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INNOVATIVE DETERMINANTS OF POSTWAR SOCIALIZATION OF THE UKRAINIAN ECONOMY

Purpose. Establishment of innovative determinants of post-war socialization of the Ukrainian economy.

Methodology. The work uses general scientific methods of data synthesis and analysis, systematization and comparison, and conducts factor modeling using the principal component method with the help of the Statistica 7.0 data analysis package of innovative factors of post-war socialization of the Ukrainian economy. The information base for the study consisted of scientific articles, statistical data from international organizations, the State Statistics Committee of Ukraine, and our own empirical research.

Findings. Innovative factors have the potential to significantly improve Ukraine's socio-economic development in the post-war period, creating a stable institutional and economic foundation for future growth and prosperity, digitalization, and competitiveness. The paper conducts factor modeling of national and global innovation indicators and characterizes the innovation factors of Ukraine's post-war socio-economic development. Innovation factors will play a key role in the post-war socialization of Ukraine's economy.

Originality. The science novelty of the article is the modeling of national and global innovation indicators, which are determined by two factors that characterize Ukraine's innovation potential, the availability of talent and financial resources for innovative development. It has been proven that Ukraine's low position in the Global Talent Competitiveness Index negatively affects the innovative aspects of the socialization of the Ukrainian economy. Using factor modeling, it has been proven that special attention should be paid to the development of startups for the post-war socialization of Ukraine's economy.

Practical value. Recommendation for strengthening the positive impact of innovative development on the post-war socialization of Ukraine's economy and the development of appropriate policies.

Keywords: *socialization, innovation, competitiveness, post-war period, digitalization*

Introduction. The war caused many social and economic problems in Ukrainian society. In the context of post-war reconstruction and European integration, innovation will play a key role in the socialization of the economy. Innovations allow for more efficient organization and access to basic social services, such as healthcare, education, and social protection. For example, digital technologies can simplify the processes of obtaining medical care or social benefits. In addition, innovations can reduce the cost of managing and maintaining social programs through process automation and the introduction of effective monitoring and management systems.

The development of new technologies and innovations can become an additional incentive for economic growth in the country and increase Ukraine's competitiveness, which will have a positive impact on the welfare of citizens. Innovations contribute to the introduction of new approaches to solving social problems, which improves the quality of life of citizens. In the context of Ukraine's future post-war reconstruction, innovations are becoming an important tool for ensuring sustainable social development, raising living standards and improving the overall quality of life.

Literature review. The issue of innovative aspects of the postwar reconstruction of Ukraine has been studied by such scholars as Kulikov, Aziukovskyi, Vahonova, Bondar, Akimova, Akimov [1], who reviewed a strategic project for the innovation and investment development of Ukraine's postwar economy, with a focus on industrial recovery, infrastructure modernization, and entrepreneurship promotion. The authors emphasize the importance of attracting foreign investment and supporting domestic producers.

The research by Lavrukhina, Tytok, Shpakova, Ivanova, Shevchuk, Biloshchytskyi [2] focuses on the role of innovative communication technologies in the development of the digital economy and the management of recovery processes.

In turn, the authors S. Bondarenko and O. Nikishyna [3] analyze the integration of circular economy principles into the investment and innovation policy of environmental management, which is a key area of sustainable development of Ukraine in the post-war period. These works form a holistic vision of the modernization of Ukraine's economy based on innovation, digitalization, and environmental responsibility and the use of innovative and investment factors in the post-war reconstruction of Ukraine.

Researchers Olshanska, Milinov, Puzyrova, Mitkov [4] consider the sustainable development of Ukraine's agro-social system in the context of post-war recovery through the prism of innovation competitiveness. The authors emphasize the need to introduce modern agricultural technologies, develop rural areas and increase the efficiency of agricultural production. It is determined that an innovative approach to the agricultural sector is a key factor in ensuring food security and socio-economic stability in the regions affected by the war.

Kindzerskyi's article focuses on increasing the competitiveness of the agricultural sector and industry of Ukraine in the postwar period [5]. The author analyzes the structural deformations of the industrial complex caused by the war and identifies the priorities of state

policy, including support for strategic industries, modernization of production, and development of the domestic market. The paper emphasizes the importance of combining anti-crisis measures with long-term industrial development programs.

