https://doi.org/10.33271/nvngu/2026-1/197

H. Ostrovska[*1],
orcid.org/0000-0002-9318-2258,
L. Melnyk[1],
orcid.org/0000-0001-8844-5490,
I. Yasinetska[2],
orcid.org/0000-0002-2996-4394,
M. Mykhailov[3],
orcid.org/0000-0002-5448-5379,
S. Shevchuk[3],
orcid.org/0000-0002-1179-9562

1 – Ternopil Ivan Pul'uj National Technical University, Ternopil, Ukraine
2 – Higher Educational Institution "Podillia State University", Kamianets-Podilskyi, Ukraine
3 – Admiral Makarov National University of Shipbuilding, Mykolaiv, Ukraine
* Corresponding author e-mail: h.ostrovska@gmail.com

MACROECONOMIC CHALLENGES AND THE GLOBAL CONTEXT OF POST-WAR RECONSTRUCTION IN UKRAINE

Purpose. To conduct a comprehensive study of the macroeconomic challenges of Ukraine's post-war recovery and to develop scientific and practical recommendations for ensuring socio-economic development based on intellectualization, innovative progress, and European integration.

Methodology. The study is based on the techno-socio-economic paradigm of economic development. To achieve the research objectives, methods of comparative, systematic, structural-logical, economic-statistical, and critical analysis, grouping, and logical generalization were used.

Findings. The article analyzes the global political, social, and economic consequences of the Russian-Ukrainian war for Ukraine and the world economy and outlines scenarios for the development of macroeconomic indicators in the medium and long term. The paper provides a comparative analysis of the experience of countries that have effectively implemented post-war transformation strategies and identifies universal principles of structural economic renewal based on the consolidation of the nation around common goals and all resources mobilization. The innovative and scientific-technological potential of Ukraine is examined, its position in global rankings is determined, and the possibilities for integration into a single European economic and scientific-technological community are identified. The research proves that the intellectualization of the economy, which involves the synergy of scientific, educational, innovative, and cultural components of social potential, is a prerequisite for sustainable development. The authors provide recommendations for activating Ukraine's potential. We estimate the importance of external support for ensuring the sustainability of transformation processes. The authors develop a system of organizational, regulatory, and managerial measures aimed at implementing state policy in the segment of science, technological progress, and innovation.

Originality. The analysis of the global political and economic consequences of the war is systematically combined with the development of a recovery model based not only on infrastructure and financial reconstruction, but also on the formation of a knowledge economy. The authors propose integrating human resource development tools, advanced digital technologies, and innovative ecosystems into the reconstruction strategy as long-term drivers of economic progress.

Practical value. The results of the study are of practical importance for the development of public policy concepts, modernization programs, and the formation of a comprehensive strategy for Ukraine's intellectual development in the context of post-war reconstruction.

Keywords: *post-war reconstruction, economy intellectualization, techno-innovation policy, technologization, euro-integration*

Introduction. The term "economic miracle" is often found in scientific sources on economics, where it is understood as a figurative name for successful stories of economic development. In different parts of the world, dozens of countries have undergone structural transformation of their economies to higher technological levels and achieved high average annual GDP growth rates of over 5 % over the past 10 years. Similar stories were realized in the post-war period by countries such as South Korea, Japan, Singapore, Taiwan, Germany, and others. These countries differ in terms of political system, cultural outlook, geographical location, and resources, but there is something common in their histories. Each of these countries had a sovereign economic development strategy and national leaders who persistently implemented it. At the same time, long-term economic plans were based on the effective use of intellectual resources, particularly human resources, and provided for rational interaction with the outside world [1, 2]. In this context, Ukraine has not yet been able to fully transform its economy of intellectual labor, science, and new technologies. However, its own large-scale success story has already become a factor in its preservation as a sovereign state. We are convinced that Ukraine can and must achieve a similar economic miracle. It has enormous potential to achieve this, but it needs a sovereign and clear plan for socio-economic development, creative leaders to implement it, and, of course, significant efforts on the part of society [3, 4].

Today, Ukraine is experiencing turbulent events in its history. In this reality, intellectual potential, which is the main dominant factor in the socio-economic development of modern society, is becoming increasingly important for Ukraine's development. At the same time, the relevance of scientific potential, the availability of

advanced technologies, and innovations for increasing the country's competitive advantages on the world stage is growing. In this context, education is becoming an industry, and the main resource for economic development is the human factor. The most valued individuals are those who can discover and create something new in production, science, culture, etc. In terms of its potential consequences, the crisis in the context of the intellectual potential of society formation and use is more dangerous than the economic crisis. It may take decades or even centuries to overcome it. Ukraine's intellectual potential encompasses various segments of the population, but its foundation is the intellectual community, which determines the characteristics, functions, and prospects for its development. The formation of an intellectual and economic platform for Ukraine's post-war revival is aimed at ensuring socio-economic progress and improving the quality of life of the population. It should be noted that the issue of Ukraine's post-war recovery should become a strategic guideline for social progress and a "window of opportunity" for the formation of modern infrastructure in the technological, organizational, and product dimension characteristic of countries with knowledge-based economies. Under these conditions, it is necessary to ensure clear coordination of measures to modernize society and the national economy in the scientific, technological, manufacturing, and innovation spheres, which harmoniously correlate with the cultural and spiritual heritage of the nation [5].

Literature review. Domestic and foreign scientists pay considerable attention to the issues of economic and social development in the context of Ukraine's post-war recovery.

We support the position of the authors [6] that it is precisely a contextual model of national development based on the activation of its own resource potential that can guarantee Ukraine's resilience in the current conditions of global uncertainty. The study by Yu. Kindzerskyi notes that the priority of wartime and post-war reconstruction in Ukraine is the need to correct the flaws of neoliberal economic policy, which has led to our country lagging significantly behind developed countries, and, in the context of military aggression by the Russian Federation, to the instability and vulnerability of the national economy [7].

