ISSN 2522-9818 (print)
ISSN 2524-2296 (online) *Innovative technologies and scientific solutions for industries. 2023. No. 3 (25)*

UDC 311.2:658 DOI: https://doi.org/10.30837/ITSSI.2023.25.148

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MODERN DEFINING CHARACTERISTICS OF INNOVATIVE DEVELOPMENT OF THE UKRAINIAN ECONOMY: THEORETICAL AND PRACTICAL ASPECTS

The subject of the article is theoretical substantiation, methodological support, and practical proposals for studying the innovative development of the economy in modern conditions. **The aim of the study** is to generalize and improve the theoretical foundations of innovative development, identify the main influencing factors and defining characteristics of its course and develop proposals to ensure innovative development of Ukraine's economy in the current conditions. The following **tasks** have been defined: to find out the attitude of specialists to the possibility and necessity of supporting innovative development in today's difficult military conditions; to summarize the theoretical basis of innovative development and improve its definition and group existing concepts; to substantiate the most influential factors that determine the intensification and/or containment of innovative development of the Ukrainian economy; to identify its defining characteristics, which are used to generate measures to ensure innovative development of the economy in wartime conditions. To solve the tasks, the following **methods** were used: theoretical generalization, analysis, synthesis, induction, deduction, structural and logical analysis, systemic and situational approaches, economic and statistical analysis, correlation analysis, multivariate regression analysis, graphical method. The following **results** have been obtained: the definition of the concept of "innovative development" has been improved; the concepts of innovative development have been analyzed; the main factors influencing the course of innovative development in Ukraine have been identified; multivariate regression models have been built according to the influential factors of innovative development and the most important of them have been substantiated; the current defining features of innovative development of the Ukrainian economy have been identified by significant factors and their specification has been carried out in accordance with the measures to ensure it in the conditions of military operations. **Conclusions.** It is proved that the improved concept of "innovative development" is that it characterizes the resolution of obvious and hidden contradictions on the basis of qualitative changes in the economic system through the accumulation of quantitative transformations in its components and/or factors of innovation processes, intellectual property, the latest technologies and products. In accordance with the above generalized concepts of innovation development, the author investigates the factors influencing this phenomenon based on the dynamics of the components of the global innovation index and statistical indicators of Ukraine's economy for the period 2015–2022. The most influential factors according to the outlined indicators are identified and multivariate regression models are built, which reveal the following modern leading features of innovation development: formation and maintenance of solvent demand of end users (customers) of innovations for the acquisition of intellectual property. With this in mind, the author proposes measures to ensure and intensify innovative development in the context of military operations in Ukraine.

Keywords: innovative development; global innovation index; modern defining features; measures; military actions.

Relevance of the article

The difficult economic conditions of Ukraine in the course of military operations bring to the fore a global question: is innovative development of the economic sphere urgent right now? After all, to ensure the country's innovative development, it is advisable to determine the opinion of consumers, customers and implementers of such development at the microeconomic level. The Institute for Economic Research conducted experiments and policy consultations [2] at the request of the Ukrainian Cluster Alliance. In April–May 2023, about 500 industrial enterprises took part in the survey. The results of the research show that the owners and managers of enterprises have an ambiguous attitude to innovative development and the need for its implementation as an objective need. This is confirmed by the fact that in today's military environment, enterprises mainly strive for survival, but the more they are internationalized, the higher their need for innovative development. Business owners and managers see the need to overcome the unstable situation, a significant drop in demand, and an unfavorable regulatory climate as more urgent. These are the issues that need to be overcome in order to increase production and ensure innovative development. In other words, in today's environment, production growth is one of the main tasks of business entities, which they seek to realize. But it is impossible to achieve it without innovative development, although managers and owners do not publicly recognize

Сучасний стан наукових досліджень та технологій в промисловості. 2023. № 3 (25)
ISSN 2522-9818 (print)
ISSN 2524-2296 (online)

this. Nevertheless, for 23 % of large exporting enterprises, innovations remain relevant for ensuring development. That is, the focus on cooperation with foreign partners creates an objective real need for innovative development to ensure not only survival but also the formation of a powerful mainstream of qualitative changes. An important incentive for the innovative development of enterprises is the need for innovation among end users and their effective demand. The main document supporting innovation development is the National Economic Strategy 2030, in particular its improved part in the direction of selectivity of the following institutions: the State Agency for Industry 4.0 Development, the Digital Innovation Hub network, a network of innovation clusters, industry incubators and accelerators, retraining programs, export-internationalization programs, programs to stimulate customer demand through regular events and meetings with developers in the format of technological and innovation days, brokerage events, etc. Thus, the following issues of innovation development are urgent: changing the state's approaches to innovation, identifying influential factors that facilitate export-import activities to find end users interested in innovation, consolidating representatives of innovation systems at different economic levels to focus on achieving joint priority actions to lobby for innovation interests to stimulate effective demand for innovative results. Such views are mainly shared by the export communities of industry. For this purpose, it is important to form and obtain financial support from government organizations and investment donors.

Analysis of recent research and publications

The works of the classics of innovation theory J. Schumpeter [30], B. Santo [27, 43], B. Twiss [47] are of great importance in substantiating the general theoretical foundations of innovative development for the economy as a whole and enterprises in particular. Based on their works, the peculiarity of innovative development in today's difficult conditions and its categorical apparatus continue to be studied. The research of these scientists is the basis for modern scientific, theoretical and practical achievements. Among the domestic scholars who study innovative development and activities of business entities at the macro- and microeconomic levels, it is important to mention V. Heets [7], A. Kniazevych [16], N. Ilyashenko [11–14], S. Ilyashenko, Y. Shipulina [13, 14]. They comprehensively studied the phenomenon of innovative development, developing the classical views of their predecessors.

The war globally slows down economic recovery and slows down GDP growth, as many scholars have written about, for example, I. Ludvik [19]. The scientist points to a significant decline in GDP and negative trends that are systemic in nature. After all, science, technology and innovation, which are crucial for the development of modern society and the acceleration of innovation processes, are not limited to the Ukrainian economy, but also apply to developed countries. This is especially true of trends in export and import activities in conceptual and practical terms [23]. The authors of the article [23] paid considerable attention to the streamlining of innovation development strategies and the development of their own concept of transformation of innovation development in export-import activities in wartime. The proposed concept specifies export-import processes and increases the relevance of their implementation in the context of a complex course of these processes and the imposition of an embargo on certain types of products. The peculiarities of innovative development in the context of globalization were studied in the scientific works of M. Bohun [5], O. Dyba [9], A. Kovpak [17], who identified the main conditions for achieving competitiveness through the introduction of innovations in the global space. O. Kvasha [15] identified the directions and mechanisms for enhancing innovative development in the national context, emphasized the importance of implementing the world experience of innovative transformations in Ukraine.

