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MAIN TRENDS OF INVESTMENT AND INNOVATIVE ACTIVITY OF BUSINESS ENTITIES IN THE CONDITIONS OF EUROPEAN INTEGRATION

The **subject** of the research in the article is the main tendencies of investment and innovation activity of business entities. The **purpose** of the work is to determine the main tendencies of investment and innovation activity of economic entities at the international, macro and microeconomic levels in the conditions of European integration with application of methods of economical and mathematical modeling. **Task:** definition of integral indicator of investment and innovation activity of economic entities at international, macro and microeconomic levels. To achieve the goal, the following **methods** were used: abstract-logical method, method of analysis and synthesis, logical-content analysis - formation and substantiation of the system of indicators of evaluation of investment and innovation activity of subjects of management; generalization and abstracting - the study of categorical apparatus of investment and innovation activity of business entities, multidimensional factor analysis - for the classification and systematization of the space of signs of research and the grouping of factors by their economic content. The following **results** are obtained: to increase the objectivity and reliability of the analysis, the corresponding integral indicators characterizing each level are combined into a generalized integral index of investment and innovation activity of economic entities, calculated by the method of additive convolution, taking into account the coefficients of significance of each level. Significance is determined on the basis of the use of expert survey method taking into account the predominance: for foreign investments and for domestic investments. **Conclusions:** the theoretical and methodical approach to the definition of investment and innovation activity of economic entities is proposed, which provides the opportunity to determine the most influential factors on the level of investment-innovation activity economic entities at the international, macro- and microeconomic levels in the context of European integration and provides an integrated valuations taking into account the predominance of foreign or domestic investment, which contributes to the adoption of sound management decisions.

Keywords: investment and innovation activity; European integration; trends; economic levels; business entities.

Introduction

Globalization processes have a significant impact on the economy of any country, but the global investment's flows and the growth of the level of intensity of innovation activity, as one of the main tools for improving the competitive position, significantly affects the state of investment and innovation activity of economic entities, especially those located in the territories of countries, which occupy insufficiently high positions in the relevant world rankings. In particular, Ukraine at the global level of competitiveness ranks the 83th place in 2017-2018 (Source: The Global Competitiveness Report). Therefore, one of the ways to overcome this situation is to identify the main trends in changing the investment and innovation activity of economic entities, which determines the feasibility of applied research aimed at increasing their level.

Literature review

In order to ensure the progressive development of business entities in a highly dynamic competitive environment, it is expedient to gradually introduce the innovations that can be realized only through the use of investments. Therefore, the issue of improving the investment and innovation activity of business entities seems to be relevant.

For the implementation of the innovation activity it is important to ensure the investment resources.

According to the law "On investment activity" (1991), investments are "all types of property and intellectual property that are invested in objects of entrepreneurial activity and other kinds of activity, which results in the creation of profit (income) and / or social

and environmental effect" (Article 1).

McConnell and Brue (2003) pointed out that investments are "the costs of building new factories, machines, equipment with a long service life, the cost of production and accumulation of means of production and the increase of material stocks, the cost of improving education, health of workers or to increase mobility of labor".

Balabanov (2001) and Melkumov (2014) define investments as "the use of financial resources in the form of long-term capital investments".

Fedorenko (2013) considers investments as "a capital investment in order to further increase it. The growth of the capital as a result of the investment is a compensation of the risk of losses from inflation and the non-receipt of interest from banking capital investments."

Mertens (2011) regards investments as "today's costs, which are aimed at obtaining future benefits."

Hence, investments are all types of financial, property, intellectual property, which ensure the success of European integration of domestic business entities through the intensification of their innovation activities.

Therefore, it is very important to realize the investment activity. According to the Law "On Investment Activity":

1. Investment activity is a set of practical actions of citizens, legal entities and the state in terms of investment.

2. Investment activity is carried out on the basis of:

- investment by citizens, non-state enterprises, economic associations, unions and societies, as well as public and religious organizations, other legal entities based on collective ownership;

- state investment, carried out by state authorities at the expense of the state budget, loan funds, as well as state enterprises and institutions at the expense of their own and borrowed funds;

- local investment by local governments at the expense of local budgets, borrowed funds, as well as municipal enterprises and institutions at the expense of their own and borrowed funds;

- state support for the implementation of investment projects;

- foreign investment carried out by foreign states, legal entities and citizens of foreign states;

- joint investment by legal entities and citizens of Ukraine, legal entities and citizens of foreign countries.

Balan (2014) considers investment activity as a modern investment process can be defined as a phenomenon that is accompanied by the adoption of investment decisions in real time against the background of building models and mechanisms for the attraction and use of investments.

Muzychenko (2014) emphasizes that investment activity is a coherent set of actions of its subjects (investors, participants) in order to make investments in order to receive income.

Petrenko (2012) believes that investment activity is an activity associated with investing in investment objects in order to receive profits [6]. In the narrow sense, as noted

Semenyuta (2010) considers investment activity at the microeconomic level and indicates that its purpose is to generate profit or to generate additional income, achieve social benefits, ensure development, increase the market value of capital, reflected on the amount of capital employed, or on the growth of operating capital, the consequence of investing at the macro level is the achievement of economic growth.

Summarizing the presented definitions and taking into account the objective of investment activity, one should understand the set of practical actions carried out at the international, macro and microeconomic levels in the context of European integration and characterized by investing financial, property, intellectual property, which ensure the success of European integration of domestic business entities through activation their innovation activities.

Investment activity is the basis for innovation. The term "innovation" consists of two words: the first is the Latin "innovation" (novelty, innovation) and the second - the English prefix "in", which means "input".

The Law of Ukraine "On Innovation Activity" (2002) defines the term "innovations" as "newly created (applied) and (or) improved competitive technologies, products or services, as well as organizational and technical decisions of an industrial, administrative, commercial or other nature that significantly improve the structure and quality of production and (or) social sphere."

Drucker (2007) sees innovation as "a special tool for entrepreneurs, a tool by which they use change as a chance to implement a new type of business or service."

