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RESEARCH ON THE POSSIBILITY OF INNOVATIVE INTEGRATION OF UKRAINE AND THE EU

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Introduction. The revitalization of innovation in the global dimension has a significant impact on the competitiveness of the national economy. The intensification of innovation processes requires the use of innovative strategies. There is a significant differentiation of countries in terms of competitiveness and innovative development. At the present stage of reforming, the development of the economy on an innovative basis becomes one of the priorities of strengthening the competitiveness, modernization of the institutional base and effective use of the innovative potential of innovative integration of Ukraine and the EU.

Hypothesis of scientific research. It is envisaged that the use of strategic priorities and mechanisms for utilizing Ukraine's innovation potential through the implementation of European practices of managing targeted innovation programs will allow developing programmatic measures to strengthen the existing and modernize the competitive advantages of innovative integration of Ukraine and the EU.

The purpose of the article is setting priorities and developing a system of means of enhancing Ukraine's competitiveness on innovative grounds in the context of European integration.

The research methodology is the use of the European Innovation Scoreboard, the Innovation Index of the EU Member States. In the course of the study, the methods of systematization and taxonomy were used.

Results: the position of Ukraine in the global and innovation ratings, the EU innovation scoreboard, the place of Ukraine in it, the position of Ukraine in the ranking of the countries of the world according to the Global Competitiveness Index, the Global Competitiveness Index. The analysis of differences in the development and implementation of innovative development strategies of EU Member States and Ukraine is conducted, the organizational and economic toolkit of innovative integration of Ukraine and the EU is substantiated.

Conclusions: proved that macro-level competitiveness research in an innovative context is based on the methodology of calculation of such indicators as: IMD and WEF global competitiveness indices; global innovation development indices from Boston Consulting groupe and INSEAD; Eurostat European Innovation Rating (EIS); Bloomberg Agency Global Innovation Ratio (GIQ); international innovation index; composite eco-innovation index; the patent activity rating of the World Intellectual Property Organization (WIPO) allows you to find out the main directions of innovative integration of Ukraine and the EU.

Keywords: innovation activity; innovation development indices; European integration.

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ДОСЛІДЖЕННЯ МОЖЛИВОСТІ ІННОВАЦІЙНОЇ ІНТЕГРАЦІЇ УКРАЇНИ ТА ЄС

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Вступ. Активізація інноваційної діяльності у глобальному вимірі істотно впливає на конкурентоспроможність національної економіки. Інтенсифікація інноваційних процесів вимагає застосування інноваційних стратегій. Простежується значна диференціація країн за рівнем конкурентоспроможності та інноваційного розвитку. На сучасному етапі реформування розвиток економіки на інноваційних засадах стає одним з пріоритетів зміцнення конкурентоспроможності, модернізації інституціонального базису та ефективного використання інноваційного потенціалу інноваційної інтеграції України та ЄС.

Гіпотеза наукового дослідження. Передбачається, що використання стратегічних пріоритетів та механізмів використання інноваційного потенціалу України шляхом імплементації європейських практик управління реалізацією цільових інноваційних програм дозволить розробити програмні заходи щодо зміцнення наявних і модернізації набутих конкурентних переваг інноваційної інтеграції України та ЄС.

Метою статті є визначення пріоритетів і розроблення системи засобів підвищення конкурентоспроможності України на інноваційних засадах в умовах євроінтеграції.

Методологією дослідження є використання системи індикаторів Європейського інноваційного табло, інноваційного індексу країн-членів ЄС. В ході дослідження були використані методи систематизації, методу таксономії.

Результати: вивчено позиції України у світових глобальних та інноваційних рейтингах, інноваційного табло ЄС, визначено місця у ньому України, позиція України в рейтингу країн світу за Індексом глобальної конкурентоспроможності, Індексом Глобальної конкурентоспроможності. Проведено аналіз відмінностей у розробленні та реалізації стратегій інноваційного розвитку країн-членів ЄС і України, обґрунтовано організаційно-економічний інструментарій інноваційної інтеграції України та ЄС.

Висновки: доведено, що дослідження конкурентоспроможності на макрорівні в інноваційному контексті на основі методології розрахунку таких індикаторів, як: індекси глобальної конкурентоспроможності IMD та ВЕФ; глобальні індекси інноваційного розвитку від Boston Consulting groupe та INSEAD; Європейський рейтинг інновацій Євростату (EIS); глобальний інноваційний коефіцієнт агентства Bloomberg (GIQ); міжнародний інноваційний індекс; композитний еко-інноваційний індекс; рейтинг патентної активності Всесвітньої організації інтелектуальної власності (BOIB) дозволяє з'ясувати основні напрями інноваційної інтеграції України та ЄС.

Ключові слова: інноваційна діяльність, індекси інноваційного розвитку, європейська інтеграція.