Opportunities and directions of economic development during the war are proposed in an international collective monograph edited by V. Nebrat [6]. This work formulates a new model of the economy capable of guaranteeing national security and future development, and presents a consistent implementation of the principle of "rebuilding better than before", which corresponds to the innovative development of the economy during the war and in the post-war period.

Innovative development requires appropriate sources of funding. I. Khovrak's publication [29] is devoted to their study. The proposals under consideration may be appropriate for the practical implementation of the principle of combining investment methods to reduce risks. Researchers have paid much attention to the formation of innovation development strategies, for example, the work of Z. Yurynets [31]; their regional features, in particular, the monograph of V. Belyavtseva [3].

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Since socialization is a global trend in the development of economic systems, it is also inherent in innovative development, as Y. Ushkarenko and A. Solovyov prove in their publication [28]. The authors propose to solve the problems of innovative development, taking into account the peculiarities of the perception of innovations by society. This is especially important for increasing the motivation of managers, owners, and public administration specialists. Clear solutions to the problems of motivation in innovative activities were formed by O. Bilobrova in her work [4]. Significant proposals for innovations in the social aspect of top managers' motivation are proposed by the authors of publications [41, 42]. However, we believe that insufficient attention has been paid to the intensification of innovative development based on the motivation of top managers in wartime. The implementation of this issue will increase the interest of both recipients and donors in the justified use and allocation of funds to enhance innovation development.

The authors of the publication [38] continue to study innovative development in the social and organizational aspects. They proposed to use the considered types of relations and to form information strategies between enterprises in the production of innovative products, which will significantly improve the innovative development of manufacturing enterprises and partners. Such proposals are reasonable, but they should be considered in accordance with the peculiarities of the course of hostilities and the macroeconomic level of interaction.

A. Hryshko and A. Melnyk proposed the key components of innovation in world practice. The main ones are as follows: building an innovation strategy, value of innovation, formation of the company's business mentality, and compliance of innovation with the company's business strategy. In addition, the authors proposed to use them in the context of innovation activities for the microeconomic level in Ukraine [8].

Regarding foreign publications on the problem of innovative development, it should be noted that the authors consider the organization of its course, taking into account the characteristics of each country [44–46]. For Ukraine, it is advisable to adapt the experience of generation leaders and introduce innovations according to the Global Innovation Index [44, 46], relying on organizational knowledge and creativity [32–35, 39, 40].

Since innovative development is a complex and complicated phenomenon that changes its characteristics over time, the authors of [37] consider it from the perspective of acquiring new qualities, i.e., in the context of technological singularity. This is a relevant and timely issue, proving the nonlinearity of the course of innovative development and confirming the need to consider economic processes as a VUCA-world that is gradually turning into a BANI-world. That is, the economic environment is gradually becoming more complex and changing its characteristics. Instability, poor predictability, and nonlinearity of economic agents' behavior are the basis for perceiving economic relations as a VUCA-world that is gradually transforming into a BANI-world. The economic environment from an unstable, variable, uncertain, complex and ambiguous VUCA-world is turning into a fragile, disturbing, nonlinear, incomprehensible, non-constant structure, BANI-world. This confirms the need for further research on innovation development in terms of modeling the factors influencing its course.

Identification of previously unsolved parts of the overall problem. Purpose of the work, tasks

The diversity of research on innovative development, its complexity, ambiguity, and complexity of practical implementation, especially in the context of military operations in Ukraine, necessitate further research on this topic, namely, to clarify the concept of "innovative development", to define its concepts which are most appropriate in modern conditions, and to develop measures to implement innovative development during war and post-war periods based on the use of economic and mathematical methods and models. Thus, the analysis of unresolved issues and discussions of scholars and experts on the implementation of innovative development have led to the formation of the purpose of the article – to generalize and improve the theoretical foundations of innovative development, to identify the main influencing factors and determinants of its course and to develop proposals for ensuring innovative development of Ukraine's economy in the current conditions.

Given this goal, the article identifies the following main objectives:

– to find out the attitude of experts to the possibility and necessity of supporting innovative development in the difficult military conditions of today;

– to generalize the theoretical basis of innovative development, to improve its definition;

– to group the existing concepts of innovative development;

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– based on the use of economic and mathematical methods, to substantiate the most influential factors that determine the intensification and/or restraint of innovative development of the Ukrainian economy;

– using the identified factors of innovative development, to substantiate its new defining characteristics for the Ukrainian economy;

– to propose measures to ensure innovative development of the economy in wartime in accordance with its identified new defining characteristics.

The object of the study is the innovative development of the economy.

The subject is theoretical provisions, methodological basis, practical proposals for the study of innovative economic development in modern conditions.

Materials and methods

The methodological basis of the article is the works of domestic and foreign scholars and practitioners on the problems of innovation activity and innovative development, which are the theoretical basis of modern research. The methods of theoretical generalization, analysis, and synthesis were used to analyze and summarize the literature; to improve the categorical apparatus for defining innovative development in modern conditions, to group its concepts, structural and logical analysis, systemic and situational approaches were applied; to identify the dynamics of the global innovation index and the dynamics of factors influencing the global innovation index in Ukraine, the method of economic and statistical analysis was used; to determine the impact of each factor, correlation was applied.

Results and their discussion

Before clarifying the concept of innovation development, it is advisable to analyze the existing definitions from the point of view of the philosophy of science. Based on the most common definitions, it can be stated that there are two clusters of this concept. The first one can be considered as a subject-technological cluster focused on the scientific result, which was initiated by J. Schumpeter [30] and his followers. From this point of view, innovative development is the final result of scientific and technological activity at the microeconomic level. The second cluster should be defined as functional. It was initiated by B. Twiss [47] and B. Santo [27, 43], who linked innovation development to the functions of innovation management and proposed to use it at the macroeconomic level. However, according to most scholars and practitioners, innovation development refers to the macroeconomic level and the construction of the knowledge economy and the state model of economic development, the mechanism for its implementation. Summarizing the understanding of the concept of innovative development, we can give a broader definition: "a method of economic growth based on constant and systematic innovations aimed at significant improvement of all aspects of the economic system, on the periodic regrouping of forces due to the logic of STP, goals and objectives of the system development, the possibility of using certain resource factors in the creation of innovative goods and the formation of competitive advantages" [10, p. 58–59]. In addition, the model of innovative development is considered to be the one based on "obtaining new scientific results and their technological implementation in production, ensuring GDP growth mainly through the production and sale of knowledge-intensive products and services" [14, p. 31]. Some scholars equate the concepts of "innovative development" and "innovative activity" [1], which is erroneous, since activity involves certain actions, and development involves actions related to the essence, interdependence, state, transformation, and transformations. At the same time, development can be both evolutionary and revolutionary, positive and negative, associated with a reduction, as well as sustainable, which characterizes the constant increase in the values of the indicators by which this process is studied.