According to Schumpeter (2008), innovation is the use of new combinations of existing productive forces to solve commercial problems. The author distinguishes the following types of innovations: the production of a new product that is not familiar to consumers or a product with qualitatively new properties; introduction of new means of production; development of a new market in a certain

branch of the country; search of new sources of raw materials and semi-finished products; application of new organizational forms.

Twiss (1989) sees innovation as "a process in which an invention or idea becomes economically meaningful."

Sakhal (1985) defines innovation as an element that derives the entire economic system from equilibrium.

Dodgson (2000) includes the scientific, technological, organizational and financial activities in the innovation process, which will lead to the commercial introduction of a new (or improvement) product or production process.

Nixon (1997) considers innovation based on the application of the process approach and understands as a set of technical, production and commercial measures that lead to the emergence of new and improved industrial processes and equipment on the market.

According to Santo (1990), innovation is a social, technical, economic process, which, through the practical use of ideas and inventions, leads to the creation of the best in their properties of products, technologies.

Dorofeev, Drevyanikov (2003) believe that innovation is the ultimate result of innovations that has been incarnated in the form of new or improved: product, process, new approach to social problems.

According to the OECD / Eurostat (2018) guidelines for the collection, presentation and use of innovation data: "Innovation is a basis for raising the standard of living and can affect people, institutions, sectors of the economy and countries in different ways. Measuring innovation and using innovative data in research can help policymakers improve understanding of economic and social change, assess the contribution (positive or negative) of innovation to achieve social and economic goals, and monitor and evaluate effectiveness and effectiveness of their policies."

Dycha, Tanasienko, Kolisnik (2017) consider the introduction of innovations as a key factor in the growth of labor productivity. Resler, Kuril, Logvinenko, Makhinchuk, Ivanishchuk (2018) interpret innovations in the following way:

1) innovation in the broadest sense - as any change that raises the competitiveness of business entities;

2) innovation in the narrow sense - as a process of transformation of scientific achievements into production;

3) innovations that are introduced into economic practice.

Consequently, innovations are the first created or improved organizational, production, logistics, information and other technologies that ensure the success of European integration of domestic business entities.

Implementation of innovations is impossible without innovation. According to the law "On Investment Activities (1991), innovation activity is" a set of measures aimed at the creation, implementation, dissemination and implementation of innovations in accordance with the Law of Ukraine "On Innovation Activity" (2002) in order to obtain the commercial and / or social effect that is being carried out through the implementation of investments invested in objects of innovation activity" (Article 3).

The Law of Ukraine "On Innovation Activity" (2002) defines innovation activity as "activity aimed at the use and commercialization of the results of research and development and promotes the launch of new competitive products and services on the market" (Article 1).

Bliznyuk (2008) characterizes innovation activity as a complex dynamic system of measures for the use of the results of completed scientific and technological research, organizational and economic development or other scientific and technological achievements, which functions under the influence of environmental factors of all levels (external and internal) in order to meet the changing individual demand and the needs of society as a whole in competitive products (goods, works, services).

Zavlin, Kazantsev, Mindeli (1998) indicate that innovation activity is aimed at using the results of scientific research and development for the expansion and updating of the nomenclature and improvement of the quality of products (goods, services), the improvement of the technology of their production, with subsequent implementation and effective implementation on domestic and foreign markets.

Zyanko (2005) notes that innovation activity is a complex dynamic system of interaction and interaction of different methods, factors and management bodies engaged in innovation research, the creation of new types of goods, improvement of the technological process, equipment or labor, organizational forms of production, etc. based on the latest scientific and technological achievements. This is the activity of planning, financing and coordination of scientific and technological progress, which is related to the improvement of economic levers and incentives, the development of a system of actions for the management of a set of interdependent processes or activities that are one way or another aimed at accelerating the intensive development of scientific and technological progress and increase socio-economic efficiency of production.

Kozmenko S.M. (2010) emphasizes that innovation activity is associated with the processes of creation, introduction and dissemination of innovations.

Consequently, innovation activities are activities aimed at intensifying the implementation of research and development, attracting existing developments at the international, macro- and microeconomic levels to the activities of domestic business entities with a view to their successful European integration.

Consequently, the economic terms of "investment" and "innovation", investment and innovation activities are interconnected and condition one another. In addition, in the conditions of expediency of integration into the international economic community, it is expedient to see the growth of the investment and innovation activity of economic entities.

Rayevneva and Grinevich (2012) proposed to evaluate the investment and innovation activity of the state using statistical tools for assessing the intensity of change in quantitative indicators.

Grishko, Koleshchuk and Lesik (2011) substantiated the indicators of quantitative assessment of the degree of innovation and investment activity of enterprises and the investment and innovation potential of enterprises.

Kharazishvili (2015) proposed to assess the country's investment and innovation security using indicators based on macroeconomic indicators.

Mikhailov (2011) proposes to assess the quality of the structure of investment by their innovation (progressiveness). The author combines investment and innovation in one indicator, which allows him to be considered an integral indicator of activity both at the beginning and at the stage of completion of the innovation process.

Bogutskaya (2017) supplemented Michalov's approach (2011) to determining the level of investment and innovation activity of industrial enterprises on the basis of the application of multi-level gradation - passive, medium-active, active.

In addition, the growth of the investment and innovation activity of business entities is the basis for the improvement of business activity in the country and in the world as a whole. The analysis, conducted by Ponomarenko, Gontarevo (2017), indicates a reduction in the number of innovative enterprises by reducing the sources of funding from both the state and large businesses.

At the same time, despite a large number of scientific papers in the field of analysis of investment and innovation activity of business entities, some issues remain controversial, only some aspects of the given problem which require further research are considered.

Methods

The purpose of the article is to determine the main tendencies of investment and innovation activity of economic entities at the international, macro and microeconomic levels in the conditions of European integration with application of methods of economical and mathematical modeling.