Yanchuk A. analyzes aspects of ensuring Ukraine's national interests based on a long-term strategy for post-war economic recovery. This strategy should include regulatory, institutional, and organizational prerequisites in the context of sustainable economic development in the long term [8]. In this context, the authors [9] propose a strategy based on four scenarios. At the same time, the most likely scenario is considered to be one of slow development, characterized by the gradual formation of a stimulating institutional environment against the backdrop of declining international support. The study [10] builds a model of Ukraine's post-war revival based on four "Rs" – Relationships, Renovation, Resilience, and Revampment – covering the economic sphere and the higher education system. The central element of the model is the integration of digital technologies to support Sustainable Development Goals and enhance post-war security. In this vein, the authors [11] emphasize that Ukraine's post-war development strategy encompasses a set of key tasks, among which stimulating economic progress through the implementation of innovative projects on a national scale is of particular importance. It is necessary to agree with the statement by V. Heyets, who notes that in the process of post-war reconstruction based on a policy focused on the development of industrial production, the tasks of overcoming the peripherality of Ukraine's economy must be implemented [12]. At the same time, a group of authors [13] analyzes regional-specific factors affecting the functioning of the industrial sector of the national economy in the conditions created by full-scale war. Aligning companies' business strategies with the tasks of Ukraine's post-war recovery based on the principles of sustainable development requires the implementation of updated corporate social responsibility programs [14].

Studies [15, 16] deserve attention, where the dominant position is that the key basis for building a high-tech and competitive society is the doctrine of intellectual commercialization of entrepreneurship. Its progress is due to the creation of an intellectual product as a result of human talent. At the same time, it is emphasized that investment in intellectual assets, given strategic priorities, should be considered a leading factor in the formation of a knowledge society. The main approaches proposed by foreign researchers [17, 18] can be summarized as follows. Ideological foundations based on the development of social and intellectual capital are considered a key condition for ensuring competitiveness. At the same time, the most effective mechanism for mobilizing intellectual capital is determined to be the introduction of technologies based on leading practices in humanities education, which are positioned as the main tool for managing state and social values.

Scientific works present strategies and models for Ukraine's post-war recovery, but their content focuses mainly on issues of infrastructure reconstruction, improvement of financial and economic mechanisms, and implementation of institutional reforms. At the same time, these approaches lack emphasis on the intellectualization of socio-economic progress as a key factor in ensuring sustainable innovative growth. It is precisely the consideration of this aspect that forms the conceptual basis of our research and distinguishes it from existing scientific developments.

The purpose of the article is to conduct a comprehensive study of Ukraine's post-war recovery macroeconomic challenges and to formulate scientific and practical recommendations for ensuring sustainable socio-economic development based on intellectualization, innovative development, and integration into the European space.

Methodology. The research is based on the techno-socio-economic paradigm of economic development. The methodology for substantiating the scientific concept and research issues, as well as the theoretical significance of its solution, is based on the synthesis of post-industrial economic theory, modern theories of innovation and technological development and management. The methodological basis of the study is formed on an interdisciplinary approach that combines political, institutional, and economic analytics in the context of Ukraine's post-war recovery, as well as the formation of strategic guidelines for sustainable devel-

opment. To achieve the research objectives, general scientific methods were used: induction and deduction, scientific abstraction, analysis, and synthesis, grouping, the method of comparative analysis, systematic analysis, structural and logical analysis, economic and statistical analysis, method of logical generalization, method of critical analysis. The scientific basis of the study was formed by systemic, resource, sociocultural, humanistic, civilizational, axiological, and institutional approaches.

Results. In the third millennium, humanity lives in conditions of total uncertainty. At the same time, the war of such magnitude unleashed by the Russian leadership in Ukraine is beyond any conception of instability. This war is a global humanitarian catastrophe. Against this backdrop, we will analyze the prospects for the global economy over the next two years, as presented in the International Monetary Fund's World Economic Outlook [19] report, particularly with regard to regional economic development and the situation in Ukraine. The report contains an assessment of economic prospects, taking into account the tariffs imposed by the United States in early April. Global growth is expected to reach 2.8 and 3 % in 2025 and 2026, respectively. The analysis of forecasts for 2025 and 2026 confirms that global economic growth is reaching a level significantly below the historical average of 3.7 % recorded between 2000 and 2019. At the same time, the economic shocks from the war are exacerbating the ongoing effects of the COVID-19 pandemic. This is the second contraction in many years and twice as large as the pandemic-induced contraction in 2020. According to the IMF forecast, amid significant uncertainty due to Russia's war against Ukraine, Ukraine's real GDP growth is expected to slow to 2 % by the end of 2025 and increase to 4.5 % in 2026. The slowdown in the economies of key trading partners and, accordingly, the decline in demand for Ukrainian exports will most likely be an additional factor that will hold back the economic growth of the Ukrainian economy in 2025. Significant growth in trade barriers, stricter financial conditions, and increased political uncertainty create the basis for increased risks. If these trends continue, they could significantly worsen the economic outlook.

In this context, Dragon Capital, one of the largest investment companies in Ukraine, has compiled a forecast of Ukraine's key macroeconomic indicators for 2026 (Table 1).

The consequences of the war in Ukraine have caused an economic, energy, food, and financial crisis in the global economy. In this context, experts from the Organization for Economic Co-operation and Development [21] have formulated key conclusions regarding the crisis.

Need to support refugees. Millions of people have left Ukraine. Burden sharing and EU support to the main host countries will be needed to provide this support in a stable and effective manner. According to UN Refugee Agencies, as of April 2025, there were 6.918 million refugees from Ukraine registered worldwide, including 6.358 million in Europe and 0.56 million outside Europe. At the same time, 11–12 million people received internal displacement status.

Global growth slowdown and inflation rising. According to OECD estimates, amid uncertainty, global economic growth will slow to 2.9 % in 2025–2026. At the same time, inflationary pressures remain in many economies, with headline inflation rising again in an increasing number of economies recently. Inflation in the OECD is projected to be slightly higher than previously expected until 2026. Inflation in the OECD is projected to reach 2.9 % in 2026, compared with the previous estimate. Headline inflation in the G20 economies will decline to 3.2 % in 2026.

Rising prices for raw materials and energy. The consequences of the war quickly spread across Europe and the world, disrupting already strained supply chains and causing a sharp rise in prices for raw materials and energy. The war in Ukraine has triggered a global crisis, resulting in rising food prices, which has negatively affected the economies of 74 developing countries with a total population of 1.2 billion.