The article by S. Petrukha, D. Konovalenko, and N. Petrukha explores the role of inclusive economy and public finance in the process of post-war recovery of Ukraine [6]. The authors analyze the current state of socio-economic inequality, access to financial resources and the role of the state budget in ensuring equal opportunities for all segments of the population. The paper proposes the principles of fair redistribution of resources that should become the basis for economic recovery, taking into account social cohesion and sustainability.

The monograph by Kisterskyi and Zadoia presents an interdisciplinary analysis of the transformation processes and strategies of Ukraine's economic recovery after the war [7]. The collection examines macroeconomic, institutional and sectoral aspects of economic reconstruction, including the problems of investment, employment, energy security and integration into the European space. The publication combines scientific approaches to the formation of an effective recovery model focused on sustainable development and competitiveness.

Researchers T. Gorokhova, O. Firstenko, Y. Chopyk, K. Voitsitska, and N. Petrukha analyze the possibilities of rebuilding Ukraine's economy after the war through the prism of the Sustainable Development Goals [8]. The authors emphasize the need to integrate environmental, social, and economic components into recovery policy, with a particular focus on green growth, an inclusive labor market, and good governance. The study proposes a comprehensive strategic framework to ensure not only recovery but also long-term sustainability and competitiveness of the Ukrainian economy in the context of European integration.

Scientists V. Yemets, I. Petrunenko, A. Frolov, Y. Orel, and M. Naumov in their studies consider the role of international investment as a key tool for Ukraine's economic recovery [9]. They emphasize that attracting foreign capital contributes not only to financial stabilization, but also to the modernization of production, infrastructure development, and technological upgrading. The authors also draw attention to the need to create a favorable investment climate, including reforms of the legal system, anti-corruption measures, and guarantees of investor protection.

The concept of post-war socialization was previously studied by the author, in particular, its essence, directions and relevance to Ukraine's European integration in the context of strengthening national and European security [10].

The above-mentioned articles have become the basis for assessing the innovation component of the Ukrainian economy's reconstruction.

However, despite a certain scientific heritage on this issue, the innovative factors that can contribute to the post-war socialization of the Ukrainian economy remain unexplored, which determines the relevance of this article.

The purpose of the article is to model the factors of post-war socialization of the Ukrainian economy.

To achieve this goal, the article sets and solves the following tasks: to analyze the impact of innovative determinants on the post-war socialization of Ukraine's economy, to identify a set of national and global innovative factors, to conduct factor modeling of the impact of innovative determinants on the post-war socialization of Ukraine's economy, and to propose recommendations for further post-war socialization of Ukraine.

Methodology. To achieve the purpose of the article, the author uses general scientific methods of data synthesis and analysis, systematization and comparison, and also conducts factor modeling of innovative factors of post-war socialization of Ukraine's economy, which allowed increasing the objectivity of a multicriteria assessment and determining a set of factors that have different nature but comprehensively characterize innovative development. The general equation of factor modeling is presented in the form

$$y = f(x_1, x_2, ..., x_m), \quad (1)$$

where x refers to factors ($j = 1, 2, ..., m$); y is the performance indicator.

The values of the factors are known at each n time points, and because of this fact, the available values can be represented in the form of a matrix

$$\begin{pmatrix} x_1^1, x_2^1, ..., x_m^1 \\ x_1^2, x_2^2, ..., x_m^2 \\ ..., ..., ..., ... \\ x_1^n, x_2^n, ..., x_m^n \end{pmatrix}, \quad (2)$$

where x is the value of the j^{th} factor at time i ($j = 1, 2, ..., m$; $i = 1, 2, ..., n$).

Each row of the matrix corresponds to a vector in m-dimensional space, the first and last rows correspond to the initial and final reporting periods.

Factor modeling was performed using the Statistica 7.0 data analysis package.

Scientific articles, statistical data of international organizations, the State Statistics Committee of Ukraine, etc. became the information base of the research.

