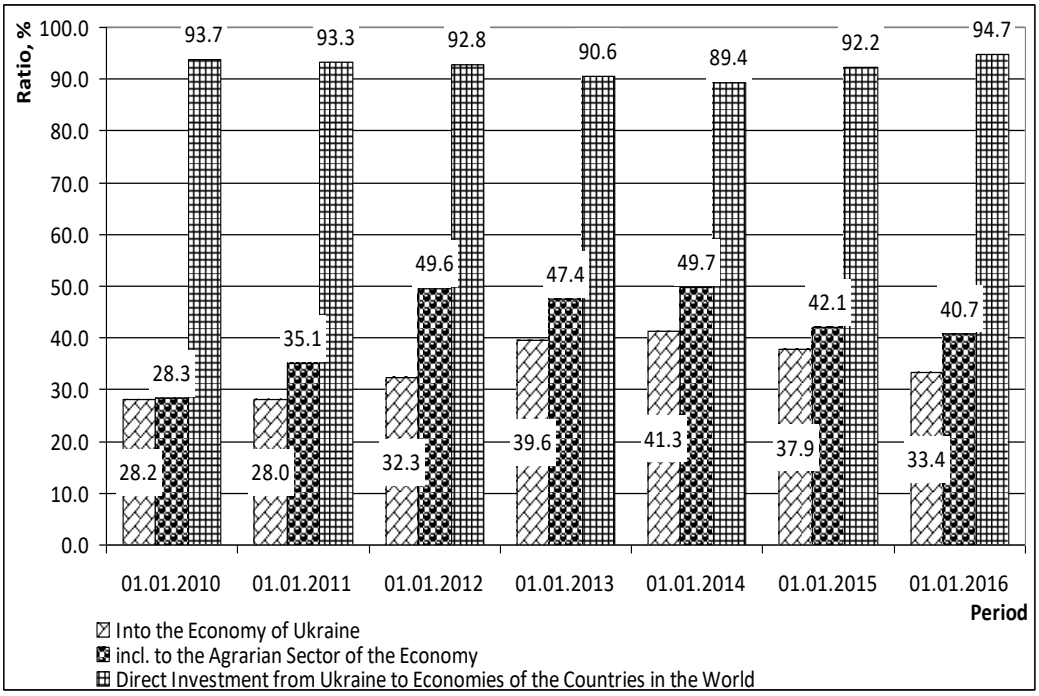
The volumes of the direct investments from Ukraine to the economies of the countries in the world are insignificant throughout the studied period. As of 2016, January 1 the native enterprises invested 6208.6 mln. dollars, of which in the agrarian sector of other states – 16.7 mln. dollars.

At the same time, in 1996, 1998, 2002, 2006 and 2015 within the methodology of the International Monetary Fund we can observe capital reinvestment process. The choice of the recipient country until 2005 was caused by strategic partnership of Ukraine with other countries, but over time, it has changed to an offshore vector under the influence of TNCs and the economy became shadow. According to our estimates, about 94.7% of the direct investments from Ukraine in economies of the countries in the world are the shares of the offshore zones (see fig. 4), 93.7% of which are invested into Cyprus.

It should be noted that according to the calculations of the American scientists, in developing countries the volumes of proceeding cash flows are underestimated due to the imperfection of social, political and legal institutes, and also under the influence of TNCs. Particularly, illicit financial flows from Ukraine caused by trade misinvoicing during 2004-2013 amounted about to 115.6 bln. dollars, including in 2013 – 13.3 bln. dollars or 7.0% of GDP [260].

260 Kar, D. & Spanjers, J. (2015). Illicit Financial Flows from Developing Countries: 2004-2013. Washington : Global Financial Integrity.

Figure 4. The Structure of the Foreign Direct Investment into the Ukrainian economy through Offshore Zones and Zones of Special Jurisdiction



Notes The information for 2015-2016, January 1 excludes the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and a part of the zone, where the anti-terrorist operation takes place. Offshore zones and zones of special jurisdiction are determined by the list approved by the Cabinet of Ministers of Ukraine. The data on the agrarian sector of the economy correspond to the type of economic activity "Agriculture, forestry and fishery".
Source: compiled by the authors on the basis of the data of the State Statistics Service of Ukraine.