Reduction in commodity supplies. As a result of hostilities, trade restrictions, sanctions against Russia, the closure of Ukraine's airspace, and the blockade of seaports by Russia, there has been a reduction in commodity supplies in the global economy. Problems with logistics, raw material supply chains, and cargo transportation security will continue in the medium term, and

Table 1

Key macroeconomic indicators for Ukraine in 2021–2026 [20]

Period	2021	2022	2023	2024	2025 rating	2026 prognosis	
						The long war	Sustainable truce
Real GDP (% y/y)	3.4	(29.1)	5.3	2.9	2.0	1.5	5.0
Nominal GDP ($ billion)	200	160	179	191	208	215	225
Consumer price index (end of year, % y/y)	10.0	26.6	5.1	12.0	9.3	5.3	7.5
Budget (fiscal) balance of the general government sector* ($ billion)	(7.3)	(39)	(47)	(44)	(44)	(44)	(30)
Budget (fiscal) balance of the general government sector* (% of GDP)	(3.6)	(25)	(26)	(23)	(21)	(20)	(13)
Foreign trade balance ($ billion)	(6.6)	(15)	(29)	(34)	(44)	(44)	(36)
Foreign trade balance (% of GDP)	(3.3)	(9.1)	(16)	(18)	(21)	(20)	(16)
NBU discount rate (%, end of year)	9.0	25.0	15.0	13.5	14.5	11.5	12.5
UAH exchange rate (end of year)	27.3	36.6	38.0	42.0	43.5	46.0	44.0
Average annual UAH/USD exchange rate	27.3	32.4	36.6	40.2	42.1	44.4	43.3

Note: * Includes central budget, local budgets, and social insurance funds; grants are included in the sources of deficit financing

their restoration, even in an optimistic scenario, will require significant financial costs and time.

Non-intensive investments has also hurt the impressive growth in production since the global financial crisis, even with high corporate profits, historically low financing costs, and high corporate profitability. The slowdown in capital accumulation largely reflects the lingering impact of two major cyclical shocks: the global financial crisis and the COVID-19 pandemic. These effects are interrelated: cyclical downturns can themselves lead to structural changes, leaving lasting scars on company balance sheets, labor market dynamics, and technology adoption patterns. Real investment in developed and developing countries is still about 20 % below its pre-crisis trend [22] (Fig. 1).

At the same time, investment models have shifted in favor of digital and knowledge assets – software, data, and research and development, which now account for over 35 % of business investment in OECD economies, compared to 28 % in 2000 [22].

In the context of this study, it is appropriate to conduct a comparative analysis of international experience in post-war transformations.

Prior to the large-scale invasion of Ukraine, a number of strategic concepts for economic development were proposed and developed by government authorities, the scientific community, and experts. In 2021, the Cabinet of Ministers of Ukraine approved the National Economic Strategy for the period up to 2030 [23]. Naturally, it did not take into account the realities of war. Currently, the content of the Strategy has not undergone any significant changes, which confirms the following: Strategy is not considered by the Government as the basis for post-war recovery. According to a study of post-war reconstruction initiatives conducted by Kyiv International Institute of Sociology, the Ukraine Recovery Plan has not acquired legal status, has not become a roadmap for reconstruction participants, is practically not applied, and is hardly mentioned by those involved in the recovery process [8]. The report "Evaluation of Ukraine's National Recovery Draft Plan", developed by experts from The Vienna Institute for International Economic Studies emphasizes that the Ukrainian government is overestimating the country's post-war economic potential. In this context, plans for industrial policy and the financial sector, as well as the distribution of post-war sectoral funding, need to be adjusted. At the same time, the desire to reduce the tax burden is hardly compatible with the post-war needs of the state budget related to reconstruction. In addition, the proposed decentralized approach raises the doubts about expected results. In most areas, reconstruction should take place at the national level. It is also necessary to eliminate duplication of areas, pay attention to the lack of coordination between different parts of the recovery plan, and the misidentification of priorities [24].

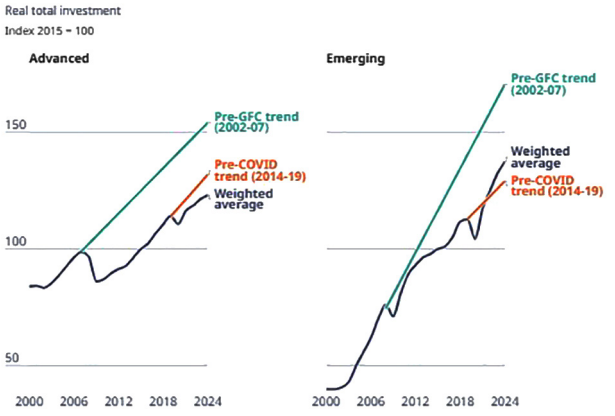

Fig. 1. Dynamics of real investment levels in developed economies

The implementation of the Ukraine Facility Plan [25] will undoubtedly be of great benefit to Ukraine, not only because its implementation will lead to international financial support, but also because it provides a list of reforms in line with European values and priorities. Therefore, the practical implementation of the measures of the Ukraine Facility Plan brings us closer to meeting the requirements for European integration and the implementation of modern trends in the economy, and in the future can ensure Ukraine's competitiveness in global markets. However, the final long-term plan for Ukraine's recovery proposed by international partners is unknown, particularly given that it will depend on the success of the reforms currently being implemented.