Setting the problem. Research on the state and use of the innovative potential of competitiveness requires analysis of the methodological basis of evaluation of innovative activity used in the world practice, and evaluation indicators for Ukraine. According to the Global Competitiveness Index 2016–2017, Ukraine ranked 85th out of 140 countries (79th in the previous rating). The Ukraine 2020 Strategy for Sustainable Development foresees the goal of Ukraine entering the top 40 countries in the global competitiveness rating. Reserves for enhancing Ukraine's competitiveness, first and foremost, in the field of information technology, which is a factor in the development of high-tech business, given the significant share of the "gray" zone of functioning of the IT sector in the country.

Regional dimension indicators include the European Innovation Index, built on the basis of the European Innovation Scoreboard for use in developing a regional development strategy. According to this index, EU member states are divided into groups: innovative leaders, follower countries (active innovators), moderate innovators, modest innovators (emerging innovators). The calculations of the innovation scoreboard for Ukraine show that the gap between the group of leading countries is more than four times higher, with significant differences in the formulation and implementation of innovative development strategies of the EU Member States and Ukraine. Using this methodology will help to find out the main directions of innovative integration of Ukraine and the EU.

Analysis of the latest research and the unresolved part of the problem. In domestic economic science, the research of fundamental principles of formation and implementation of innovation policy, financing of innovation activity, functioning of innovation infrastructure, strategic programming of innovation development, methodology of evaluation of innovation potential and efficiency of innovation activity in the conditions of globalization were reflected. Peculiarities, problems and priorities of realization of the European integration vector of Ukraine are reflected in the works of D. Antonyuk, V. Budkin, I. Egorov, O. Yermakova, D. Lukyanenko, A. Melnyk, V. Novitsky, N. Pavlikha, S. Pisarenko, A. Lieutenant, V. Sidenko, A. Filipenko, V. Chuzhikov, O. Shnyrkova and others. Despite the strong theoretical and applied achievements of domestic and foreign scientists, Ukraine's innovative development is linked to systemic problems and requires further research, systematization, generalization, implementation and development of methodology and mechanisms for implementing EU regional policies and strategies that have proven effective in the EU member states.

The purpose of the article is setting priorities and developing a system of means of enhancing Ukraine's competitiveness on innovative grounds in the context of European integration.

Explanation of the main research material. Ranking on the level of competitiveness on an innovative basis is important for assessing the growth potential, identifying benefits or problems and developing strategic goals and operational objectives to improve existing competitive positions on this basis. According to the WEF Global Competitiveness Index, in 2016–2017 Ukraine ranked 85th among 140 countries (79th position in the previous year). This index covers and takes into account more than 100 variables, which are combined into 12 summarizing indicators by three basic groups: "Essential Requirements", "Productivity Enhancers" and "Innovation and Improvement Factors". The disadvantages of the method of calculating this indicator are the use of the results of surveys of artificially identified groups of business entities in Ukraine, which can not sufficiently evaluate, for example, the quality level of activity of research institutions [1, p. 88]. For some structural parts of this indicator (Table 1), the component "Innovation" reflects the improvement of Ukraine's position from 54th to 52nd. First of all, the cooperation between universities and industry in research and development has improved; public procurement of high-tech products; ability to innovate. However, the quality of research institutes and companies' spending on research and development has worsened.

Table 1

Ukraine's ranking on the Global Competitiveness Index, Innovation and Improvement Factors group, (Innovation subgroup), 2014–2017

№	Sub indexes / Years	2014–2015 (144 countries)	2015–2016 (140 countries)	2016–2017 (138 countries)
1.	The ability to innovate	82	52	49
2.	Quality of research institutes	67	43	50
3.	Expenses of companies for research and development	66	54	68
4.	Collaboration between universities and industry in research and development	74	74	57
5.	Public procurement of high-tech products	123	98	82
6.	Presence of scientists and engineers	48	29	29

Source: [2].

The Ukraine 2020 Sustainable Development Strategy foresees Ukraine's entry into the top 40 countries in the global competitiveness rating [3] (for comparison, in 2015–16 it was 79th). It does not take into account that no country has been able to rise to 39 positions over five years, and at different times the index value for Ukraine ranged from 3.9–4.14, and in order to enter the first forty countries, a result above 4.5 is required [4]. Therefore, the likelihood of achieving the goal outlined in the document is low enough.