To achieve the goal, the following methods were used: abstract-logical method, method of analysis and synthesis, logical-content analysis - formation and substantiation of the system of indicators of evaluation of investment and innovation activity of subjects of management; generalization and abstraction - the study of categorical apparatus of investment and innovation activity of business entities, multidimensional factor analysis - for the classification and systematization of the space of signs of research and factorization of their economic content.

Results

In the conditions of high competition both in international and domestic markets, a significant number of factors affect the investment and innovation activity of business entities. It is therefore advisable to determine the main trends at three levels: international, national, business entities.

The most informative indicator characterizing the investment and innovation activity of business entities at the international level is the global innovation index, which consists of two groups of indicators: available resources and conditions for innovation (Innovation Input)

and achieved innovative results of innovation (Innovation Output). Information on dynamics of values of the global index of innovations and their components for 2013-2018 is presented in the table 1.

Table 1. Dynamics of values of the global index of innovations and their components for 2013-2018. Source: The Global Innovation Index

No.	Indicator	2013		2014		2015		2016		2017		2018	
		Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
1.	Global Innovation Index	71	35,78	63	36,26	64	36,50	56	35,72	50	37,62	43	38,50
2.	Innovation Input	83	37,91	88	38,15	84	39,06	76	38,91	77	41,05	75	40,45
3.	Innovation Output	58	33,65	46	34,37	47	33,85	40	32,53	40	34,19	35	36,59
4.	1. Institutions	105	51,39	103	52,90	98	52,25	101	48,71	101	47,9	107	49,09
5.	2. Human capital and research	44	37,93	45	36,56	36	40,39	40	40,80	41	39,58	43	37,93
6.	3. Infrastructure	91	25,98	107	27,09	112	26,32	99	32,33	90	39,30	89	38,08
7.	4. Market sophistication	82	44,04	90	45,14	89	43,94	75	42,11	81	43,18	89	42,68
8.	5. Business sophistication	79	30,23	87	29,07	78	32,39	73	30,59	51	35,28	46	34,38
9.	6. Knowledge and technology outputs	45	31,98	32	38,17	34	36,39	33	34,05	32	32,76	27	36,69
10.	7. Creative outputs	81	35,33	77	30,56	75	31,31	58	31,01	49	35,62	45	36,49

Available resources and conditions for innovation include: institutional support; human capital and research; infrastructure; development of the domestic market; business development.

In particular, a group of indicators characterizing available resources and terms of innovation, indirectly takes into account investment activity, through a thorough analysis of the development of the domestic market, which focuses on the analysis of credit (ease of "obtaining a loan", private loans to the private sector, microfinance institutions with a large loan portfolio) and investments

(ease of protection of investors, market capitalization, total value of shares).

In the framework of the achieved practical results of innovation, the analysis of the development of technology and knowledge economy and the results of creative activity are used.

The dynamics of the position in the ranking of the Global Index of Innovation for 2013–2018 is presented in fig. 1. Optimization criterion – the minimization.

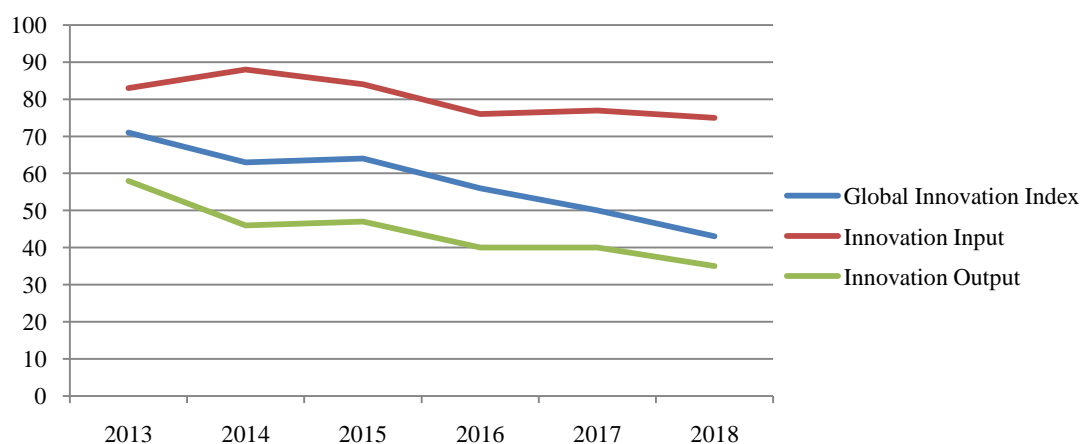


Fig. 1. Dynamics of values of indexes of investment and innovation activity of business entities at the international level for 2013–2018. Source: The Global Innovation Index

The analysis of the data presented in fig. 1 shows that during the period of 2013–2018 the dynamics of the global index of innovations and the achieved practical results of innovations characterizing the investment-innovation activity of economic entities at the international level have a significant improvement, except for 2016. The available resources and conditions for

innovation in 2018 were slightly worsened. On the whole, the current dynamics indicate a significant improvement of Ukraine's position in the ranking of the Global Index of Innovation.

Thus, the given index allows estimating investment-innovative activity of business entities in Ukraine in comparison with other countries. According to the

information provided the Ukraine's position on the global innovation index is characterized by the positive dynamics. Ukraine moved from the 71st place in 2013 to the 43rd place in 2018.

However, such components as the results in the field of knowledge and technologies, creative results and business development have improved most significantly

(fig. 2). The components that characterize human capital and research, and infrastructure are virtually unchanged. On the contrary, due to the institutional support and development of the domestic market, the situation has deteriorated significantly and requires the adoption of urgent relevant management decisions to address the problems that have arisen (fig. 2).