Building Ukraine's economy of tomorrow needs to start today. To do this, we definitely need to adapt to the demands of the times. Right now, the media is talking about a "Marshall Plan for Ukraine". In this context, it means help from other countries with post-war reconstruction, which basically just cash subsidies. This is a simplified model that ignores the structural problems of the post-war economic situation. It should be noted that the economic miracles of South Korea, Germany and Japan, did not happen because of the "Marshall Plan", but because they developed their own economic models tailored to the specifics of each country. At the same time, these models differed significantly. In Germany, it was a social market economy; in Japan, it was vertically integrated champion companies; and in South Korea, it was economic nationalism. The most important factor is the opening of sales markets. Therefore, in order to rebuild and strengthen our state, we need to independently choose the priorities of socio-economic development and develop our own economic plans. In our opinion, the main vector of the future plan lies in creating an economic foundation for Ukraine's accelerated European integration – it should focus on the multi-level reintegration of Ukraine and its participants into pan-European processes, supporting and promoting the reforms necessary to achieve Ukraine's goals as a candidate and dynamic acquisition of EU membership. It is necessary to urgently prepare a roadmap for this path, based on the best historical examples – South Korea's economic development plan. The main thing to start such work is political commitment, in other words, political will. We have little experience in this type of planning.

The experience of countries that have undergone post-war reconstruction shows that there is no universal approach to economic recovery after war. Each country has unique geopolitical, economic, and cultural characteristics that define the specifics of the reconstruction process. At the same time, there are common strategies that have been successfully used in various countries for the post-war recovery of their economies:

1) state anti-crisis regulation that promotes the restoration of national production and stimulates economic activity;

2) liberalization of the economy, which will open up markets and attract foreign investment;

3) creation of an export-oriented economy that promotes the expansion of foreign trade and increases exports;

4) restoration and development of high-tech sectors and industries that ensure innovation and increase the competitiveness of the economy;

5) attracting external financial resources that support the recovery process and stimulate the development of key industries.

As for the principles, they can be implemented from the Communiqué adopted by the European Commission, which provides four main guidelines for recovery [26]:

1) rebuilding the state, including infrastructure, housing, schools, medical services, as well as digital and energy sustainability in accordance with the latest European policies and standards;

2) continuing the modernization of the state and its institutions to ensure good governance and respect for the rule of law through administrative potential building and technical assistance (including at the local and regional levels);

3) implementing a regulatory and structural agenda to deepen Ukraine's social and economic integration with the EU;

4) supporting the recovery of Ukrainian society and economy with the aim of establishing strong and inclusive economic competitiveness, sustainable trade, private business development, and, at the same time, contributing to the digital and green transformation of the state.

These guidelines should be supplemented by a policy of national consolidation based on common goals and the mobilization of all resources.

Let us consider one of the key aspects of the country's reconstruction (Table 2).

Since local communities have a better understanding of the situation on the ground, the process of financing recovery projects should begin with requests from local authorities to central authorities, rather than the other way around. The role of the Cabinet of Ministers at this stage is to identify directions and develop new standards, make recommendations on opportunities for creating new economic regional clusters in the form of cooperation or specialization, and prioritize requests from local communities. Competition and the results of project implementation in different communities will help unleash the initiative of local activists and create public accountability.

Support for the reconstruction of Ukraine's economy and society involves helping its economy develop in the long term. Political will, support for reforms, and effective distribution of post-war investments will contribute to successful overall recovery. One method of stimulating reforms is to provide Ukraine and its businesses with unprecedented access to European markets and involvement in supply chains, up to and including EU membership. Economists at the European Bank for Reconstruction and Development argue that the appeal of accession lies in the fact that it provides Ukraine with a consensus on the ultimate goal of the long reform process and sets the direction. In this context, the Ukrainian government's willingness to modernize the economy and increase its competitive advantages will be decisive.

We consider it expedient to analyze the scientific, technological, and innovative capacity of the domestic economy.

For Ukraine, which seeks to strengthen its international position, a comprehensive analysis of innovation development indicators in international rankings is a key tool for shaping effective public policy in the field of science, technology, and innovation (STI). The scientific

Table 2

List of infrastructure's recovery stages

Stages	Recovery objects	Estimated timeframes
Infrastructure	Roads, bridges, communication systems, as well as critical urban infrastructure (power plants, pumping stations, modern water supply systems with biological water purification systems) and everything that ensures the city's viability	about 6 months
Residential	Construction of both multi-story residential buildings and private estates. The best method of modern construction is fast modular buildings made of modern composites that ensure optimal use of natural forces (wind, sun, rain) for energy-efficient solutions and heat/cooling conservation in homes without excessive electricity or heating costs	12–24 months
Social and domestic	Medical facilities, hospitals, maternity hospitals, kindergartens, schools, theaters	36 months
Industrial	Industrial facilities, warehouse space, and entertainment and retail infrastructure, which must be restored through private investment. At this stage, the task of local authorities, together with the national government, is to develop cooperation in building a new type of cluster economy. Many enterprises have moved to new regions, and new supply chains have been established. Therefore, the task of the authorities and businesses is to use existing resources and opportunities and provide everyone with equal conditions for integration and access to support and development opportunities	36–48 months
Cultural	Cultural heritage sites and historical monuments. This war should teach us to preserve our historical monuments. In its current form, this means creating a nationwide digital register of national heritage. Its mission is to control the creation of digital or analogue copies of cultural objects, develop the Ukrainian culture market and promote it worldwide	The longest stage can be implemented in 48–60 months

and innovative potential of the national economy is a critically important factor in ensuring sustainable development and the country's integration into the global economic space. According to the Global Innovation Index [27], Global Sustainable Competitiveness Index [28], Human Development Index [29], Global Startup Ecosystem Index [30], and Global Talent Competitiveness Index [31], which reflect the level of scientific, technological, and innovative spheres of Ukraine's economy, the results for 2019–2024 show improvement in certain areas (Fig. 2). In these circumstances, the human resources component of the indices is considered a powerful vector for Ukraine.

An analysis of Ukraine's international ratings in the pre-war period shows that the country had significant unrealized intellectual potential before the full-scale war. During 2022–2024, science, as the foundation of society's intellectual potential, practically ceased to perform its economic function. The crisis situation in the scientific and technological spheres is mainly due to chronic underfunding. Under these conditions, the science intensity of Ukraine's GDP (R&D expenditure from all sources as a percentage of GDP) is steadily declining: 0.70 % in 2013, 0.33 % in 2022–2023, and a slight increase to 0.37 % in 2024. Global experience confirms that science influences a country's economic development when funding for science exceeds 0.9 % of GDP. We believe that this is what reduces the significance of scientific knowledge for the national economy and society. Well-known strategies aimed at building an intellectual economy include the European Union's Lisbon Strategy, which provides for funding for science of at least 3 % of GDP.