In-depth studies of the content of the concept of "development" at the level of economic systems and organizations are proposed in the monograph by S. Mochny [21]. Mocherny [21], who identified quantitative and qualitative changes as criteria for the development process. This is very important for understanding innovation development and explains the changes that occur as a result of development in the state of the system or its subsystems, which are determined by the basic laws of dialectics, i.e. the transition of quantitative changes to qualitative ones, unity and struggle of opposites, and resolution of contradictions.

Applying the laws of dialectics to improve the definition of the term "innovative development" and exploring its essence, the author offers her own definition of this concept: innovative development characterizes the resolution of obvious and hidden contradictions

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on the basis of qualitative changes in the economic system through the accumulation of quantitative transformations in its components and/or factors of innovation processes, intellectual property, the latest technologies and products. The advantages of this definition are its compliance with the dialectical laws of cognition, and consideration of the objective essence of innovations in all spheres of economic systems at all their levels of functioning and by the main types of innovations. The proposed definition should be taken into account in the concept of innovative development of economic systems.

With regard to the process of managing innovation development, its main feature is the discrepancy between the methods and principles of economic system management. It is this contradiction that requires improvement of certain theoretical and practical provisions of innovation development.

In terms of the theoretical aspect, the authors of the publication [23, p. 90] fully and deeply studied and generalized the concepts of innovative development of economic systems. They identified the following main groups of concepts:

– the concept of cyclical development, which includes the concepts of economic growth and STP, cyclical crises and "long waves";

– the orthodox concept, which includes the following concepts: the subjectivist concept of innovative development, the concept of cyclicality of innovations, technological systems, and the innovation and investment concept;

– the paradigm of technological change, which includes the concept of renewal and the innovation-centered concept of economic development;

– the paradigm of innovation diffusion, which includes the concepts of: speed of innovation diffusion, "demand pressure", regional diffusion of innovations, formation of technological systems and diffusion of innovations, sectoral distribution, human capital, harmonious economy, growth poles, competitive advantages, cluster development, innovation cluster;

– the concept of a technocratic society, which includes the concepts of stages of economic growth, managerial revolution, technological determinism and convergence, technotronic, post-economic information society, economic integration;

– the concept of technological progress, which includes the following concepts: technological-product, endogenous technological progress, economic growth with endogenous technological progress;

– the social concept, which includes the socio-psychological concept of innovative development in the socio-cultural environment;

– modern concepts, which may include concepts with an information component, economic progress, with an emphasis on various innovations and features of the innovation process, an ecosystem approach to innovations, and business model development.

The most difficult thing is to combine such a heterogeneous set of concepts and to take into account and highlight those defining features that are more relevant to the current economic environment, the needs of solvent end users and global trends in changes in economic relations in which the Ukrainian economic system operates. To do this, it is necessary to identify the factors that are significant and have the greatest impact on the current state of the Ukrainian economy, according to the main most important trends in its innovative development, and correspond to its substantive essence (as taken into account in our proposed definition). Therefore, the main phenomenon and complex indicator, the dynamics of changes of which should be analyzed, is the innovation rating of the world's economies. It is formed on the basis of the global innovation index and should be studied by the dynamics of the quantitative values of the components that characterize the Ukrainian economy.

According to the World Intellectual Property Organization (WIPO), in 2022, Ukraine ranked 57th in the innovation ranking of 132 economies, which is based on the Global Innovation Index (GII). Ukraine scored 31.0 points out of 100. The components of the ranking are the regulatory environment (in 2022, 75th position (+3 positions)); business environment (99th position (+5 positions)); human capital and research (49th position (–5 positions)); education (26th position (–3 positions)); R&D (59th position (–1 position)); information and communication technologies (63rd position (+6 positions)); knowledge and research results (36th position (–3 positions)) [25, 32]. Fig. 1 shows the dynamics of the global innovation index of Ukraine in 2015–2022.

The analysis of Fig. 1 shows that Ukraine's ranking in the Global Innovation Index was growing until 2018 (the lower the ranking, the better); in 2019, it deteriorated, and starting in 2021, after a slight increase, it began to fall again. It is known that the components of this index are the *Innovation Input* sub-index, which includes the following variables: institutions, human capital and research, infrastructure,

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market development, business development or business experience; and the *Innovation Output* sub-index, which is formed by the values of knowledge and results of scientific research, creativity or results of creative activity. However, the value of the global innovation index is accidentally influenced by many other factors, namely: GDP in actual prices (x_1), exports of goods (x_2), imports of goods (x_3), exports of services (x_4), imports of services (x_5). The value of the country's global innovation index is influenced by direct investment (balance) (x_6), direct investment (actives) (x_7), direct investment (passives) (x_8), income from capital transactions (x_9), revenues from the European Union, foreign governments international organizations, donor agencies (x_{10}), trust funds (x_{11}), consumer price index (x_{12}), volume of industrial products (goods, services) sold (x_{13}), economically active population aged 15–70 (x_{14}), real wage index (x_{15}) [18, 20, 22, 31]. Figs. 2–16 show the dynamics of these factors of the global innovation index of Ukraine [25, 26].