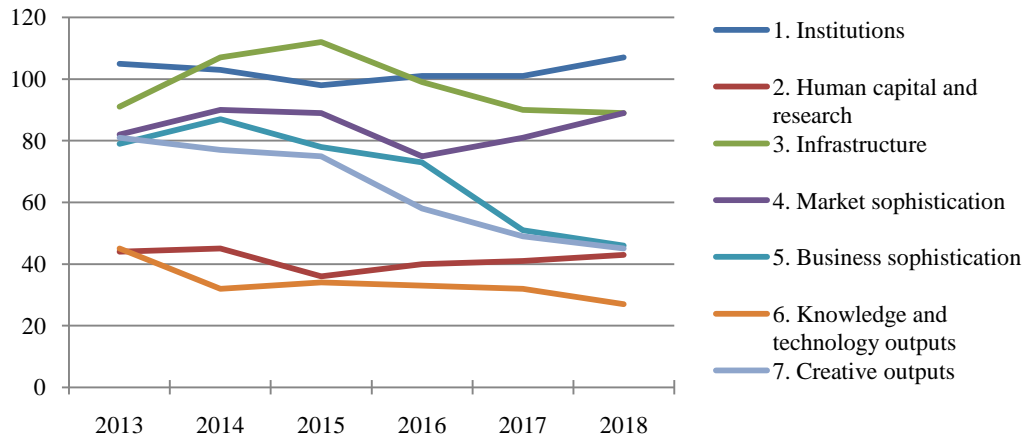


Fig. 2. The dynamics of the components of the global innovation index for 2013–2018. Source: The Global Innovation Index

The next step in the study of investment and innovation activity of business entities is to identify the main trends at the macroeconomic level. In table 2

the information describing the cost of research and development by type of work in Ukraine is presented.

Table 2. Sources of financing of innovation activity of industrial enterprises. Source: the State Statistics Service of Ukraine

Period	Total amount of expenses	Including at the expense of funds				Growth rate of total cost (up to the previous period)
		own	state budget	foreign investors	other sources	
mln. UAH						
2010 ¹	8045,5	4775,2	87	2411,4	771,9	–
2011 ¹	14334	7585,6	149,2	56,9	6542,2	1,781617
2012 ¹	11481	7335,9	224,3	994,8	2925,6	0,800963
2013 ¹	9562,6	6973,4	24,7	1253,2	1311,3	0,832907
2014 ^{1,2}	7695,9	6540,3	344,1	138,7	672,8	0,804792
2015 ^{1,2}	13814	13427	55,1	58,6	273	1,794982
2016 ²	23230	22036	179	23,4	991,1	1,681627
2017 ²	9117,5	7704,1	227,3	107,8	1078,3	0,392488

¹ data are given without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea, Sevastopol and parts of temporarily occupied territories in the Donetsk and Luhansk regions;

² data are based on the results of the state statistical observation in the form of the number of ITN "Survey of innovation activity of enterprises for the period 2014–2016 years" (according to the international methodology).

According to the information presented in table 2 the growth rates of total expenditures (up to the previous period) are characterized by a positive trend only in 2011, 2015, 2016, which indicates the presence of negative trends and insufficient amount of funding for innovation activities of industrial enterprises. In 2017, compared with 2016, there was a significant decline in the financing of innovation activities of industrial enterprises at their own expense (decreased by 2.86 times). This testifies to the existence of a negative trend regarding the fact that enterprises practically reduce investment and innovation activity.

Therefore, it is expedient to conduct an analysis of capital investment by sources of financing (table 3).

The information presented in table 3 shows the gradual growth of volumes of capital investment in all sources of financing in 2011, excluding households for housing construction. In 2012, the positive tendency remains for financing at the expense of local budgets, own funds of enterprises and organizations, loans from banks and other loans, other sources of financing, restored relative to the population's funds for housing construction. During 2013–2014, there is a negative tendency towards funding from sources such as funds from state and local budgets, own funds of enterprises and organizations, bank loans and other loans, public funds for housing construction, and other sources of financing. In the period from 2015 to 2017, the positive trend is restored to such

sources as funds of state and local budgets, own funds of enterprises and organizations.

Table 3. Capital investment by the sources of financing. Source: the State Statistics Service of Ukraine

Sources of financing	2010	2011	2012	2013	2014	2015	2016	2017
Total	180576	241286	273256	249873	219420	273116	359216	448462
incl. at the expense of								
the state budget funds	10223	17377	16288	6174,9	2738,7	6919,5	9264,1	15295
the local budgets funds	5730,8	7746,9	8555,7	6796,8	5918,2	14260	26817	41566
own funds of enterprises and organizations	111371	147570	171177	165787	154630	184351	248769	310062
bank credits and other loans	22888	36652	39725	34735	21739	20740	27106	29589
funds of foreign investors	3723,9	5038,9	4904,3	4271,3	5639,8	8185,4	9831,4	6206,4
funds of the population for housing construction	18886	17589	22576	24072	22064	31985	29933	32803
other sources of funding	7752,5	9312,8	10031	8036,7	6690,2	6674,7	7495,5	12941

In 2015–2017, financing increases at the expense of foreign investors, but in 2017 they are reduced by 42 %. Also, more than 5 times the funding from other sources decreased in 2017 in comparison with 2016. But in general, Capital investment by sources of financing during 2015–2017 grew more than 1.64 times. Therefore, on the basis of table 2, 3 it should be concluded that the overall funding volume is increasing during 2014–2017, but the

innovation activity decreased significantly by 2.86 times in 2017 compared to 2016.

Of particular importance for the growth of investment and innovation activity of economic entities is the implementation of costs for the implementation of scientific research and development by types of works, which is presented in table 4.

Table 4. Expenditures for carrying out scientific researches and developments by the types of works, mln.UAH. Source: the State Statistics Service of Ukraine

Period	Total, in actual prices	Including execution of		
		fundamental research	applied scientific research	scientific-technical (experimental) developments
2010 ¹	8107,1	2175	1589,4	4342,7
2011 ¹	8513,4	2200,8	1813,9	4498,7
2012 ¹	9419,9	2615,3	2023,2	4781,4
2013 ¹	10248,5	2698,2	2061,4	5488,9
2014 ^{1,2}	9487,5	2452	1882,7	5152,8
2015 ^{1,2}	11003,6	2460,2	1960,6	6582,8
2016 ²	11530,7	2225,7	2561,2	6743,8
2017 ²	13379,3	2924,5	3163,2	7291,6

¹ Data for 2010-2015 have been recalculated without the cost of performing scientific and technical services.