Results. From our point of view, post-war socialization is the direction of economic processes to increase the welfare of the population after the war. It is obvious that post-war socialization will require the involvement of internal and external sources of financing, as well as the digital transformation of the entire society [11]. A key role in the post-war reconstruction will be played by innovations that will contribute to increasing the competitiveness of Ukraine's economy, its digitalization, the involvement of artificial intelligence, etc.

After the war in Ukraine, innovative factors of socio-economic development will influence the recovery of the country and the strengthening of its economy, in particular:

1. Technological innovations. The implementation of modern technologies in production, infrastructure and public services can improve the productivity and competitiveness of the economy. These can be innovations in the field of information technology, medicine, agriculture, etc.

2. Development of human capital. Investments in education, research and the development of a highly skilled workforce are key to creating an innovative econ-

omy. Providing access to high-quality education, improving the skills of the population, and developing science in Ukraine can make Ukrainian workers more competitive in the world market.

3. Support of small and medium-sized enterprises, which are often a source of innovation in the economy. This includes startups. Supporting their development through financial instruments, advisory support and facilitating access to markets can stimulate new initiatives and business creation.

4. Environmental innovations. In connection with the global challenges of climate change, the development of environmental technologies and green initiatives can not only reduce the negative impact on the environment, but also create new opportunities for economic growth.

5. Infrastructural innovations. Improvement of transport networks, energy systems, telecommunication infrastructures and communication, startup infrastructure will contribute to more efficient functioning of the economy and attraction of investments.

6. Innovations in public management and administration. Implementation of electronic governance, electronic services for citizens and enterprises simplifies interaction with state bodies and reduces corruption.

These innovative factors have the potential to significantly improve the socio-economic development of Ukraine after the war period, to create stable institutional and economic foundations for future growth and prosperity, digitalization and competitiveness.

Thus, to conduct factor modeling in accordance with formulas (1 and 2), a set of national and global indicators of innovation development was selected. In particular, 7 national indicators have been identified that characterize the state of the innovation sphere in Ukraine. These include: expenditures on research and development (R&D), the number of organizations engaged in such work, internal R&D expenditures, personnel involved in R&D, and the share of researchers in the total number of such personnel [12]. Additionally, the volume of digital products sold and the volume of investments in Ukrainian startups were taken into account [13]. In addition, 7 global indicators were included to reflect the international context of innovation development. Among them are Global Innovation Index [12], Global Sustainable Competitiveness Index [14], Global Human Capital Competitiveness Index [15], Global Human Development Index [16, 17], and ICT Development Index [12]. In addition, data from 4 reports on the Global Knowledge Index were used: 2020 [18], 2021 [19], 2022 [20], 2023 [21] as well as data from 5 reports on the Network Readiness Index: 2019 [22], 2020 [23], 2021 [24], 2022 [25], 2023 [26]. The combination of these indicators allows us to outline the key innovative determinants of the socialization type of Ukraine's economy (Table 1).

Based on the innovation determinants presented in Table 1, a factor analysis was conducted, the main purpose of which is to reduce the number of indicators and determine the relationships between the factors. The number of factors is reduced by identifying hidden common factors that explain the relationships between the features or variables inherent in innovation development as an object of study.

For the purpose of this article, one of its varieties, the principal component method, was used to conduct factor analysis. The use of the principal components method is based on the assumption that the input indicators are highly correlated (multicollinear) and, as a result, they can be represented by a smaller number of uncorrelated hypothetical indicators (principal components) that would retain all the information about the causal mechanism and not affect the accuracy of the analysis.

Factor analysis is widely used to identify hidden variables (factors) that explain the common variation among observed variables. One of the key steps in this process is to determine the number of factors that should be retained for further analysis. Therefore, a correlation matrix was calculated for factor analysis (Table 2). This matrix was calculated by entering the values of innovative determinants of socialization of the Ukrainian economy into the Statistica 7.0 data analysis package and using the "factor analysis" – "correlation calculation" function. The analysis of the correlation matrix will allow us to assess the degree of correlation between the factors. If this degree is high, the factors can be combined into one factor.