It is worth noting the Digital Economy and Society Index (DESI), which assesses the digital competitiveness of EU countries and the effectiveness of digital technology use. On October 25, 2024, the Ministry of Digital Transformation of Ukraine approved methodological recommendations for the formation of index indicators [32]. Inclusion in the DESI will enable the realization of the state's digital competitiveness potential and promote Ukraine's integration into the EU's Single Digital Market.

Currently, the key problems hindering economic development include: limited access to public and private investment, an underdeveloped innovation ecosystem, the quality of intellectual capital and management, the quality of public institutions, political instability, imperfect legislation, insufficient state support for innovative

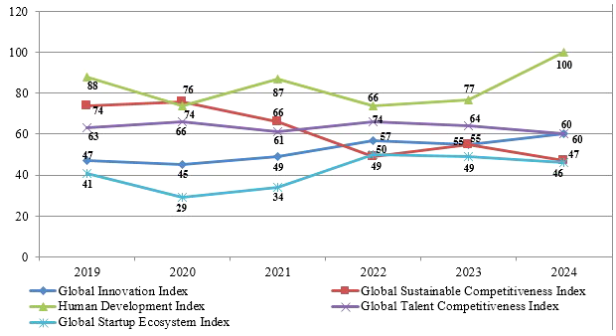

Fig. 2. Trends in Ukraine's positioning in global rankings reflecting the level of Ukraine's economic capacity in the field of STI

projects and their financing, ineffective and weak mechanisms for introducing innovations into the business sector and their further commercialization, and an inadequate level of cooperation between innovative companies and research institutes.

In this context, the country's strengths remain the level of education of its citizens; the percentage of people with higher education; the quality of education; the professional level of those engaged in business, creativity, and innovation; legislation in the field of e-commerce; the ability to adapt the legislative framework to new technologies; gender equality; the availability of mobile communications; ease of starting a business; e-democracy; availability of innovative technologies; the number of patent applications in the field of ICT and use of ICT. Ukraine's policy in the STI spheres does not pay sufficient attention to the development of new export-oriented technology businesses, cooperation between science, universities, and industry in the "knowledge triangle," or the development of innovative ecosystems.

The dynamics of domestic economic ratings allow us to conclude that there are shortcomings in policy and a lack of opportunities for breakthroughs in innovative development, both on the part of business and the state. The slow development of the national innovation system, coupled with weak links between education, science, and business in the context of intellectual potential utilization and innovation transfer, creates obstacles and has a significant destabilizing effect on GDP growth.

In our study, we will attempt to provide recommendations for Ukraine's political leadership and business elite on the creation of a comprehensive document in the context of post-war recovery based on the integration of structural transformation, digitalization, and human capital development as systemic determinants of social and economic growth.

Activating Ukraine's potential in the context of economic recovery is a key factor in ensuring sustainable socio-economic development.

Ukraine's recovery is viewed from the perspective of a paradigm shift in our state as a renewal together with our global partners in accordance with regional and parametric principles. This involves state support for sectoral development priorities, as well as the development of infrastructure and education systems, and the intensification of R&D to obtain innovative products of domestic production and technologies for civil and defense purposes. Development should be carried out according to an accelerated plan aimed at reducing the gap with developed countries. Taking into account the actual destruction of domestic science and the lack of ready-to-implement innovative developments, it must be carried out on the basis of borrowing foreign technologies and organizing licensed production. At the same time, domestic science must develop and generate its own developments, the implementation of which will be necessary after the completion of the catch-up stage and the exhaustion of growth potential through technological borrowing.

In this regard, we propose measures to activate Ukraine's potential in the context of economic recovery (Table 3).

The reconstruction of Ukraine depends on the mobilization of human resources, the promotion of social

Table 3

Strategic measures to restore Ukraine's economic potential

Topics	Measures	Priorities
Economic analysis and strategic scenario planning	Conducting an analysis of the state of the economy and determining economic scenarios with an assessment of GDP and losses in various sectors. Developing investment policy, determining directions and priorities for attracting investment in order to create economic added value	Understanding the current economic situation, creating a basis for effective planning and resource mobilization
Government procurement and production incentives	Establishment of a list of enterprises and industries that require state orders to ensure the supply of essential goods and import substitution. Formulation of a program to stimulate production and define clear mechanisms for obtaining state orders and selling products. Introduction of a public-private partnership program in parallel with compensation for interest on loans. Focusing industry on mobilization orders for the needs of the army and restoring distribution chains	Supporting domestic production, ensuring critical goods, organizing employment
Foreign trade and international relations	Intensifying discussions and concluding contracts with foreign countries on the export of Ukrainian goods. Developing initiatives to facilitate the conditions for Ukrainians living abroad and their return home	Expanding export opportunities, supporting citizens abroad, and returning skilled personnel
Support for SMEs	Ensuring a favorable tax and administrative environment for SMEs, improving conditions through the digitization of services	Favorable conditions for the development of SMEs, increasing their competitive advantages
Security and defense capabilities	Increased defense spending (say, 8 % of GDP instead of 5 %) and new security guarantees, integrating Ukraine into the European community	Ensuring defense capability and national security
Social support and human resource development	Developing a program to support internally displaced persons: providing jobs, housing, and rebuilding destroyed homes. Formulating policies to identify and retain talent, creating effective mechanisms to incentivize highly qualified specialists	Social stability, human resource development

cohesion, and the resolution of inclusion issues in order to unlock the potential of all citizens in the country and abroad, especially women and young people. The main challenges will include, among other things, the reintegration of internally displaced persons and refugees into civilian life.

The return of our citizens from abroad is a priority for the preservation of the Ukrainian nation. There is reason to believe that the country's democratic progress, socio-economic growth, the fight against corruption and legal nihilism, and decent wages will encourage most citizens to return. The support of allies also gives cause for hope. Based on the results of recent surveys, we estimate that 1.1–1.5 million refugees will return to Ukraine in 2025–2026, provided that the fighting subsides and rocket/drone strikes cease. However, taking into account the demographic structure of refugees outside Ukraine, only 0.3–0.45 million will participate in the labor market. Therefore, the labor shortage will remain significant and, together with the real reduction of fiscal incentives will slow down the pace of economic recovery. Cooperation between civil society and the Ukrainian diaspora is vital in the context of preserving and developing the country's human capital for sustainable reconstruction.