² The data are given without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea, Sevastopol and parts of the temporarily occupied territories in the Donetsk and Luhansk oblasts.

Analysis of the data presented in table 4 shows in general the gradual increase in the cost of research and development by type of work except for 2014, but the values of indicators taking into account the existing inflation rates (table 5) will be significantly reduced from 2013 to 2015, which indicates the presence negative tendencies regarding investment-innovation activity of business entities (fig. 3). During 2016–2017, expenditures on research and development work by type of work are gradually increasing, but this is not enough to strengthen

the competitiveness of the country, as its position at the global level of competitiveness is unsatisfactory: 2015–2016 – 79th place, 2016-2017 – 85th place, 2017–2018 – 83th place (Source: The Global Competitiveness Report).

In addition, the total amount of expenditures for innovative activities and the share of enterprises engaged in innovations are important for determining the trends of investment and innovation activity of economic entities (table 6).

Table 5. Inflation Indices for 2010 – 2017. Source: the State Statistics Service of Ukraine

2010	2011	2012	2013	2014	2015	2016	2017
109,1	104,6	99,8	100,5	124,9	143,3	112,4	113,7

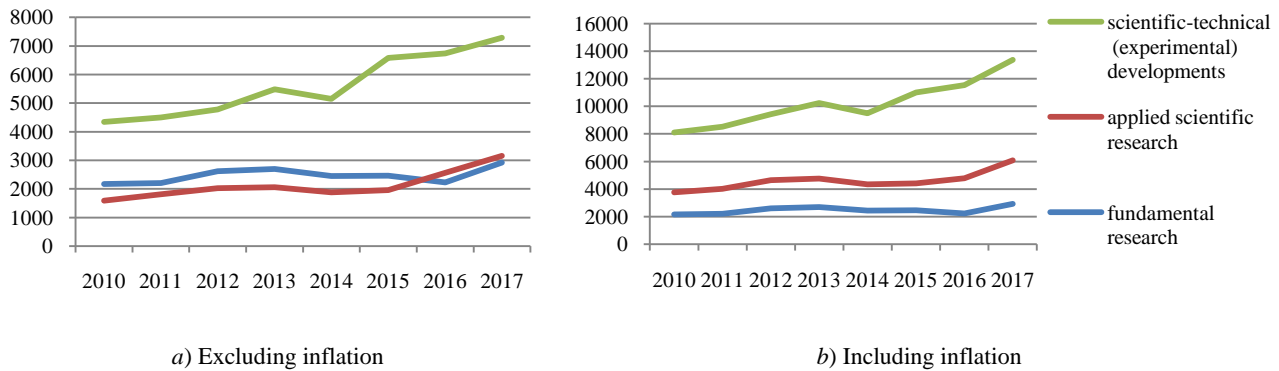


Fig. 3. Dynamics of expenses for research and development according to types of works, mln. UAH. Source: the State Statistics Service of Ukraine

Table 6. Total expenditure on innovation activities. Source: the State Statistics Service of Ukraine

Year	Share of enterprises engaged in innovations	Total amount of expenses	including					
			researches and developments ¹	including		purchase of other external knowledge	purchase of machinery equipment and software	other expenses
				internal SRW	external SRW			
%		mln. UAH						
2010	13,8	8045,5	996,4	818,5	177,9	141,6	5051,7	1855,8
2011	16,2	14334	1079,9	833,3	246,6	324,7	10489	2440,2
2012	17,4	11481	1196,3	965,2	231,1	47	8051,8	2185,5
2013	16,8	9562,6	1638,5	1312,1	326,4	87	5546,3	2290,9
2014	16,1	7695,9	1754,6	1221,5	533,1	47,2	5115,3	778,8
2015	17,36	13814	2039,5	1834,1	205,4	84,9	11141	548
2016	18,9	23230	2457,8	2063,8	394	64,2	19829	878,4
2017	16,2	9117,5	2169,8	1941,3	228,5	21,8	5898,8	1027,1

The analysis of table 6 demonstrates, in general, the improvement of the share of enterprises engaged in innovations during 2010–2016, but in 2017 there is a return to the value of 2011 and the total amount of expenses has decreased by more than 1.5 times, as evidenced about deterioration of investment and innovation activity of business entities.

In order to determine the list of indicators to be analyzed in order to determine the main

trends of investment and innovation activity of economic entities, increase the reliability of their assessment and significance, the valuation of all indicators of this level was made, the correlation dependence between each indicator analyzed during the period under study and SRW. The calculation is made using STATISTICA 12.5. The results are presented in the table 7.

Table 7. Results of correlation analysis

List of indicators	Value of the correlation coefficient
the share of enterprises engaged in innovations	0,451125
financing of innovative activity of industrial enterprises in general	0,318068
at own expense	0,503268
at the expense of the state budget	0,230716
at the expense of foreign investors	-0,601337
at the expense of other sources	-0,343151
total amount of expenses in the areas of innovation activity	0,318068
expenses for research and development by the types of work	0,968392
expenses for fundamental research	0,506827
expenses for applied scientific researches	0,944895
expenses for the implementation of scientific and technical (experimental) developments	0,948337
expenses for research and development	0,856000
expenses on internal SRW	0,897847
expenses on external SRW	0,053538
expenses on purchase of other external knowledge	-0,501715
expenses on purchase of machinery equipment and software	0,338342
other expenses	-0,634152

Thus, according to the results of the analysis (table 7), the highest level of correlation dependence are: the cost of performing research and development by types of works, applied research, scientific and technological (experimental) development, research and development costs, costs for internal SRW.

Therefore, indicators characterized by the highest level of correlation dependence were included in the integral indicator of investment and innovation activity of

economic entities at the macroeconomic level, which is calculated by the method of additive convolution, taking into account the coefficients of significance of each indicator. The significance is determined on the basis of the normalization of the coefficients of correlation for each of the indicators included for the calculation. The results of calculating the integral index of investment-innovation activity of economic entities by macroeconomic level are presented in table 8.