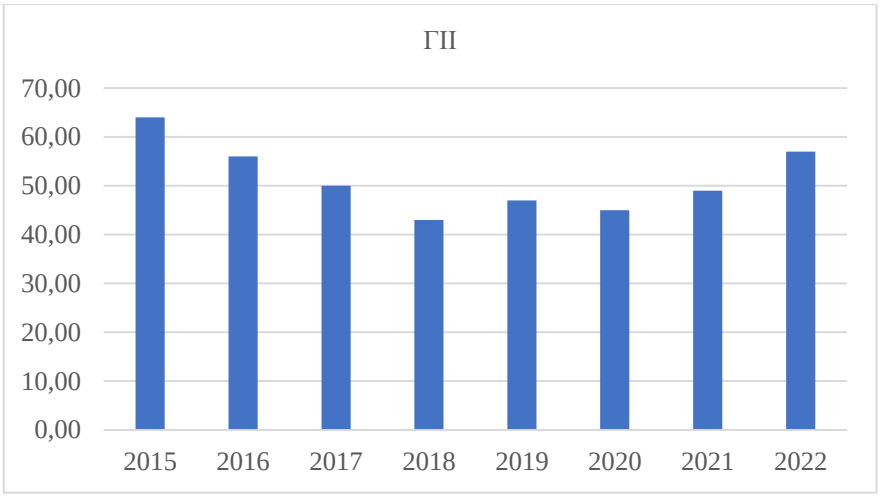

Fig. 1. Dynamics of the Global Innovation Index of Ukraine in 2015–2022

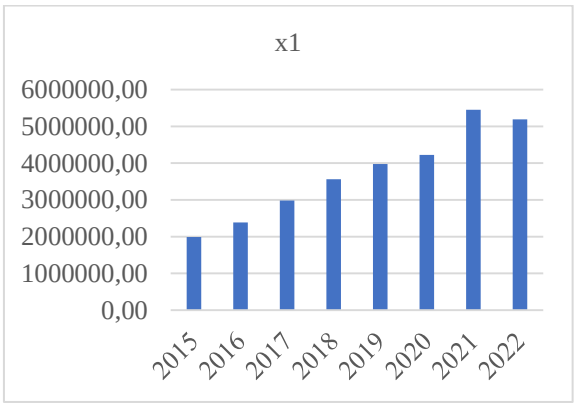

Fig. 2. Dynamics of GDP in actual prices

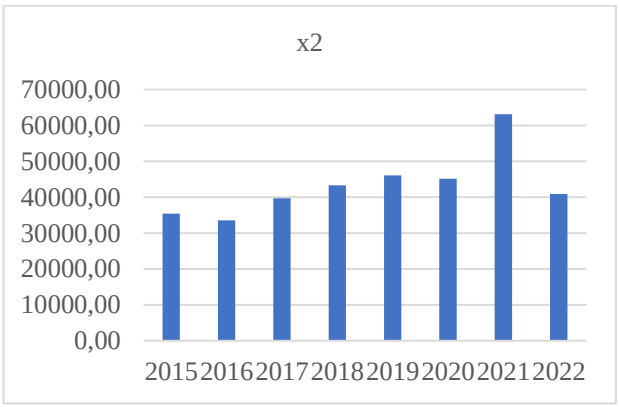

Fig. 3. Dynamics of exports of goods

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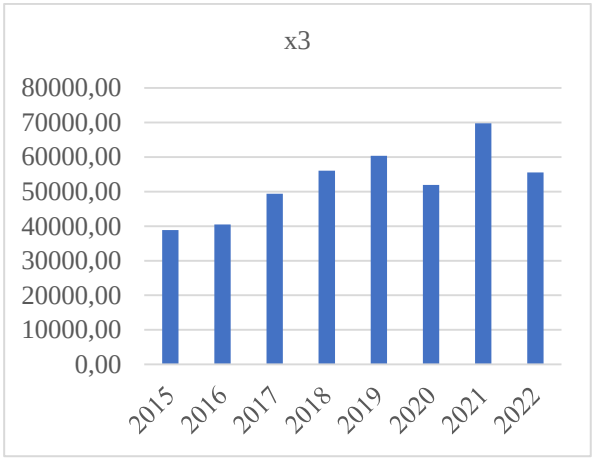

Fig. 4. Dynamics of imports of goods

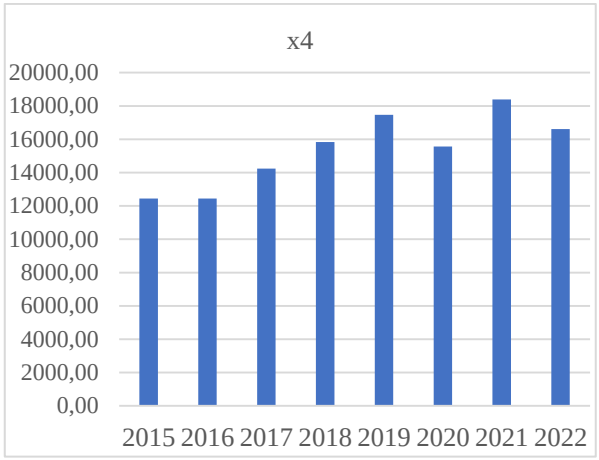

Fig. 5. Dynamics of exports of services

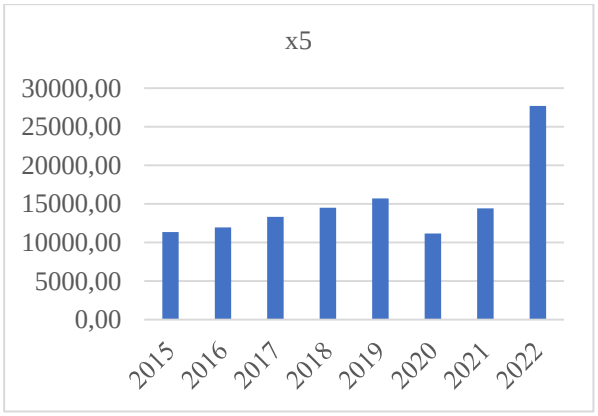

Fig. 6. Dynamics of imports of services

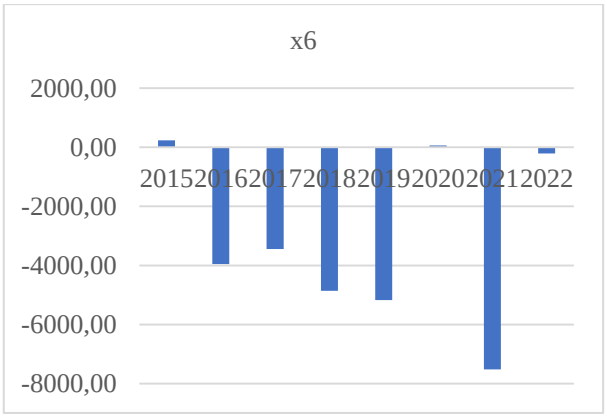

Fig. 7. Dynamics of direct investment (balance)

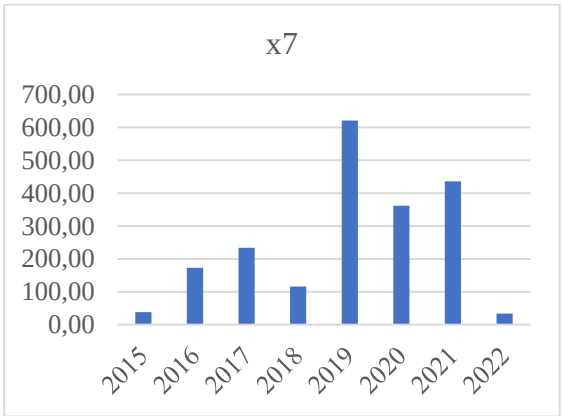

Fig. 8. Dynamics of direct investments (actives)