According to the data presented in Table 2, it can be argued that the correlation coefficients for Var2 and Var6, Var2 and Var14, Var4 and Var9, Var8 and Var9, Var12 and Var13 are high. According to Table 2, the lowest correlation coefficients are for Var3 and Var10. Factor loadings of innovation determinants by the principal components method are shown in Table 3.

According to the data in Table 3, Factor 1 explains 71.484 % of the total variance, Factor 2 – 17.691 %. other factors have a smaller percentage of the total variance. Factor 1 includes 11 innovative determinants. Factor 2 includes only 2 innovative determinants – Var3 (Intramural R&D expenditure) and Var10 (Global Talent Competitiveness Index).

The factor analysis revealed that the innovation determinant Var7, which reflects the level of investment in Ukrainian startups, was not included in any of the selected factors. This indicates that within the selected data sample for 2019–2024, this indicator does not have a statistically significant impact on the processes of socialization of the Ukrainian economy. The probable reason for this result is both the unstable situation in the country and the limited opportunities for implementing startup projects during the wartime period, which reduces the impact of this determinant on the overall socio-economic processes.

However, investments in startups should not be seen as a marginal or insignificant indicator, but as a strategic reserve for the future. Startups create an environment for self-realization, stimulate innovation, engage young people in entrepreneurial activities, and form new social ties. That is why, despite the lack of impact in the analyzed period, this indicator can become an important factor of socialization in the post-war period, when the innovation economy will be activated, investor confidence will increase, and new opportunities for small business development will appear.

According to the calculations presented in Table 3, Factor 1 and Factor 2 explain 89.175 % of the total variance. According to the rules of factor analysis, only those factors that explain at least 75 % of the accumulated vari-

Table 1

Innovative determinants of the socialization of the economy of Ukraine in 2019–2023

Variables	Number of Variables	2019	2020	2021	2022	2023
R&D expenditure, % of GDP, %	1	0.43	0.41	0.38	0.33	0.17
Number of R&D organization	2	950	769	637	567	547
Intramural R&D expenditure – total, mln UAH	3	17,254.6	17,022.4	20,973.8	17,117.8	21,348.1
R&D personnel – total, persons	4	79,262	78,860	68,808	53,221	58,567
Researchers in the percentage of the total number of R&D personnel, %	5	64.5	65.2	64.8	67.8	66.3
Volume of sold digital products, mln UAH	6	1,776,603	2,158,030	2,625,862	2,756,876	–
Investments in Ukrainian startups, mln USD	7	542	571	832	218	209
Global Innovation Index, rank	8	74	76	66	49	55
Global Sustainable Competitiveness Index, rank	9	47	45	49	57	57
Global Talent Competitiveness Index, rank	10	63	66	61	66	64
Human Development Index, rank	11	88	74	86	100	–
Network Readiness Index, rank	12	67	64	53	50	43
Global Knowledge Index, rank	13	–	56	61	63	68
ICT Development Index, score	14	70	74	76	77	79.2

Table 2

Correlation matrix of innovative determinants of socialization of the Ukrainian economy in 2019–2023