Table 8. Results of calculation of the integral index of investment-innovation activity of economic entities by macroeconomic level

Period	The value of the integral indicator
2010	0,89212
2011	0,710859
2012	0,627388
2013	0,591154
2014	0,560684
2015	0,550717
2016	0,545415
2017	0,544382

Thus, the analysis of indicators values presented in table 8 testify the presence of a negative trend characterized by a gradual decrease in the values of integral indicators of investment and innovation activity of economic entities

The next step in determining the main trends of investment and innovation activity of economic entities is its analysis at the microeconomic level, which should be carried out on the basis of the information provided in the form of official statistical reporting for 2010–2017 and coincides with the study periods at the two previous levels.

So according to the proposals of Dourthmes (2017), a specific weight in the system of indicators of evaluation of investment and innovation activity of economic entities is given: the real investments at the expense of the enterprise's own funds in the total volume of investments; investment in fixed capital in equity; the real investments at the expense of depreciation deductions of the enterprise in the total volume of investments; capital investment in tangible assets in the total volume of capital investments; investment in computing equipment and software in the total volume of investment in intangible assets; investment in innovation in the total investment; investments for informatization in the total amount of investments; investment in intangible assets in the total value of non-current assets; investment in intangible assets in the total value of assets; the cost of research and development in the total cost of innovation; investment in innovation in equity; investment in innovation in the total capital; the costs of machinery, equipment and software related to the introduction of innovations in the total amount of innovation costs; the number of inventors and innovators in the average number of personnel; budget investments on technological innovations in the total amount of investments in innovation; own investments in

technological innovations in the total amount of expenses for innovation; investments of domestic investors in the total amount of expenses for innovation; investments of foreign investors in the total amount of expenses for innovations; shipped innovative products in the total volume of sales; shipped products, which are characterized by significant technological changes or re-introduced within three years, in the total volume of products shipped; transmitted new technologies abroad in the total amount of technology transferred; transferred new technologies in Ukraine in the total amount of technology transferred; shipped products, for which the manufacturing process was improved, in the total volume of shipped products; new products in total production; new products put up for export in the total volume of new products.

Machine-building enterprises of the Kharkiv region, whose activities are characterized by a positive financial result during 2010–2017, were selected as the basis of the research.

The proposed number of indicators is significant; therefore, the factor analysis using the main components method was used to reduce it, which helps to optimize the number of indicators. Varimax factor rotation method has been used, which has contributed to the improvement of the quality of the results, which due to the orthogonality of the factors to maximize the number of variables with high factor load.

The factor load of the indicators of investment and innovation activity of economic entities is given in table 9.

As a result of the evaluation, 4 main components were selected, which are characterized by a cumulative dispersion index of 76.05 %. The economic interpretation of the selected factors is presented in table 10.

Table 9. The factor load of indicators of investment and innovation activity of business entities

Indicator	Components			
	1	2	3	4
the share of real investments at the expense of the company's own funds in the total volume of investments	0,723680	0,230961	0,208209	0,054342
the share of investments in fixed capital in equity	0,723117	0,301356	-0,058491	0,133937
the share of real investments at the expense of depreciation deductions of the enterprise in the total volume of investments	0,242892	0,786020	0,144854	0,008169
the share of advertising investments in the total amount of investment in innovation	0,028863	-0,013851	0,954753	0,040011
the share of capital investments in tangible assets in the total volume of capital investments	-0,173841	0,095555	0,500657	-0,277420
the share of investment in computing equipment and software in the total volume of investment in intangible assets	0,648221	-0,156666	0,293951	-0,190044
the share of investment in innovation in the total investment	-0,029039	-0,028947	0,921129	0,009336
the share of investments in informatization in the total volume of investments	-0,179545	0,476154	0,686367	0,060123
the share of investments in intangible assets in the total value of non-current assets	0,753430	-0,192471	-0,140793	0,090072
the share of investments in intangible assets in the total value of assets	0,818433	-0,109005	-0,140990	0,075912
the share of research and development costs in the total amount of innovation costs	0,648888	-0,087759	-0,062308	0,218169
the share of investment in innovation in equity	0,695571	-0,243084	-0,121965	0,088799
the share of investment in innovation in total capital	-0,357030	0,282162	0,152462	-0,343212
the share of expenses for machinery, equipment and software related to the introduction of innovations in the total amount of expenses for innovation	-0,116253	0,807650	-0,112272	-0,091476
the share of the number of inventors and innovators in the average number of personnel	-0,098564	0,861162	0,132703	0,058689
the share of budget investment in technological innovation in the total amount of investment in innovation	-0,058074	-0,195780	-0,229487	0,725835
the share of own investments in technological innovations in the total amount of expenses for innovation	0,200415	-0,255074	0,083085	-0,373093
the share of investments of domestic investors in the total amount of expenses for innovation	-0,359809	0,292232	-0,172913	0,001328
the share of investments of foreign investors in the total amount of expenses for innovation	0,070325	-0,322927	-0,148001	0,403620
the share of the shipped innovative products in the total volume of sales	0,663742	-0,039591	0,084277	-0,237435
the share of shipped products, which is characterized by the significant technological changes or re-introduced during three years, in the total volume of shipped products	0,360233	0,041059	0,471375	0,612400
the share of new technologies transmitted abroad in the total amount of technology transmitted	-0,103898	0,020487	-0,094167	0,345063
the share of new technologies transmitted in Ukraine in the total amount of technology transferred	0,132322	0,237839	0,389328	0,631468
the share of shipped products, for which the manufacturing process was improved, in the total volume of shipped products	0,232158	0,086610	-0,306788	-0,409839
the share of new products in the total volume of production	0,172323	-0,025770	0,083824	0,582204
the share of new products put up for export, in the total volume of new products	-0,078738	0,930835	-0,022329	-0,043021

Table 10. Composition and economic content of the selected factors of investment and innovation activity of business entities

Factor	Name of the factor
Factor 1	Indicators of the share: real investment at the expense of the enterprise's own funds in the total volume of investments; investment in fixed capital in equity; investment in intangible assets in the total value of non-current assets; investment in intangible assets in the total value of assets.
Factor 2	Indicators of the share: real investments at the expense of depreciation deductions of the enterprise in the total volume of investments; the costs of machinery, equipment and software related to the introduction of innovations in the total amount of innovation costs; the number of inventors and innovators in the average number of personnel; new products put up for export in the total volume of new products.
Factor 3	Indicators of the share: investments in advertising in the total amount of investments in innovation; investment in innovation in the total investment.
Factor 4	Indicators of the share of budget investments in technological innovation in the total amount of investment in innovation

The next step in analyzing the investment and innovation activity of business entities is to obtain an integral assessment. An integral estimation is performed

on the basis of the calculation of the integral index, which is determined on the basis of the method of additive convolution (table 11).