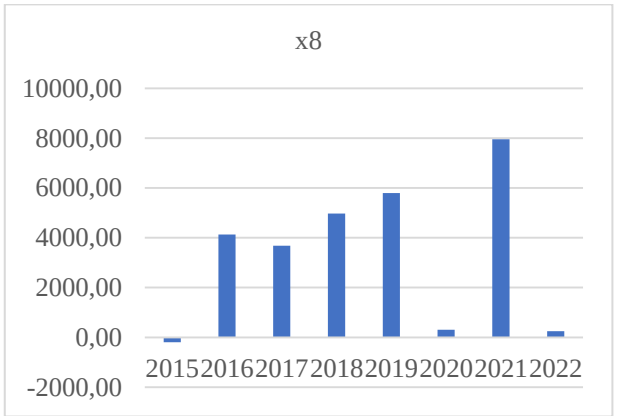

Fig. 9. Dynamics of direct investments (passives)

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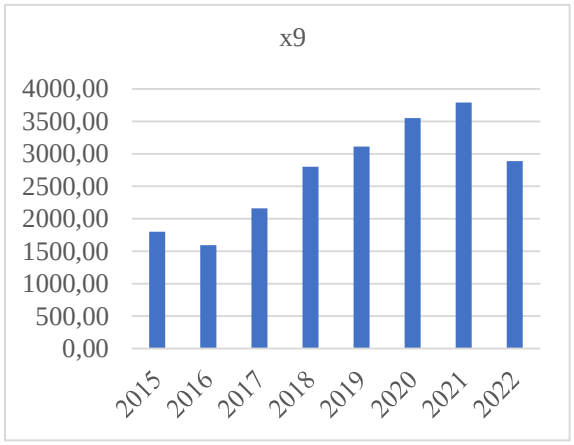