	Var1	Var2	Var3	Var4	Var5	Var6	Var7	Var8	Var9	Var10	Var11	Var12	Var13	Var14
Var1	1	0.75	–0.64	0.73	–0.54	–0.71	0.68	0.71	–0.82	–0.1	–0.72	0.89	–0.95	–0.84
Var2	0.75	1	–0.55	0.88	–0.72	–0.99	0.43	0.83	–0.79	–0.13	–0.58	0.94	–0.87	–0.98
Var3	–0.64	–0.55	1	–0.33	–0.1	0.57	0.11	–0.29	0.35	–0.63	0.33	–0.69	0.69	0.62
Var4	0.73	0.88	–0.33	1	–0.89	–0.89	0.68	1	–0.97	–0.22	–0.86	0.89	–0.87	–0.83
Var5	–0.54	–0.72	–0.1	–0.89	1	0.7	–0.81	–0.89	0.85	0.62	0.7	–0.65	0.62	0.66
Var6	–0.71	–0.99	0.57	–0.89	0.7	1	–0.37	–0.85	0.79	0.05	0.6	–0.94	0.86	0.96
Var7	0.68	0.43	0.11	0.68	–0.81	–0.37	1	0.71	–0.79	–0.65	–0.72	0.52	–0.6	–0.46
Var8	0.71	0.83	–0.29	1	–0.89	–0.85	0.71	1	–0.98	–0.22	–0.9	0.87	–0.85	–0.78
Var9	–0.82	–0.79	0.35	–0.97	0.85	0.79	–0.79	–0.98	1	0.21	0.94	–0.89	0.91	0.78
Var10	–0.1	–0.13	–0.63	–0.22	0.62	0.05	–0.65	–0.22	0.21	1	0.02	0.02	–0.02	0.14
Var11	–0.72	–0.58	0.33	–0.86	0.7	0.6	–0.72	–0.9	0.94	0.02	1	–0.76	0.81	0.56
Var12	0.89	0.94	–0.69	0.89	–0.65	–0.94	0.52	0.87	–0.89	0.02	–0.76	1	–0.98	–0.95
Var13	–0.95	–0.87	0.69	–0.87	0.62	0.86	–0.6	–0.85	0.91	–0.02	0.81	–0.98	1	0.9
Var14	–0.84	–0.98	0.62	–0.83	0.66	0.96	–0.46	–0.78	0.78	0.14	0.56	–0.95	0.9	1

ance are considered for further research. Thus, the innovation determinants presented in Table 3 have the greatest impact on the socialization of Ukraine's economy. To confirm this, we apply two methods to determine the number of necessary selected factors, namely, the Kaiser criterion and the "rock shift" criterion.

According to the Kaiser criterion, only factors with intrinsic values greater than 1 are selected, this criterion was proposed by Kaiser [27]. This approach assumes that a factor must explain at least as much variance as a single primary variable. This criterion is one of the most common methods in the practice of multivariate statistical analysis. Its application allows one to reduce the number of factors to the optimal number without losing the essential information. According to the information in Tables 3 and 4, two factors can be identified for the innovation determinants based on this criterion.

The "rock shift" criterion is a graphical method first proposed by Cattell [28]. The method involves plotting the eigenvalues in descending order – from the largest to the smallest ones. The factor number is plotted on the X-axis, and the corresponding eigenvalue is plotted on the Y-axis. As a rule, the graph shows a steep decline in the first positions (i.e., the first few factors explain the largest share of the total variance), and then the decline becomes gentler and more stable – this is the so-called "rock shift" zone.

To apply this criterion, the eigenvalues presented in Tables 3 and 4 should be plotted as a graph. Cattell

Table 3

Factor Loadings of innovative determinants by the principal component's method

Variables	Factor 1	Factor 2
Var1	0.87546	–0.1503
Var2	0.91662	–0.152
Var3	–0.4905	0.85225
Var4	0.96537	0.12303
Var5	–0.8121	–0.5441
Var6	–0.9087	0.20218
Var7	0.69288	0.60375
Var8	0.95232	0.16339
Var9	–0.9657	–0.1394
Var10	–0.1794	–0.8836
Var11	–0.8384	–0.0976
Var12	0.96655	–0.2503
Var13	–0.9585	0.22502
Var14	–0.9142	0.19604
Expl.Var	10.0077	2.47679
Prp.Totl	0.71484	0.17691

Table 4

Eigenvalue of Factors

Factors	Eigenvalue	% Total	Cumulative	Cumulative
Factor 1	10.00774	71.48383	10.00774	71.48383
Factor 2	2.47679	17.69138	12.48453	89.17521

proposed to find a place on the graph where the decline of eigenvalues from left to right slows down as much as possible. To determine the main components of the innovation determinants, we will use the graphical criterion of the "rock shift" (Fig. 1). It can be used to visually estimate the number of principal components on a linear graph, with the numbers of the eigenvalues of the correlation matrix on the abscissa axis and the corresponding eigenvalues on the ordinate axis.