Accordingly, all this requires a completely different quality of management and decision-making. As we can see, the tasks facing the government and Ukrainian society are extremely complex. To accomplish them, tens of thousands of the most effective managers are needed.

The recovery of the Ukrainian economy in the post-war period will be based on the effective use of intellectual potential, the development of human capital, education, and scientific research, which form the foundation of the knowledge economy. The priority is to support high-tech industries and implement the results of intellectual activity in production processes, which will ensure the accelerated modernization of the country. At the same time, we propose a set of organizational, regulatory, and managerial measures for the implementation of state policy in the field of STI (Table 4).

Thus, from the perspective of the strategic vision of Ukraine's post-war revival, innovation policy should play the role of a driver of economy transformation and a sustainable society of the *21st* century. In the context of addressing the ambitious goals embodied in the Sustainable Development Goals, it is necessary to build a new framework for innovation policy aimed at transformational change based on a critical analysis of gaps in innovation policy management, as well as obstacles to scientific research and business innovation in the areas most important for reconstruction.

An important prerequisite for Ukraine's post-war recovery is large-scale financial support from the international community aimed at stabilizing the macroeconomic situation and ensuring long-term economic growth. External support for Ukraine in the form of investments, loans, grants, and international cooperation is a decisive factor in economic recovery and sustainability. Investments contribute to the modernization of infrastructure and production, loans ensure the implementation of recovery projects and stimulate reforms, grants support the development of human capital and innovation, and international cooperation integrates Ukraine into global production and innovation chains. Decentralizing funding and focusing on inno-

Table 4

System of measures for organizing and managing the national economy in the field of STI

Themes	Measures	Expected results
Institutional development and policy management	1. Granting the National Council for Scientific and Technological Development advisory and supervisory powers, including participation in the implementation of state policy in the field of STI; ensuring multilateral dialogue between state institutions, scientific institutions, business, and other stakeholders; developing and coordinating comprehensive policy decisions in this area and integrating them into other areas of state policy. 2. Appointing the Ministry of Digital Transformation as the secretariat of the Republican Council for Science and Technology Development, delegating to it the task of ensuring effective management of the policy cycle in this area - from development to performance evaluation, eliminating potential conflicts of interest, and preventing duplication of functions in the system of state regulation of scientific and technological activities. 3. Reviewing and refining the functional distribution of powers between the main actors of the national innovation system involved in the implementation of policies, strategic priorities, and innovation development programs, taking into account the principles of clear division of responsibilities, ensuring transparency of management processes, and improving the effectiveness of coordination mechanisms. 4. Developing a comprehensive state policy in the field of STI for the coming years and ensuring the active participation of stakeholders in the national innovation system, primarily research centers, higher education institutions, business structures, representatives of civil society, and innovation infrastructure. 5. Ensuring the effective coordination of innovation projects in the public sector by building and implementing coordinated mechanisms for managing, planning, and monitoring initiatives implemented by various ministries and government agencies	Improved coordination and management of science and technology development, active stakeholder participation, elimination of duplication of functions
Reform of scientific institutions and infrastructure development	1. Systemic strengthening of the National Academy of Sciences through the implementation of a comprehensive reform program covering the modernization of the organizational structure, improvement of management processes, development of human resources, integration of advanced technologies, and strengthening of the financial and infrastructure base. 2. Creating and supporting a balanced mix of policies in the field of STI, as well as conducting a systematic assessment and improvement of existing tools and infrastructures (technology parks, IT parks, research institutes, innovation centers, etc.) to enhance their effectiveness and achieve a lasting impact. 3. Promoting the development of sustainable social and economic infrastructures that create favorable conditions for innovation, support sustainable economic development, social integration, and the well-being of citizens, and contribute to the long-term economic stability of regions	Enhanced scientific potential, modernized infrastructure, favorable conditions for innovation, sustainable social development
Funding and economic incentives	1. Creating and applying public policy tools in the field of STI that are not limited to supporting technology companies and are aimed at stimulating the activities of small and medium-sized enterprises (SMEs) and grassroots innovators in order to attract new participants to the innovation process. 2. Ensuring diversification of funding mechanisms to support STI activities for different target groups, involving higher education institutions, research institutions, SMEs, start-ups, and other participants in the innovation process; approving a regulatory framework that establishes procedures for providing funding and criteria for selecting its beneficiaries. 3. Using public procurement to encourage R&D and integrating new technologies into the business sector; organizing cooperation with scientists and research centers to develop and apply innovations in practice	Expansion of the circle of innovation actors, stimulation of SMEs development, increase in investment and R&D efficiency
Regulatory and legal support and monitoring	1. Improving current legislation in the field of STI; simplifying administrative procedures for state administration and support in this area; creating mechanisms for monitoring and evaluating the effectiveness of regulatory and legal regulation in the scientific and technological spheres. 2. Ensuring the integration of systems for monitoring and evaluating policies and policy measures in the field of STI as an integral part of the policy cycle and ensuring that these systems comply with international best practices in the field of STI management; introducing regular reviews and improving mechanisms for evaluating policy effectiveness	Creation of a favorable environment for innovation, effective monitoring of policy results, best management practices