Fig. 10. Dynamics of income from capital transactions

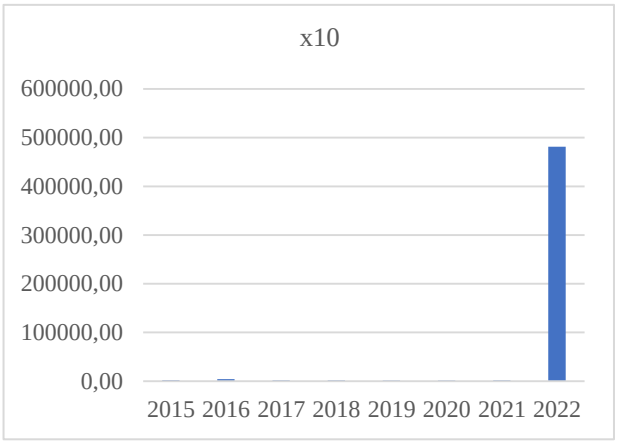

Fig. 11. Dynamics of income

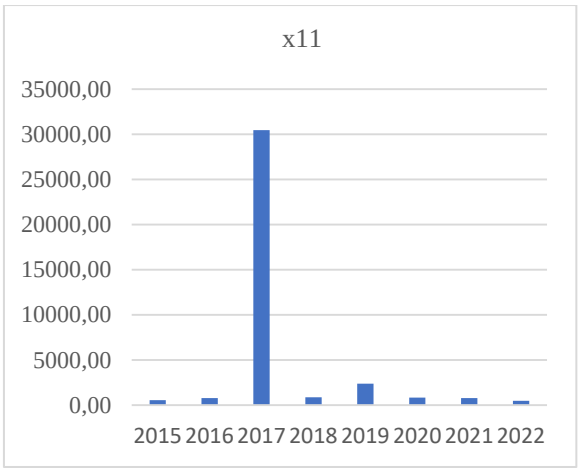

Fig. 12. Dynamics of trust funds

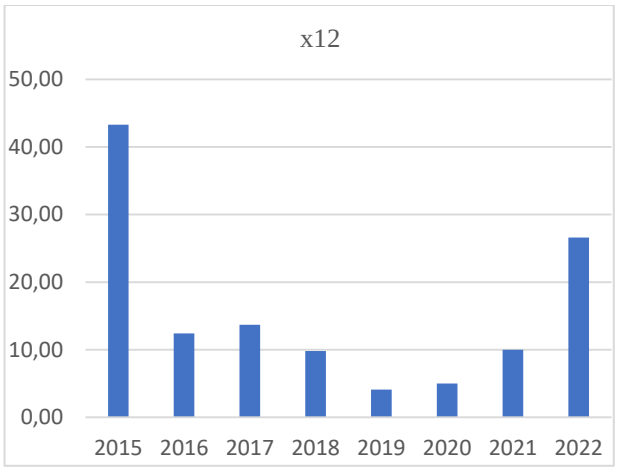

Fig. 13. Dynamics of the consumer price index

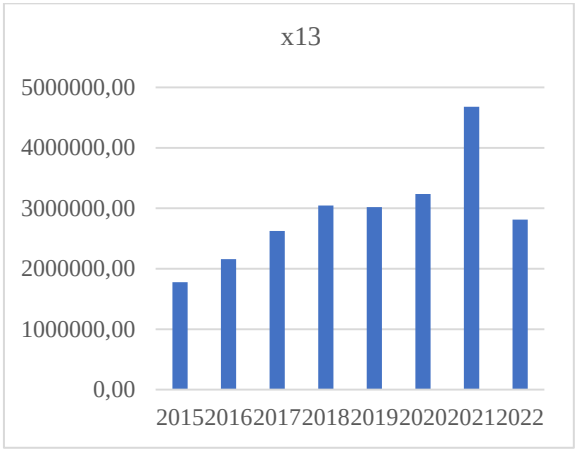

Fig. 14. Dynamics of industrial production sold

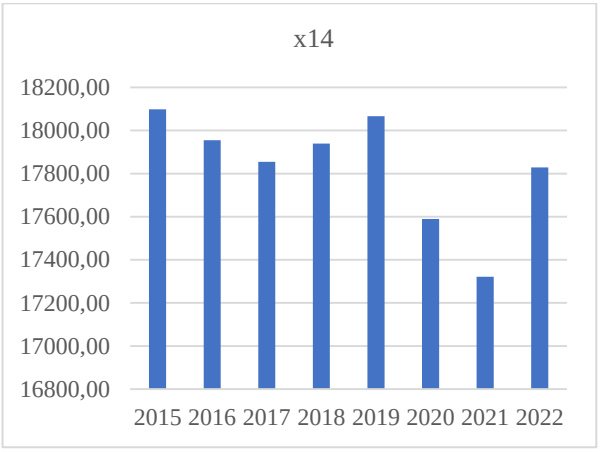

Fig. 15. Dynamics of economically active population

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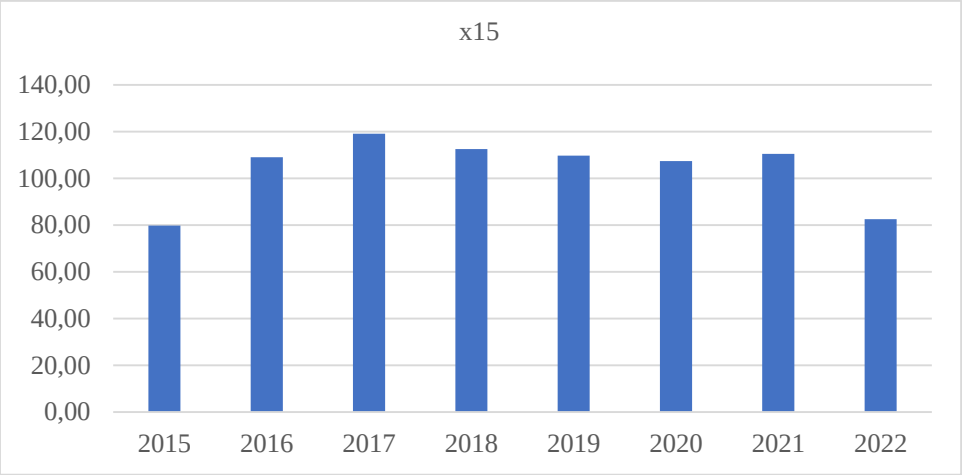

Fig. 16. Dynamics of the real wage index

The analysis of Figs. 2–16 shows that different trends in the factors influencing the global innovation index in Ukraine cause different changes in it. Growth up to 2021 inclusive was characterized by such factors as GDP in actual prices, exports of goods, imports of goods, exports of services, income from capital transactions, and the volume of industrial products (goods and services) sold. In 2022, all of these factors decreased. Other factors of Ukraine's global innovation index had unstable dynamics throughout the study period. To determine the influence of each factor, we should calculate the pairwise correlation coefficients. Table 1 shows the values of the paired correlation coefficients and their importance *P-values*. If the *P-values* are ≤ 0.05, the coefficient is considered significant and can be used to assess the close relationship between the global innovation index and the factors mentioned above. Thus, Table 1 shows that the global innovation index is most closely correlated directly with the consumer price index (x_{12}) and inversely with the real wage index (x_{15}). Considering the levels of the modulo correlation coefficient in the intervals $[0,0,4)$ as a weak relationship; $[0,4,0,7)$ as a moderate relationship; and $[0,7,1]$ as a strong relationship, it is advisable to analyze the moderate relationship [24].

Thus, the global innovation index is moderately correlated with such factors as GDP in actual prices, exports of goods, imports of goods, exports of services, direct investment (balance), direct investment (assets), direct investment (liabilities), income from capital transactions, revenues from the European Union, foreign governments, international organizations, donor agencies, volume of industrial products (goods, services) sold, and economically active population aged 15–70. At the same time, among these factors, there are those that have a positive impact on Ukraine's ranking in the Global Innovation Index (an increase in the value of a factor is interrelated with a decrease in the ranking position, since a ranking of 1 is the highest ranking of a country), and there are those that have a negative impact. The positive factors include the real wage index (x_{15}), direct investment (passives) (x_8), income from capital transactions (x_9), imports of goods $(x_3)(x_3)$, volume of industrial products (goods, services) sold (x_{13}), exports of services (x_4), direct investment (actives) (x_7), direct investment (passives) (x_8), exports of goods (x_2), and the negative factors are the consumer price index, direct investment (balance) (x_6).

Further, it is advisable to continue the study of the impact of positive factors by calculating a multivariate regression model. First, we should determine the impact of positive factors on the global innovation index, which allowed us to build the following model:

$$Y = 97.549 - 0,329x_{15} - 0.004x_9 .$$

Only two positive factors were significant in the model, while the rest of the factors, according to the Student's criterion, were not significant. The model is statistically significant, as evidenced by both the coefficient of determination $(R^2 = 0.845)$ and the Fisher's criterion $(F = 13.64)$. Thus, if the real wage index (x_{15}) increases by 10 %, Ukraine's rating will rise

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by three positions, holding all other factors constant. And if capital gains (x_9) increase by UAH 1000 million, Ukraine's rating will rise by four positions, all other factors held constant.

$$Y = 43.913 + 0.478x_{12}\ .$$

Only one negative factor was significant in the model, and the second negative factor (direct investment (balance)) was not significant according to the Student's criterion. In general, the model is statistically qualitative, as evidenced both by the coefficient of determination $(R^2 = 0.791)$, and the Fisher's criterion $(F = 22.73)$. So, if the consumer price index (x_{12}) increase by 10 %, Ukraine's rating will fall by almost five positions.

Table 1. *Pairwise correlation coefficients of the global innovation index with the factors*