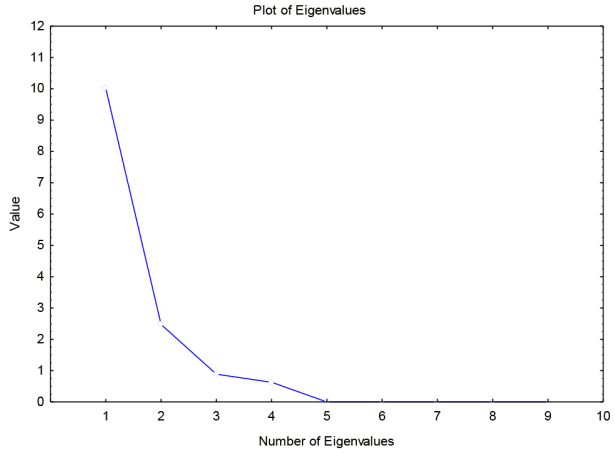

Fig. 1. Plot of eigenvalues of innovative determinants of economy socialization

The "rock shift" criterion is convenient and widely used, especially in combination with other methods (e.g., Kaiser's criterion or parallel component analysis). Its main advantage is its ease of use. However, the main disadvantage is subjectivity, since the choice of the breakpoint depends on the researcher's interpretation, especially when the boundary is not clearly defined. Therefore, it is recommended to combine this criterion with quantitative methods for more informed decision-making in factor modeling.

According to Fig. 1, it is also advisable to distinguish 2 main components – 2 Factors of innovation determinants.

Factor 1, identified because of factor analysis, combines a number of key innovation determinants that comprehensively characterize the state of the national innovation system of Ukraine. It includes expenditures on research and development (R&D), the number of research organizations, the number of personnel engaged in R&D, and the share of researchers in the structure of this personnel. In addition, Factor 1 includes international indicators that reflect the quality and readiness of the innovation environment: the volume of digital products sold, the Global Innovation Index, the Global Sustainable Competitiveness Index, the Human Development Index, the Network Readiness Index, the Global Knowledge Index, and the ICT Development Index (Fig. 2).

The general structure of the factor loadings shows that Factor 1 reflects the integrated level of Ukraine's innovation potential, including both internal resources (R&D investments, human resources) and external assessments (international indices). Thus, this factor is a strategic indicator of the country's innovation capacity, which is important for shaping state policy in the field of science, technology and digital transformation.

However, an important detail is that some of the indicators in the structure of Factor 1 have a negative factor load. Such determinants as the share of researchers in R&D personnel, sales of digital products, the Global Sustainable Competitiveness Index, the Human Development Index, the Global Knowledge Index, and the ICT Development Index have negative values (Table 3 and Fig. 2). This means that the growth or current state of these indicators in the period under study does not support innovation potential but rather indicates negative dynamics or a weak connection with real innovation processes in Ukraine.

Such a result may indicate structural contradictions in the national innovation system, when formal indicators (e.g., international rankings or sales of digital products) are not converted into real competitive advantages due to low institutional efficiency, staff outflow, or an unstable investment environment. This emphasizes the need not only for a quantitative increase in innovative resources, but also for a qualitative reform of the science, education, and technology management system to ensure sustainable development.

The analysis of the data in Table 1 shows a marked deterioration in Ukraine's global position in key international indices. In particular, the country's position in the Global Sustainable Competitiveness Index fell from 47^{th} place in 2019 to 57^{th} in 2023. Similar dynamics are also observed in the Human Development Index, where Ukraine dropped from 88^{th} place in 2019 to 100^{th} in

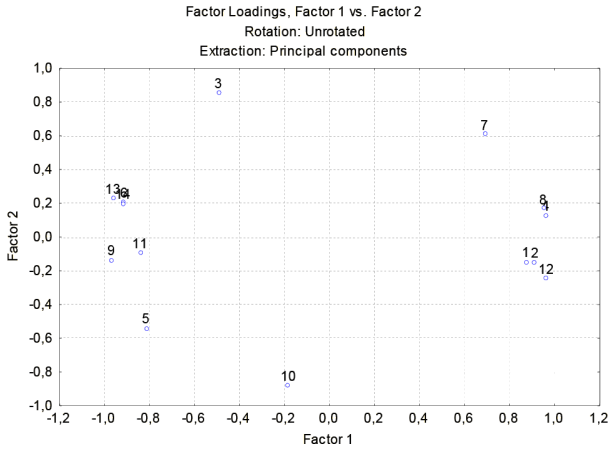

Fig. 2. Factor 1 and Factor 2 Loadings

2022. The Global Knowledge Index also recorded a decline from *56th* position in 2020 to *68th* in 2022. These changes indicate a general weakening of the state's position in the context of innovative development, sustainability, and human potential.