Reserves to increase the level of competitiveness of Ukraine are in the field of information technology, which by its nature is a significant factor in the development of any type of business, including high-tech. Today, over one thousand IT companies and over one hundred R&D centers operate in Ukraine, the country ranks fourth in the world in the number of certified IT specialists and third in Europe in terms of outsourcing operations [5]. The Knowledge Economy Index, developed on the basis of a methodological approach to knowledge assessment, reflects the direct link between economic intellectualization and long-term stable growth, as well as national competitiveness. The index is formed on the basis of the following components: economic incentives and institutional regime; education and human resources; innovative system, information and communication technologies. In 2016, Ukraine ranked 63rd out of 133 countries in the Social Progress Index of the non-governmental organization Social Progress Imperative (SPS). Ukraine has traditionally demonstrated high levels of access to higher education and basic knowledge (31st and 28th places respectively) [6].

The Cornell University Global Innovation Index, the INSEAD School of Business and the World Intellectual Property Organization (WIPO) are the result of a survey of the innovation potential of over 100 countries. Switzerland, Sweden, the United Kingdom, the United States, Finland and Singapore topped the rating in 2016. The rating results reflect the distance between developed economies and developing countries [7] (Table 2).

Table 2

Bloomberg Rankings metrics used to evaluate country innovation

№	Name of factors (factors)	Specific weight	Essential characteristics of factors (factors)
1.	Intensity of research and development	20%	Research and development is a percentage of GDP growth
2.	Productivity	20%	GDP per employed person, per hour of work
3.	High-tech density	20%	State-owned companies in the high-tech fields – aerospace, defense, biotechnology, manufacturers of equipment, software, Internet applications and services, renewable energy – a percentage of the total number of state-owned companies
4.	Concentration	20%	Concentration of researchers and developers per million people
5.	Researchers	10%	Percentage of production in GDP, share of high-tech products in exports
6.	Technological	5%	Coverage ratio for all subjects for graduates of educational institutions; share of students of high-tech specialties; an annual proportion of graduates who have earned a degree in high-tech disciplines
7.	Opportunities	5%	Patent applications per million population and $ 1 million USA in the field of research and development

Source: [8].

To assess the level of innovation activity of Ukraine during the period 2000–2017, we have further used the taxonomic method described in the second section, based on the following indicators: the number of research and development organizations; number of researchers; volumes of completed scientific and scientific and technical works; share of enterprises engaged in innovation; the total amount of innovation costs; the share of innovators; the number of new technological processes and innovative types of products implemented (Table 3).

Table 3

Input data for assessing the dynamics of innovation activity in Ukraine, 2000–2017

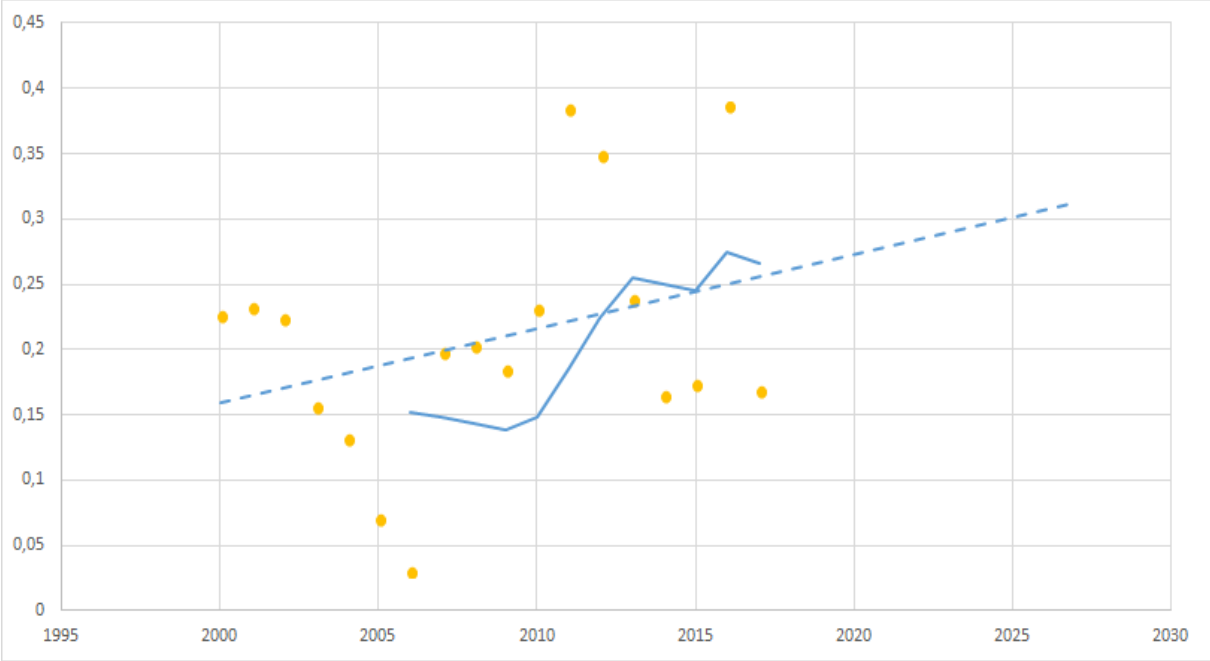
Years / Indicators	Number of research and development organizations, units	Number of researchers, thousand people	Volumes of completed scientific and technical works, million UAH	The share of enterprises engaged in innovation, %	The total amount of innovation costs, million UAH	The share of enterprises introducing innovations, %	Introduced new technological processes, units	Introduced into the production of innovative types of products, names
2000	1490	120,9	1978,4	18,0	1760,1	14,8	1403	15323
2001	1479	113,3	2275,0	16,5	1979,4	14,3	1421	19484
2002	1477	107,4	2496,8	18,0	3018,3	14,6	1142	22847
2003	1487	104,8	3319,8	15,1	3059,8	11,5	1482	7416
2004	1505	106,6	4112,4	13,7	4534,6	10,0	1727	3978
2005	1510	105,5	4818,6	11,9	5751,6	8,2	1808	3152
2006	1452	100,2	5354,6	11,2	6160,0	10,0	1145	2408
2007	1404	96,8	6700,7	14,2	10821,0	11,5	1419	2526
2008	1378	94,1	8538,9	13,0	11994,2	10,8	1647	2446
2009	1340	92,4	8653,7	12,8	7949,9	10,7	1893	2685
2010	1303	89,6	9867,1	13,8	8045,5	11,5	2043	2408
2011	1255	84,9	10349,9	16,2	14333,9	12,8	2510	3238
2012	1208	82,0	11252,7	17,4	11480,6	13,6	2188	3403
2013	1143	77,8	11781,1	16,8	9562,6	13,6	1576	3138
2014	999	69,4	10950,7	16,1	7695,9	12,1	1743	3661
2015	978	63,8	12611,0	17,3	13813,7	15,2	1217	3136
2016	972	63,7	11530,7	18,9	23229,5	16,6	3489	4139
2017	963	59,4	13379,3	16,2	9117,5	14,3	1831	2387