	Y	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	x15
Y		-0,420	-0,499	-0,612	-0,584	0,152	0,488	-0,574	-0,509	-0,642	0,324	-0,103	0,890	-0,605	0,366	-0,780
P-values		0,300	0,209	0,107	0,129	0,719	0,220	0,137	0,198	0,086	0,433	0,808	0,003	0,112	0,372	0,023
x1	-0,420		0,779	0,877	0,912	0,590	-0,259	0,365	0,274	0,880	0,475	-0,237	-0,377	0,835	-0,712	0,043
P-values	0,300		0,023	0,004	0,002	0,124	0,536	0,374	0,511	0,004	0,234	0,572	0,358	0,010	0,048	0,919
x2	-0,499	0,779		0,915	0,849	0,051	-0,611	0,600	0,629	0,860	-0,115	-0,155	-0,441	0,974	-0,802	0,316
P-values	0,209	0,023		0,002	0,008	0,905	0,108	0,116	0,095	0,006	0,787	0,714	0,274	0,000	0,017	0,447
x3	-0,612	0,877	0,915		0,978	0,331	-0,620	0,597	0,637	0,877	0,106	-0,118	-0,536	0,926	-0,631	0,334
P-values	0,107	0,004	0,002		0,000	0,424	0,101	0,118	0,089	0,004	0,802	0,781	0,171	0,001	0,094	0,420
x4	-0,584	0,912	0,849	0,978		0,437	-0,482	0,595	0,505	0,904	0,225	-0,187	-0,503	0,862	-0,556	0,219
P-values	0,129	0,002	0,008	0,000		0,279	0,226	0,120	0,202	0,002	0,592	0,658	0,204	0,006	0,153	0,603
x5	0,152	0,590	0,051	0,331	0,437		0,163	-0,245	-0,173	0,209	0,952	-0,133	0,182	0,105	-0,009	-0,446
P-values	0,719	0,124	0,905	0,424	0,279		0,700	0,558	0,681	0,620	0,000	0,753	0,667	0,805	0,983	0,269
x6	0,488	-0,259	-0,611	-0,620	-0,482	0,163		-0,546	-0,998	-0,281	0,409	-0,071	0,581	-0,612	0,304	-0,682
P-values	0,220	0,536	0,108	0,101	0,226	0,700		0,162	0,000	0,500	0,314	0,867	0,131	0,107	0,465	0,062
x7	-0,574	0,365	0,600	0,597	0,595	-0,245	-0,546		0,593	0,589	-0,427	0,011	-0,717	0,569	-0,306	0,560
P-values	0,137	0,374	0,116	0,118	0,120	0,558	0,162		0,121	0,124	0,292	0,979	0,045	0,141	0,462	0,149
x8	-0,509	0,274	0,629	0,637	0,505	-0,173	-0,998	0,593		0,311	-0,423	0,069	-0,608	0,628	-0,313	0,694
P-values	0,198	0,511	0,095	0,089	0,202	0,681	0,000	0,121		0,453	0,297	0,871	0,110	0,096	0,451	0,056
x9	-0,642	0,880	0,860	0,877	0,904	0,209	-0,281	0,589	0,311		0,084	-0,266	-0,528	0,883	-0,720	0,214
P-values	0,086	0,004	0,006	0,004	0,002	0,620	0,500	0,124	0,453		0,843	0,524	0,179	0,004	0,044	0,611
x10	0,324	0,475	-0,115	0,106	0,225	0,952	0,409	-0,427	-0,423	0,084		-0,162	0,338	-0,052	-0,003	-0,597
P-values	0,433	0,234	0,787	0,802	0,592	0,000	0,314	0,292	0,297	0,843		0,702	0,413	0,902	0,994	0,118
x11	-0,103	-0,237	-0,155	-0,118	-0,187	-0,133	-0,071	0,011	0,069	-0,266	-0,162		-0,089	-0,131	0,052	0,451
P-values	0,808	0,572	0,714	0,781	0,658	0,753	0,867	0,979	0,871	0,524	0,702		0,834	0,758	0,903	0,263
x12	0,890	-0,377	-0,441	-0,536	-0,503	0,182	0,581	-0,717	-0,608	-0,528	0,338	-0,089		-0,566	0,376	-0,857
P-values	0,003	0,358	0,274	0,171	0,204	0,667	0,131	0,045	0,110	0,179	0,413	0,834		0,144	0,358	0,007
x13	-0,605	0,835	0,974	0,926	0,862	0,105	-0,612	0,569	0,628	0,883	-0,052	-0,131	-0,566		-0,856	0,410
P-values	0,112	0,010	0,000	0,001	0,006	0,805	0,107	0,141	0,096	0,004	0,902	0,758	0,144		0,007	0,313
x14	0,366	-0,712	-0,802	-0,631	-0,556	-0,009	0,304	-0,306	-0,313	-0,720	-0,003	0,052	0,376	-0,856		-0,277
P-values	0,372	0,048	0,017	0,094	0,153	0,983	0,465	0,462	0,451	0,044	0,994	0,903	0,358	0,007		0,507
x15	-0,780	0,043	0,316	0,334	0,219	-0,446	-0,682	0,560	0,694	0,214	-0,597	0,451	-0,857	0,410	-0,277	
P-values	0,023	0,919	0,447	0,420	0,603	0,269	0,062	0,149	0,056	0,611	0,118	0,263	0,007	0,313	0,507	

According to the constructed multivariate regression models, the indicators that influence the global innovation index of Ukraine's economy are the real wage index, income from capital transactions, and the consumer price index. These indicators should be taken into account as defining features of the innovative development of Ukraine's economy, i.e. in the strategic period, in the current military and future post-war conditions, and in measures for its implementation, i.e. in the tactical period. Thus, the defining features of the innovative development of Ukraine's economy in the current military conditions in terms of its practical aspect are:

– solvent demand of end users (customers) of innovations for the acquisition of intellectual property,

ISSN 2522-9818 (print)
ISSN 2524-2296 (online) Innovative technologies and scientific solutions for industries. 2023. No. 3 (25)

production and commercialization of innovative technologies and products (in accordance with the indicators of the real wage index, which should be increased, and the consumer price index, whose growth should be restrained)

– investing in innovations that increase income from capital transactions (in accordance with the indicator of income from capital transactions, the growth of which should be promoted).

Thus, it is possible to identify specific regulatory measures to stimulate innovative development, taking into account the following factors: current defining features of innovative development, measures for their implementation and practical implementation in wartime; the experience of leading countries in the global innovation index and the experience of enterprises interested in the final consumption of innovations and in investing in green and ultramodern production, which involves significant additional costs.

To increase the effective demand of consumers (customers) of innovations, the following incentives are available:

– concessional lending to enterprises in key sectors of the economy, such as mechanical engineering, energy, chemical industry, instrumentation, and others, that serve other sectors of the economy;

– government funding for high-tech companies to develop digital skills and adapt employees to meet the needs of Industry 4.0;

– application of incentive programs that provide taxpayers with payroll credits;

– taxation of acquired patents for many years at a reduced tax rate instead of the usual percentage of corporate income tax;

– preferential lending for sales of innovative objects (patents, innovative products and technologies);

– state support for the use of production and infrastructure solutions in the production activities of enterprises involving modern robotic systems, mainly collaborative robots (cobots);

– introduction of free trade zones for innovative products and technologies;

– uniting research institutes, leading universities, and business associations into functional clusters to concentrate creative human capital and create cyclical demand from end users who are themselves developers of innovations;

– organizational support for the functioning of incubators, accelerators, technology parks, centers of expertise and R&D, testbeds, shared resource centers that support key technologies such as A.I., IoT and others that are targeted for innovation development;

– development of institutions (entities) that ensure innovation development at the macroeconomic level on a national scale and are able to play a key role in the development of certain sectors of the economy and establishing the existing institutional boundaries and institutionalization of the state innovation policy and innovation development programs;

– modernization of production facilities and their accelerated digitalization, which involve the use of mechanisms to encourage end customers and industrial enterprises to use new technologies and products;

– focusing on the development of a policy to support and apply organizational tools for the growth of those enterprises that contribute a larger share of GDP than other business entities.