This decline not only reflects the ongoing socioeconomic instability caused by the war but also poses a serious threat to the country's future recovery. Global indices that consider sustainability, human capital, and knowledge are important benchmarks for international partners, donors, and investors. Their deterioration reduces the attractiveness of Ukraine as a space for innovation and development and may complicate integration into European and global economic processes.

In the long run, such a lag in the rankings could have a negative impact on the socialization of Ukraine's economy after the war. The loss of competitive positions reduces opportunities for attracting investment, international technical assistance, and the development of an innovative environment. Therefore, along with the physical rebuilding of infrastructure, government policy should focus on restoring human potential, improving the quality of education, innovation, and digitalization, which will improve international rankings and ensure sustainable development.

Factor 2, according to the results of factor analysis, includes only two innovative determinants: internal R&D expenditures (Var3 – Intramural R&D expenditure) and the Global Talent Competitiveness Index (Var10 – Global Talent Competitiveness Index). These variables collectively reflect the key aspects of ensuring innovative development: research funding and the availability of qualified human resources capable of producing new knowledge, products and technologies. They form the basis for the formation of an effective innovation system in the country.

At the same time, it is important to note that Var10 has a negative factor load, which indicates an inverse relationship with the general vector of Factor 2. In other words, the low values of the Global Talent Competitiveness Index that characterize Ukraine's current state do not contribute to, but rather hinder, the innovative socialization of the economy. This indicates the existence of serious challenges related to the outflow of highly skilled personnel, insufficient development of the educational environment, and poor integration of Ukrainian talent into global scientific and technological networks.

In view of this, strengthening human capital and investment in science should become a strategic priority of state policy in the postwar period. Raising Ukraine's position in the global talent competitiveness index – by reforming education, creating conditions for the return of scientists, and stimulating innovation – will strengthen this factor and positively influence the country's socioeconomic transformation in the face of global competition.

Conclusions. Innovative determinants will play a key role in the post-war socialization of Ukraine's economy. The carried out factor modeling has distributed innovation indicators by two factors that characterize the innovation potential of Ukraine, the availability of talents and financial resources for innovative development. It is proved that special attention for the post-war socialization of Ukraine's economy should be paid to attracting additional investment resources for the development of startups.

According to the conducted factor modeling, the recommendations for increasing the innovativeness of post-war socialization of Ukraine can be as follows:

1. A policy to preserve and return talents to Ukraine (Ukraine's position in the Global Talent Competitiveness Index, Human Development Index, Global Knowledge Index). Ukraine must prioritize retaining its skilled workforce and attracting back those who have left due to the war. This can be achieved by improving Ukraine's position in global indices such as the Global Talent Competitiveness Index, Human Development Index, and Global Knowledge Index. Policies should focus on creating a favorable environment for professionals, including competitive salaries, career opportunities, and a high quality of life. Additionally, initiatives such as scholarships, research grants, and partnerships with international institutions can help retain and attract talent.

2. Development of innovation and startup infrastructure. Building a robust ecosystem for innovation and startups is crucial. This includes establishing innovation hubs, technology parks, and incubators that provide startups with access to resources, mentorship, and networking opportunities. Strengthening the legal and regulatory framework to protect intellectual property rights and simplify business registration processes will also encourage entrepreneurial activity.

3. Continued digitalization of the public sector and administrative services. Digital transformation is a key enabler of innovation and efficiency. Expanding e-governance initiatives, improving digital literacy, and ensuring widespread access to high-speed internet will streamline administrative processes, reduce corruption, and enhance the delivery of public services. This will create a more transparent and business-friendly environment.