End of Table 4

Themes	Measures	Expected results
Regional development and local innovation ecosystems	1. Implementing the measures aimed at forming flexible regional and local innovation ecosystems, ensuring their integration with national and global innovation systems by supporting partnerships between stakeholders, implementing joint and interdisciplinary projects, and exchanging knowledge and technologies. 2. Supporting the process of forming innovation councils in the regions to coordinate and stimulate the development of STI at the regional level; developing and implementing smart specialization strategies by the regions aimed at increasing the innovative potential of the regions; monitoring the consistency of these councils' actions with state policy in the field of STI	Increasing regional innovation capacity, integrating local systems into national and global ones, developing partnerships, and sharing knowledge
Support for participants in the innovation support system and knowledge exchange	1. Creating a single window for informing and advising researchers, entrepreneurs, and private sector entities on state policy and measures to support STI; introducing a feedback system to optimize the work of the single window and adapt support to user needs. 2. Encouraging the creation and development of innovative intermediaries and providers of specialized services that facilitate the effective transfer and implementation of scientific knowledge, technological developments, and innovative solutions. 3. Facilitating the systematic implementation of scientific, technical, and innovative initiatives by developing procedures, processes, and criteria for their selection, implementation, monitoring, evaluation of effectiveness, and scaling up of pilot projects in the field of STI	Increasing the availability of state support, developing mechanisms for knowledge and technology transfer, and increasing the scale and effectiveness of innovation projects

vative, digital, and green projects will increase the effectiveness of reconstruction and ensure the long-term sustainability of transformation processes. Important tools include the Ukraine Facility, as well as specialized reconstruction funds, investment guarantee and insurance mechanisms aimed at reducing risks for businesses. In particular, under the Ukraine Facility program [25], the EU plans to attract more than €50 billion by 2027, which will be used to finance the state budget and stimulate investment. An even more ambitious project is the US$130 billion project aimed at energy self-sufficiency and participation in the Green Deal. In fact, all the relevant sub-items of this project are directly related to the development and dissemination of innovations in the energy sector.

Conclusions. 1. The war in Ukraine has been a catalyst for deep political, economic, and social transformations, creating a high level of uncertainty for both domestic and global development. Ukraine needs its own recovery model that takes into account its geopolitical and cultural characteristics, but at the same time integrates the country into the European economic space. Given Ukraine's status as a candidate for EU membership, the reconstruction process must take into account the main trends in EU policy – the "green course", the circular economy, inclusion, and the digitization of all spheres.

2. The experience of post-war transformations in other countries shows that there is no universal model for reconstruction. The process of Ukraine's post-war recovery is closely linked to its economic, geopolitical, and cultural characteristics. At the same time, important tools include deregulation, export promotion, development of high-tech sectors, self-sufficiency in the energy sector, integration into international markets, and the creation of a significant number of jobs. In this context, the analysis of macroeconomic indicators confirms that Ukraine will face low economic growth, high inflation, and debt burdens in the coming years. Overcoming these challenges is only possible through structural economic restructuring and the attraction of external financial resources.

3. The vectors for strengthening Ukraine's innovative and intellectual development are the transformation of the state into a high-tech IT country, the integration of science, education, and innovative practices, as well as the improvement of scientific and technological competence and the mobility of human resources. Key processes include the intellectualization of production, the sustainable innovative development of industries, and the introduction of the concept of continuous education in professional activities. Production is focused on environmentally friendly technologies, and the development of IT, telecommunications, and fintech contributes to the formation of an integrated global market for goods, capital, and labor.

4. Ukraine must secure a leading position among global leaders in strategically important areas of scientific and technological development, including intellectual technologies, innovative materials, high-performance systems for the real and socio-cultural sectors, and interdisciplinary scientific and technological developments. The rapid growth of the high-tech sector should be a priority of the national strategy, ensuring competitive advantages, growth in investment flows, and the development of knowledge-intensive goods and services, and, consequently, social stability and sustainable development of society The transition to a dynamic path of innovative development requires the intellectualisation and digital industrialisation of the economy as components of the national model of innovative progress. The priority areas are breakthrough areas: the introduction of advanced digital technologies, the development of industrial systems to strengthen global competitiveness, and socio-humanitarian technologies for the effective use of society's intellectual potential. The implementation of these tasks is based on independent state thinking, historical responsibility, and a strategic vision of the future.

5. Utilizing the unique innovative potential of Ukraine's defense industry, which is driven by scientists and specialists from design bureaus and R&D institutions, is one of the main directions of the country's eco-

nomic development. In this context, the world-renowned domestic scientific schools in the defense-industrial sector are a unique intellectual asset that the state must effectively use for its economic development. The key principles for reforming the domestic defense-industrial complex in order to transform it into a high-tech, science-intensive sector of the economy are as follows: combining the scientific potential of the state with the capabilities of the defense-industrial complex, selecting scientifically sound priorities for its technological development, and concentrating resources on priority areas of development.

References.

1. Cammack, P., & Gimenez, M.E. (2024). The permanent global crisis of working-class social reproduction: ten propositions. *Global Political Economy*, *20*(20), 1-16. https://doi.org/10.1332/26352257Y20-24D000000025

2. Égert, B., & De la Maisonneuve, C. (2024). The impact of the war on human capital and productivity in Ukraine. *Policy Studies*, *45*(3-4), 282-292. https://doi.org/10.1080/01442872.2023.2288687

3. Danylyshyn, B. M. (2023). Ensuring Macroeconomic Stability under the Martial Law. *Science and Innovation*, *19*(1), 3-19. https://doi.org/10.15407/scine19.01.003

4. Melnyk, L., Sherstiuk, R., Malevski, E., Marynenko, N., & Pavlykivska, O. (2021). Models of evaluating the impact of changes technological and industrial areas in enterprise development. *Amazonia Investiga*, *10*(40), 253-264. https://doi.org/10.34069/AI/2021.40.04.25

5. Ostrovska, H., Andrushkiv, B., Tsikh, H., Boichyk, I., & Stavnycha, N. (2022). Formation of priorities for the development of intellectual potential in the conditions of establishing a knowledge-based economy. *Financial and credit activities: problems of theory and practice*, *1*(42), 415-427. https://doi.org/10.55643/fcaptp.1.42.2022.3561

6. Grytsenko, A., Bilorus, O., Burlay, T., Podliesna, V., & Borzenko, O. (2024). Ukraine's Economy: Resilience Under War and Challenges for Post-War Recovery. *Science and Innovation*, *20*(5), 16-34. https://doi.org/10.15407/scine20.05.016

7. Kindzerskyi, Yu. (2023). Industrial policy for economic development: To the problem of its justifi cation from the standpoint of world experience and in the context of the need for use during the war period and post-war recovery in Ukraine. *Economic Analysis*, *33*, 110-129. https://doi.org/10.35774/econa2023.03.110