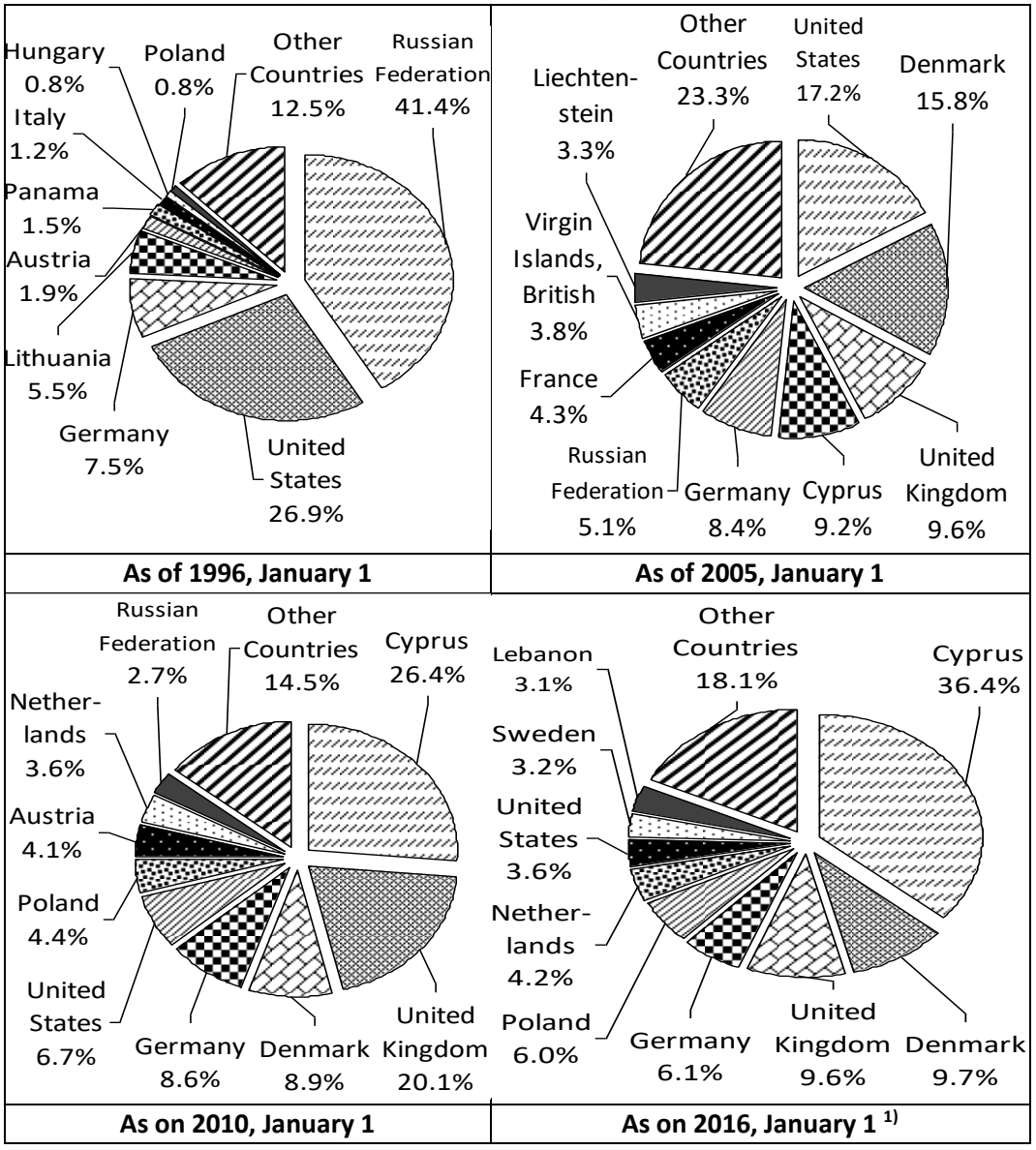
The effectiveness of the transnational integration in a global case study is often estimated through relative efficiency of foreign direct investments. Hence, the foreign direct investments performance index (FDI_{PI}) can be calculated by the formula [261, p. 4]:

$$FDI_{PI} = \frac{FDI_i}{FDI_w} \Big/ \frac{GDP_i}{GDP_w}, \quad (4)$$

where FDI_i, FDI_w – the volume of foreign direct investments in the economy of the country "*i*" and in economies of the countries in the world totally, "*w*"; GDP_i, GDP_w – a gross domestic product of the country "*i*" and the total one of all the countries in the world, "*w*".

261 FDI Potential and FDI Performance of the OIC Countries. (2014). Ankara : SESRIC.

Figure 5. The Structure of Foreign Direct Investments (Equity Capital) in the Agrarian Sector of the Economy of Ukraine by Countries of the Capital Origin



Notes. The data on the agrarian sector of the economy correspond to the type of economic activity "Agriculture, forestry and fishery". 1) – the information excludes the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and a part of the zone where the anti-terrorist operation is takes place.

Source: compiled by the authors on the basis of the data of the State Statistics Service of Ukraine.

This indicator allows approaching a transnationalization problem in complex, estimating the level of economy internationalization (the ratio of foreign direct investments in GDP of a country), as well as the involvement of the country in the international capital flow' system. We calculated the index of foreign direct investments performance of the Ukrainian economy for 2000-2015 and evaluated its place among 177 countries of the world, using the UNCTAD statistical database. The normalization of data was carried out by analogy with the formula (3).