Source: [9; 10].

Taxonomic analysis of innovation development shows a rather low innovation activity from 2000 to 2002 and a decrease in innovation activity in 2003–2006. value. In 2016, there was a slight improvement in the index and its further decrease. Such dynamics of innovation activity, in our opinion, is caused

by: general decrease in the number of scientific personnel (mostly among the countries of Central and Eastern Europe), decrease and insufficient amounts of financing of scientific and scientific-technical development and remuneration of scientists, external and internal migration, concentration of scientific personnel innovation activity in the low-tech sectors or "old-industrial" regions of the country, which does not correspond to the global and European trends of innovation activity.

Predictive estimation of innovative development of Ukraine is carried out by the method of linear approximation, which involves replacing the data set with a simple function, which does not necessarily go through all experimental points, but analytically describes the trends (Figure 1). The dotted line reflects the linear approximation and the increase in the mean of the estimate. The solid line in the figure reflects the floating average with a tendency to increase, which suggests a gradual growth in the long run of the level of innovative activity of Ukraine.



Developed by the author.

Figure 1. **Forecast indicators of the level of innovation activity of Ukraine**

The above necessitates the design of institutional support for the process of transition to development based on domestic innovations and the formation of an innovative policy of applying effective management mechanisms. The implementation of the model of structural integration with the EU in the innovation and scientific and technical sphere creates such significant competitive advantages for the regions of our country [1; 5]: access to effectively operating innovation infrastructure, modern European technologies,

joint innovation development system; possibility of reliable and timely electronic exchange of scientific and technical information on the latest achievements; access to grants and financial resources on a competitive basis; receiving services or goods (counseling, communication, laboratory equipment, etc.); participation of domestic developers in European fairs and exhibitions to showcase their achievements; possibility of using organizational and credit-financial mechanisms of development of innovative activity; receiving expert and technical assistance from domestic partners from European partners.

Undoubtedly, innovation policy should be developed taking into account the experience of European countries in particular, using such innovative management functions as controlling (planning and managing, organizing and controlling innovation), institutional (legislative and regulatory acts, regulatory documents, innovation infrastructure).), financial (budgetary and public-private financing, investments) and communicative (interaction between business and government, application of creative and motivational aspects).

Conclusions. Successful cooperation in the innovation sphere between Ukraine and the EU in the context of strengthening the competitiveness of regions requires the solution and elimination of the following obstacles and problems: non-formation of the external component of scientific and technical and patent-licensing policy, incomparability of the parameters of the effectiveness of innovative activities, dominance of priorities protection of intellectual property rights.

Today, the process of activating innovation is not yet fully transformed in line with world trends and market norms, the innovation system needs to adapt the institutional framework to the conditions of the global economy and global competition, to implement a coordinated policy of innovation cooperation with EU Member States.

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