The following incentives are available to boost investment in innovation:

– reducing taxation on mergers and acquisitions by at least half;

– providing significant benefits (several hundred percent) for patenting and licensing innovations;

– allowing the use of accelerated depreciation methods (e.g., cumulative depreciation rates for innovative products of mechanical engineering as an industry with a slow capital turnover and one that significantly lost consumers during the war) in the case of using environmentally friendly production technologies;

– application of capital super- and hyper-depreciation programs that allow companies to add significant interest (from 40 % to 150 %, following the example of Italy), according to the cost of acquisition of qualified intangible assets;

– use of a preferential tax rate (no more than 10 % on profits or income) from the implementation of Industry 4.0 technologies to invest in domestic production;

– providing preferential or state funding for artificial intelligence projects;

– introduction of special investment regimes for launching innovative production and sales of intellectual property for better penetration into domestic and global value chains.

If the proposed stimulus measures are not adopted and supported at the macroeconomic level, Ukraine's economy will lag behind the developed world on the path of innovation development and will be perceived as a raw material supplement to countries that are more advanced in generating and implementing innovations.

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ISSN 2522-9818 (print)
ISSN 2524-2296 (online)

Conclusions and prospects for further development

The relevance of the study of innovative development of Ukraine's economy is determined by the need to clarify its theoretical basis and develop the latest practical measures in accordance with the conditions of wartime. The urgent issues of promoting innovation development are changing approaches to intensifying innovation activity on the part of the State, identifying the influential factors that contribute to export-import activities to find end users interested in innovation, consolidating representatives of innovation systems of different economic levels to focus on achieving joint priority actions to lobby for innovation interests in order to stimulate effective demand for innovative results.

On the basis of generalization of theoretical sources on the definition of the concept of "innovative development", it was improved in accordance with the laws of the dialectic of cognition and the essence of the phenomenon itself. This made it possible to formulate the author's own definition of this concept. The advantages of the proposed definition are its compliance with the dialectical laws of cognition, taking into account the objective essence of innovations in all spheres of life of economic systems at all their levels of functioning and by the main types of innovations.

In accordance with the above generalized concepts of innovation development, it is proposed to study the factors of influence on this phenomenon and its defining features that are significant in modern conditions and to take them into account in order to improve theory and practice. Using the values of the dynamics of the components of the global innovation index according to the statistical indicators of Ukraine's economy in 2015–2022, the most influential factors according to the relevant indicators are identified and multivariate regression models are built, according to which the main indicators of innovative development are the real wage index, income from capital transactions, and the consumer price index. According to these significant indicators, the author proposes the defining features of the innovative development of Ukraine's economy in the current military conditions, the essence of which is the following measures: formation and support of effective demand of end users (customers) of innovations for the acquisition of intellectual property, production and commercialization of innovative products and innovative technologies (according to the indicators of the real wage index, which should be increased, and the consumer price index, the growth of which should be restrained); investment in the development of the economy of Ukraine. Based on these defining features and taking into account the experience of the world's leading leaders in innovative development, the author proposes measures to ensure and intensify it under martial law in Ukraine.

The directions of further scientific research on innovative development are the development of strategic plans and programs for its provision by economic sectors, taking into account the tactical specification of the proposed and justified measures.

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Received 05.09.2023

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ISSN 2522-9818 (print)
ISSN 2524-2296 (online) *Innovative technologies and scientific solutions for industries. 2023. No. 3 (25)*

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СУЧАСНІ ВИЗНАЧАЛЬНІ ХАРАКТЕРИСТИКИ ІННОВАЦІЙНОГО РОЗВИТКУ ЕКОНОМІКИ УКРАЇНИ: ТЕОРЕТИЧНИЙ ТА ПРАКТИЧНИЙ АСПЕКТИ

Предметом статті є теоретичне обґрунтування, методичне забезпечення, практичні пропозиції з дослідження інноваційного розвитку економіки в сучасних умовах. **Мета роботи** – узагальнення та вдосконалення теоретичних засад інноваційного розвитку, виявлення основних впливових факторів і визначальних характеристик на його перебіг та розроблення пропозицій щодо забезпечення інноваційного розвитку економіки України в сучасних умовах. Визначено такі **завдання**: з'ясувати ставлення фахівців до можливості та необхідності підтримки інноваційного розвитку в складних воєнних умовах сьогодення; узагальнити теоретичне підґрунтя інноваційного розвитку, удосконалити його визначення та згрупувати наявні концепції; обґрунтувати найвпливовіші фактори, що зумовлюють активізацію та/або стримання інноваційного розвитку економіки України; виявити його визначальні ознаки, за якими згенеровано заходи забезпечення інноваційного розвитку економіки у воєнних умовах. Для вирішення завдань застосовано такі **методи**: теоретичне узагальнення, аналіз, синтез, індукція, дедукція, структурно-логічний аналіз, системний і ситуаційний підходи, економіко-статистичний аналіз, кореляційний аналіз, багатофакторний регресійний аналіз, графічний метод. Здобуто такі **результати**: удосконалено визначення поняття "інноваційний розвиток"; проаналізовано концепції інноваційного розвитку; виявлено основні фактори, що впливають на перебіг інноваційного розвитку в Україні; побудовано багатофакторні регресійні моделі за впливовими факторами інноваційного розвитку та обґрунтовано найбільш важливі з них; за значущими факторами виявлено сучасні визначальні ознаки інноваційного розвитку економіки України та здійснено їх конкретизацію відповідно до заходів для його забезпечення в умовах воєнних дій. **Висновки**. Доведено, що вдосконалене поняття "інноваційний розвиток" полягає в тому, що воно характеризує розв'язання явних і прихованих суперечностей на основі здійснення якісних змін в економічній системі завдяки накопиченню кількісних перетворень у її складниках і/або факторах інноваційних процесів, інтелектуальної власності, новітніх технологій і продукції. Відповідно до наведених узагальнених концепцій інноваційного розвитку досліджено фактори впливу на це явище за динамікою складників глобального інноваційного індексу й за статистичними показниками економіки України за період 2015–2022 рр. Визначено найбільш впливові фактори за окресленими показниками й побудовано багатофакторні регресійні моделі, за якими виявлено такі сучасні провідні ознаки інноваційного розвитку: формування й підтримування платоспроможного попиту кінцевих споживачів (замовників) інновацій щодо надбання інтелектуальної власності, виробництва й комерціалізації інноваційної продукції та інноваційних технологій; інвестування в інновації. З огляду на це запропоновано заходи щодо забезпечення й активізації інноваційного розвитку в умовах воєнних дій в Україні.

Ключові слова: інноваційний розвиток; глобальний інноваційний індекс; сучасні визначальні ознаки; заходи; воєнні дії.

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Iastremska, O., Malyarets, L., Iastremska, O., Barannik, I. (2023), "Modern defining characteristics of innovative development of the ukrainian economy: theoretical and practical aspects", *Innovative Technologies and Scientific Solutions for Industries*, No. 3 (25), P. 148–162. DOI: https://doi.org/10.30837/ITSSI.2023.25.148