The results of calculations demonstrate that the growth rates of capital transnationalization in Ukraine were the highest till 2005, when they reached the maximum absolute level in 4.45 units and amounted to 85.9%, having put the country on the 25th place in the global rating (see fig. 1). A gradual decline in the TNC's economic activity that was caused by the world economic crisis in 2008-2009 was replaced by a short-term recession in 2010-2012. However, owing to the destabilization of a situation in Ukraine, the processes of deintertionalization began in 2014, the scale of which in many times exceeded the period of reforms in the 90s of the XX century (for example, the absolute level of relative transnationalization in 2014 was 1.6 times lower than during the crisis in 1994). In 2015, the confidence level of foreign investors was restored a little, but in any case, Ukraine remains on the 77th place among the countries of the world.

In general, the index of foreign direct investments performance quite correctly reflects not only the level of transnationalization, but also estimates the results of the decisions made by the highest management of TNCs concerning expediency of production relocation to one or another country.

Over 1995-2015, the essential changes have happened in the structure of agro-industrial production, which was completely displaced towards high-marginal types of production under the influence of transnationalization and globalization. Therefore, in the structure of agricultural production of all types of agricultural holdings in 2015, the part of crop production was 70.3%, of which 47.5% is grain, leguminous and commercial crops. In comparison with the achieved levels in 1995, these indicators increased by 12.5 and 16.2 percentage points respectively, thereby having suggested the transformation of a specialization type from the good one to crop-growing type with poor development of livestock production.

As a result, the structure of the foreign trade of agriculture products and their processing has cardinally changed. For the studied period, grain export (including the products of grain processing counted as grain) in natural units increased by 47.1 times; of fruits, berries and grapes (including canned and dried products counted as fresh) – by 10.5 times; of eggs (including egg products) – by 31.5 times. At that, the

import of meat and meat products in natural units increased more than by 8.3 times; of potatoes, vegetables, melons and gourds increased by 1.3 times, and in some years by 6-9 times, etc. The export prices during all years were many times lower than the world ones, which is formally explained by the lack of production certification and discrepancy between the native quality standards and the world and European analogues.

The total volume of the export of goods and services for 1996-2015 has increased by 2.4 times, of import – by 2.3 times. These indicators had the greatest value in 2012-2013; however, in 2015 they decreased by more than twice because of the effect of social, economic and geopolitical factors. The ratio of the export of goods and services in the GDP of Ukraine for the studied period increased by 3.2 times, of import – by 3.1 times and equalled in 2015 52.8% and 54.8% respectively.

It should be separately noted that the volume of the import of goods accepted on commission in 20 years increased only twice, and its export was reduced by 3.5 times. At the same time, the rate of the value added on production gained from the imported goods, which were accepted on commission, was 43.5% that by three times exceeds similar data on reexport operations. Unfortunately, the volumes of the foreign trade turnover of agro-food goods accepted on commission remain extremely small (in 2015, the volume of imported goods accepted on commission on 1-24 groups of goods of the Ukrainian Classification of Goods for Foreign Economic Activity was only 71.6 mln. dollars) and do not exceed 3% in the total volume.

Conclusions. Having summarized theoretical and analytical considerations, we notice that the economy of Ukraine in general and the agrarian sector in particular, is turning into a raw appendage of other countries in the world under such circumstances and tendencies. This has been already posing a serious threat to the national security. In such an aspect, transnational integration turns into expansion, and foreign direct investments are of “low-quality” and are directed at deepening the debt crisis and dependence. Transnational corporations play here a role of unfair players on the market, whose purpose is not a movement of high-tech production, but monopolization of the local markets, access to cheap resources, etc. For keeping their positions, TNCs actively use an institute of political rent, without giving the chance to carry out effective reforms and regulatory measures. Finally, it leads to the increase of the poverty and unemployment level in the country, degradation of rural territories and destruction of the national identity.

Paradoxically, but, as scientists of international fame note, transnationalization has an effect of “illusive wellbeing”. It is shown that the governments of countries seek to create favorable conditions for TNC’s involvement, fixing their positions in the state for a long time and guarantee the property right and free activity just when the

economy remains in a chronic critical condition with considerable branch disproportions. Certainly, the TNC's activities have some positive sides about which we spoke at the beginning of the research, but their effect in this case will be rather local, not focused on a long-term outlook.

We believe that transnational integration can be effective and constructive in the long term only under conditions of development and deployment of accurate standards of the activity of transnational corporation and foreign investors in Ukraine, especially in the agrarian sector of the economy. According to the analysis of the world tendencies of sectoral development, one of the most rational measures is the direction at state and corporate capitalism, when the state and corporate organizations act as the main subjects of property and their association in the united mechanism forms the system of economic relations as a qualitatively new form of productive forces development. The priority in doing so has to be given mainly to the state form of ownership of means of production, especially of land resources, the economic circulation of which will be based on their rent.

The system of regulatory actions has to be based on the principle of the restriction of the rent-seeking behavior, when a part of rental and quasi rental super profits of corporations is withdrawn in favor of society. The selective policy concerning transnational corporations needs to be pursued proceeding from the strategic priorities of the development of Ukraine, its national security and global competitiveness. The effective mechanism of cooperation between transnational corporate organizations and the state seems to be public-private partnership. The guarantee of the food security of Ukraine has to be provided by creating state transnational corporations as it is done by most developed countries of the world.

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