Table 11. The value of the integral indicator of investment and innovation activity of economic entities

Enterprise	2010	2011	2012	2013	2014	2015	2016	2017
PJSC "Kharkiv Machine-Building Plant "Svitlo Shakhtarya"	0,8357	0,8257	0,8609	0,8361	0,9111	0,8734	0,7296	0,8072
SE Plant "Electrovazhmash"	0,8369	0,8269	0,8622	0,8373	0,9124	0,7608	0,8118	0,8091
PJSC "Kharkiv Electrotechnical Plant "Ukrelectromash"	0,5180	0,5181	0,5427	0,5284	0,5924	0,5488	0,5935	0,5648
PJSC "Plant "Pivdenkabel"	0,8267	0,8268	0,8517	0,8372	0,9019	0,7568	0,8019	0,9048
PJSC "Electromachina"	0,8220	0,8220	0,8468	0,8323	0,8968	0,7525	0,7973	0,8047
PJSC " Kharkiv Machine-Tool Plant "	0,4610	0,4311	0,4561	0,4416	0,4066	0,4607	0,4061	0,4483
PJSC " Kharkiv Plant of Stamps and Molds "	0,5653	0,5254	0,5502	0,5358	0,5004	0,5555	0,5005	0,5780
PJSC "Scientific and Production Enterprise Theploautomat "	0,4240	0,8240	0,6489	0,6344	0,6989	0,6543	0,6993	0,6768
PJSC "Plant named after Frunze"	0,6242	0,7242	0,7491	0,7346	0,7992	0,7545	0,7795	0,7770
PJSC "Turboatom"	0,8180	0,8188	0,8427	0,8291	0,8924	0,7492	0,7934	0,8713
PJSC "Kharkiv Tractor Plant named after Ordzhonikidze "	0,7048	0,7180	0,7291	0,7283	0,6788	0,7437	0,7807	0,7622
PJSC " Kharkiv Bearing Plant"	0,6048	0,6249	0,6292	0,6353	0,6793	0,6474	0,6807	0,6640
PJSC "FED"	0,6047	0,7186	0,7290	0,7289	0,6788	0,6440	0,7806	0,6623

The results of table 11 analysis show that the highest values of the integral indicator of investment and innovation activity of business entities mainly have such enterprises as PJSC "Plant" Pivdenkabel", PJSC "Kharkiv Machine-Building Plant "Svitlo Shakhtarya". The smallest values of integral indicators have the representatives of PJSC "Kharkiv Machine-Tool Plant", PJSC "Kharkiv Plant of Stamps and Molds", PJSC "Kharkiv Electrotechnical Plant "Ukrelectromash", PJSC "Scientific-Production Enterprise Theploautomat".

International and national micro-level analysis of investment and innovation activity of business entities are additive. To increase the objectivity and reliability of the analysis, it is advisable to combine the corresponding integral indicators characterizing each level into a generalized integral index of investment and innovation activity of business entities, calculated by the method of additive convolution, taking into account the coefficients of significance of each level. Significance is determined on the basis of the use of the expert survey method taking into account the predominance:

- for foreign investments (international level – 0,5; macro level – 0,3; microeconomic level – 0,2);
- for internal investments (international level – 0,25; macro level – 0,3, microeconomic level – 0,45).

11 experts were polled to conduct an expert assessment with a reliability of 90% and relative error equal to 0.5. Experts were interviewed by experts dealing with the economic issues of the institutional structures at each level. In order to determine the level of consistency of expert opinions, the coefficient of concordance 0.783 is determined, which confirms the sufficient quality of the expert survey.

The final stage of the analysis of investment and innovation activity of business entities is to obtain an integrated assessment at the international, macro and microeconomic levels. Previously, the indicators of each level were normalized and the integral indicator was calculated on the basis of summing up the results of multiplying the values of indicators by international, macro and microeconomic levels on their significance. The results of calculations for 2017 are presented in table 12.

Table 12. The value of the integral indicator of investment and innovation activity of economic entities at the international, macro- and microeconomic levels

Enterprise	2017	
	for the foreign investments	for domestic investments
PJSC "Kharkiv Machine-Building Plant "Svitlo Shakhtarya"	0,532036	0,61706
SE Plant "Electrovazhmash"	0,53261	0,617915
PJSC "Kharkiv Electrotechnical Plant "Ukrelectromash"	0,45932	0,50798
PJSC "Plant "Pivdenkabel"	0,56132	0,66098
PJSC "Electromachina"	0,53129	0,615935
PJSC "Kharkiv Machine-Tool Plant "	0,42437	0,455555
PJSC "Kharkiv Plant of Stamps and Molds "	0,46328	0,51392
PJSC "Scientific and Production Enterprise Theploautomat "	0,49292	0,55838
PJSC "Plant named after Frunze"	0,52298	0,60347
PJSC "Turboatom"	0,55127	0,645905
PJSC "Kharkiv Tractor Plant named after Ordzhonikidze "	0,51854	0,59681
PJSC " Kharkiv Bearing Plant"	0,48908	0,55262
PJSC "FED"	0,48857	0,551855

Based on the analysis of the table 12 it can be concluded that the most high values of the integral indicator of investment and innovation activity of economic entities in the conditions of foreign investment prevail at such enterprises as PJSC "Pivdenkabel Plant" and PJSC "Turboatom", while the smallest have PJSC "Kharkiv Machine-Building Plant" and PJSC "Kharkiv Electrotechnical Plant "Ukrelectromash". In the conditions of the predominance of domestic investments the maximum values have PJSC "Turboatom", PJSC "Plant "Pivdenkabel" and PJSC Plant "Electrovazhmash", and the minimum are at PJSC "Kharkiv Electrotechnical Plant "Ukrelectromash" and PJSC "Kharkiv Plant of Stamps and Molds". The analysis of the submitted calculations testifies to the expediency of activating the domestic investment activity, which will contribute to a more significant increase in the investment and innovation activity of economic entities.