4. Support for small and medium-sized innovative enterprises (SMEs). SMEs are the backbone of Ukraine's economy and a major source of innovation. Providing targeted support, such as tax holidays, subsidies, grants, and low-interest loans, can incentivize SMEs to invest in research and development. Additionally, creating platforms for collaboration between SMEs,

universities, and research institutions can foster knowledge transfer and innovation.

5. Human capital development. Investments in education, health, and professional development of the population are critical for recovery and post-war development. Creating conditions for education and professional development can prepare the population for new challenges and opportunities.

6. Attracting international support and investment is a key factor for boosting Ukraine's innovation development in the post-war period. Investments from international financial institutions, donors, and private foundations not only provide the necessary financial resources, but also open access to advanced technologies, know-how, and experience in managing innovation processes. The participation of foreign partners contributes to the implementation of global quality standards, increased transparency, and a favorable investment climate. International startup support programs, technology accelerators, and bilateral cooperation projects with the EU, the US, Canada, Japan, and other countries play a special role in this process. They not only finance Ukrainian initiatives but also provide mentoring support, access to markets, and partner networks. Such cooperation allows Ukrainian innovators to compete globally and introduce the latest solutions into the economy faster.

In the long run, Ukraine's integration into global innovation ecosystems will contribute to the formation of a stable model of economic growth based on knowledge, digital technologies, and entrepreneurial activity. It is through the effective use of international assistance and investment that the country's competitiveness can be enhanced, its recovery accelerated, and its sustainable growth ensured in the postwar period.

The innovative development of post-war Ukraine requires a systematic and comprehensive approach covering various spheres of social and economic life. First of all, it is important to focus on the development of human capital, in particular through the modernization of education, support for research, and the creation of conditions for the return and retention of highly qualified specialists. At the same time, an enabling environment for entrepreneurship and innovation should be created, in particular through access to finance, reduction of administrative barriers, and incentives for start-ups and technology clusters.

In addition, improving the governance system and developing innovation infrastructure (technology parks, incubators, digital platforms, etc.) are critical for sustainable economic growth. This approach will not only boost innovation, but will also contribute to the socialization of the economy, improve the welfare of the population, and strengthen Ukraine's international competitiveness in the post-war period. Together, these factors will create the basis for the sustainable development of the national economy, focused on knowledge, technology and human potential.

The prospects for further research will be the analysis of innovative aspects of veterans' reintegration in postwar period.

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Інноваційні детермінанти повоєнної соціалізації української економіки

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Мета. Встановлення інноваційних детермінант повоєнної соціалізації української економіки.

Методика. У роботі використані загальнонаукові методи синтезу й аналізу даних, систематизації та порівняння, проведене факторне моделювання методом головних компонент за допомогою пакета аналізу даних Statistica 7.0 інноваційних чинників повоєнної соціалізації української економіки. Інформаційною базою дослідження стали наукові статті, статистичні дані міжнародних організацій, Державного комітету статистики України й власні емпіричні дослідження.

Результати. Інноваційні чинники мають потенціал для суттєвого покращення соціально-економічного розвитку України в післявоєнний період, створення стійкої інституційної й економічної основи для майбутнього зростання та процвітання, цифровізації й конкурентоспроможності. У роботі проведене факторне моделювання національних і глобальних інноваційних індикаторів, охарактеризовані інноваційні чинники повоєнного соціально-економічного розвитку України. Інноваційні чинники відіграватимуть ключову роль у післявоєнній соціалізації економіки України.

Наукова новизна. Моделювання національних і глобальних інноваційних індикаторів, які детерміновані двома факторами, що характеризують інноваційний потенціал України, наявність талантів і фінансових ресурсів для інноваційного розвитку. Доведено, що низька позиція України у Глобальному індексі конкурентоспроможності талантів негативно впливає на інноваційні аспекти соціалізації української економіки. За допомогою факторного моделювання доведено, що особливу увагу для післявоєнної соціалізації економіки України слід приділити розвитку стартапів.

Практична значимість. Практичне значення роботи полягає в рекомендаціях щодо посилення позитивного впливу інноваційного розвитку на повоєнну соціалізацію економіки України й розробці відповідних політик.

Ключові слова: *соціалізація, інновації, конкурентоспроможність, повоєнний період, діджиталізація*

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