Conclusion

It is determined that the investment-innovative activity of business entities is the basis of their progressive economic development and a prerequisite for the successful implementation of the process of integration

into the world economic space. In order to ensure the success of the implementation of integration processes, the theoretical and methodical approach to the definition of investment and innovation activity of economic entities is proposed, which provides the opportunity to determine the most influential factors on the level of investment and innovation activity of economic entities at the international, macro and microeconomic levels under conditions of European integration and ensures an integrated assessment taking into account the predominance of foreign or domestic investment, which contributes to the adoption of the soil in them management solutions.

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ОСНОВНІ ТЕНДЕНЦІ ІНВЕСТИЦІЙНО-ІННОВАЦІЙНОЇ АКТИВНОСТІ СУБ'ЄКТІВ ГОСПОДАРЮВАННЯ В УМОВАХ ЄВРОІНТЕГРАЦІЇ

Предметом дослідження в статті є основні тенденції інвестиційно-інноваційної активності суб'єктів господарювання. **Метою** роботи є визначення основних тенденцій інвестиційно-інноваційної активності суб'єктів господарювання на міжнародному, макро- та мікроекономічних рівнях в умовах євроінтеграції з застосуванням методів економіко-математичного моделювання. **Завдання:** визначення інтегрального показника інвестиційно-інноваційної активності суб'єктів господарювання за міжнародним, макро- та мікроекономічним рівнями. Для досягнення поставленої мети було використано наступні **методи:** абстрактно-логічний метод, метод аналізу і синтезу, логіко-змістовний аналіз – формування та обґрунтування системи показників оцінювання інвестиційно-інноваційної активності суб'єктів господарювання; узагальнення та абстрагування – вивчення категоріального апарату інвестиційно-інноваційної активності суб'єктів господарювання, багатовимірний факторний аналіз – для проведення класифікації та систематизації простору ознак дослідження та групування факторів за їх економічним змістом. Отримано наступні **результати:** для підвищення об'єктивності та достовірності аналізу об'єднано відповідні інтегральні показники, що характеризують кожен рівень, в узагальнюючий інтегральний показник інвестиційно-інноваційної активності суб'єктів господарювання, який розраховано методом адитивної згортки з урахуванням коефіцієнтів значущості кожного рівня. Значущість визначено на основі використання методу експертного опитування з урахуванням переважання: для іноземних інвестицій та для внутрішніх інвестицій **Висновки:** запропоновано теоретико-методичний підхід до визначення інвестиційно-інноваційної активності суб'єктів господарювання, який надає можливість визначення найбільш впливових факторів на рівень інвестиційно-інноваційної активності суб'єктів господарювання на міжнародному, макро- та мікроекономічних рівнях в умовах євроінтеграції та забезпечує проведення інтегральної оцінки з урахуванням переважання іноземних або вітчизняних інвестицій, що є сприяє прийняттю ґрунтовних управлінських рішень.

Ключові слова: інвестиційно-інноваційна активність; євроінтеграція; тенденції; економічні рівні; суб'єкти господарювання.

ОСНОВНЫЕ ТЕНДЕНЦИИ ИНВЕСТИЦИОННО-ИННОВАЦИОННОЙ АКТИВНОСТИ СУБЪЕКТОВ ХОЗЯЙСТВОВАНИЯ В УСЛОВИЯХ ЕВРОИНТЕГРАЦИИ

Предметом исследования в статье являются основные тенденции инвестиционно-инновационной активности субъектов хозяйствования. **Цель** работы является определение основных тенденций инвестиционно-инновационной активности субъектов хозяйствования на международном, макро- и микроэкономических уровнях в условиях евроинтеграции с применением методов экономико-математического моделирования. **Задачи:** определение интегрального показателя инвестиционно-инновационной активности субъектов хозяйствования по международным, макро- и микроэкономическим уровнями. Для достижения поставленной цели были использованы следующие **методы:** абстрактно-логический метод, метод анализа и синтеза, логико-содержательный анализ – формирование и обоснование системы показателей оценки инвестиционно-инновационной активности субъектов хозяйствования; обобщение и абстрагирование – изучение категориального аппарата инвестиционно-инновационной активности субъектов хозяйствования, многомерный факторный анализ – для классификации и систематизации пространства признаков исследование и группировка факторов по их экономическому содержанию. Получены следующие **результаты:** для повышения объективности и достоверности анализа объединены соответствующие интегральные показатели, характеризующие каждый уровень в обобщающий интегральный показатель инвестиционно-инновационной активности субъектов хозяйствования, который рассчитан методом адитивной свертки с учетом коэффициентов значимости каждого уровня. Значимость определены на основе использования метода экспертного опроса с учетом преобладания: для иностранных инвестиций и внутренних инвестиций **Выводы:** предложен теоретико-методический подход к определению инвестиционно-инновационной активности субъектов хозяйствования, который предоставляет возможность определения наиболее влиятельных факторов на уровень инвестиционно-инновационной активности субъектов хозяйствования на международном, макро- микроэкономических уровнях в условиях евроинтеграции и обеспечивает проведение интегральной оценки с учетом преобладания иностранных или отечественных инвестиций, что способствует принятию основательных управленческих решений.

Ключевые слова: инвестиционно-инновационная активность; евроинтеграция; тенденции; экономические уровни; субъекты хозяйствования.