8. Yanchuk, A. O. (2024). Economic strategy of post-war recovery as a basis for ensuring national interests. *Scientific notes of Vernadsky TSU*, *35*(74), 5, 80-89. https://doi.org/10.32782/tnu-2707-0581/2024.5/14

9. Prokhorova, V., Kravchenko, O., Shkurenko, O., Babichev, A., & Polivantsev, A. (2025). Study of priority directions of economic recovery of Ukraine based on scenario modelling. *Economics of Development*, *24*(1), 26-34. https://doi.org/10.63341/econ/1.2025.26

10. Kholiavko, N. (2025). Towards a sustainable post-war recovery: the role of universities in Ukraine's economic, environmental, and social transformation. *Baltic Journal of Economic Studies, 11*(3), 146-153. https://doi.org/10.30525/2256-0742/2025-11-3-146-153

11. Petrukha, N., Fedirko, N., Piatnychuk, I., Lyashenko, P., & Plakhotnii, D. (2025). Economic Rebuilding Frameworks in Post-War States: Takeaways for Ukraine. *International Journal of Economic* Sciences, *14*(1), 196-210. https://doi.org/10.31181/ijes1412025196

12. Heyets, V. (2023). Formation of the profi le of strategically important industrial activity types in Ukraine (an outlook). *Economy of Ukraine*, *66*(09(742)), 3-29. https://doi.org/10.15407/economyukr.2023.09.003

13. Ishchuk, S., Sozanskyy, L., Liahovska, O., Koval, L., & Ryvak, N. (2022). Regional functioning specifics of the Ukrainian economy industrial sector in conditions of development instability. *Financial and credit activity: problems of theory and practice*, *6*(47), 253-265. https://doi.org/10.55643/fcaptp.6.47.2022.3932

14. Oleshko, A., Novikov, D., & Petrivskyi, O. (2023). Business corporate social responsibility in the economic recovery of Ukraine. *Baltic Journal of Economic Studies*, *9*(3), 162-166. https://doi.org/10.30525/2256-0742/2023-9-3-162-166

15. Ostrovska, H., Tsikh, H., Strutynska, I., Kinash, I., & Pietukhova, O. (2021). Building an effective model of intelligent entrepreneurship development in digital economy. *Eastern-European Journal of Enterprise Technologies*, *6*(13(114)), 49-59. https://doi.org/10.15587/1729-4061.2021.244916

16. Ostrovska, H. Y., Sherstiuk, R. P., Tsikh, H. V., Ivata, V. V., & Tur, O. V. (2025). Talent management as an innovative strategy for developing the enterprise's intellectual potential in the context of information and digital reality. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*, (1), 147-156. https://doi.org/10.33271/nvngu/2025-1/147

17. Bret, C. (2024). *Two Years of War in Ukraine: What Impact on the EU Geopolitical Strategy? Policy Brief*. Jacques Delors Institute. Paris. 27. Retrieved from https://institutdelors.eu/content/uploads/2025/04/PB_240220_2_ans_guerre_ukraine_Bret_EN_1-1.pdf

18. Cirella, G. T. (Ed) (2024). *Handbook on Post-War Reconstruction and Development Economics of Ukraine: Catalyzing Progress*. Springer Nature Switzerland, Cham. ISBN: 978-3-031-48735-4.

19. *World Economic Outlook. A Critical Juncture amid Policy Shifts. April 2025* (2025). Retrieved from https://www.imf.org/en/Publications/WEO/Issues/2025/04/22/world-economic-outlook-april-2025

20. *Economy of Ukraine 2025–2026. Dragon Capital Forecasts.* Retrieved from https://biz.nv.ua/ukr/economics/ekonomika-ukrajini-2025-2026-prognozi-dragon-capital

21. OECD (2022). OECD *Economic Outlook, Interim Report March 2022: Economic and Social Impacts and Policy Implications of the War in Ukraine*. https://doi.org/10.1787/4181d61b-en

22. Dlugosch, D., Glanville, M., Hooley, J., Ozturk, F. & Westmore, B. (2025), Understanding the weakness in business investment: A cross-country analysis. *OECD Economics Department Working Papers*, No. 1836, OECD Publishing, Paris. https://doi.org/10.1787/89bd437d-en

23. Cabinet of Ministers of Ukraine (2021). *Resolution No. 179 of March 3, 2021, On the Approval of the National Economic Strategy for the Period until 2030.* Retrieved from https://zakon.rada.gov.ua/laws/show/179-2021-%D0%BF#Text

24. Bogdan, T., Landesmann, M., & Grieveson, R. (2023). Evaluation of Ukraine's National Recovery Draft Plan. *Policy Notes and Reports, 61*. The Vienna Institute for International Economic Studies. Retrieved from https://wiiw.ac.at/evaluation-of-ukraine-s-national-recovery-draft-plandlp-6405.pdf

25. Ministry of Economy of Ukraine (2024). *Ukraine Facility Plan 2024. Retrieved from https://www.ukrainefacility.me.gov.ua/Ministry of Economy of Ukraine. (2024). Ukraine Facility Plan 2024.* Retrieved from https://www.ukrainefacility.me.gov.ua/

26. European Commission (2022). *Ukraine relief and reconstruction: Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions*. Retrieved from https://commission.europa.eu/system/files/2022-05/ukraine-relief-reconstruction_en.pdf

27. World Intellectual Property Organization (WIPO) (2024). *The Global Innovation Index 2024: Unlocking the promise of social entrepreneurship*. Geneva: WIPO. https://doi.org/10.34667/tind.50062

28. SolAbility (2024). *Global Sustainable Competitiveness Index 2024.* Retrieved from https://solability.com/download/the-global-sustainable-competitiveness-index-2024

29. United Nations Development Programme (UNDP) (2024). *Human Development Report 2023–24.* Retrieved from https://hdr.undp.org/content/human-development-report-2023-24

30. StartupBlink (2024). *Global Startup Ecosystem Index 2024: Ukraine in the Top 50.* Retrieved from https://usf.com.ua/en/global-startup-ecosystem-index-2024-ukraine-in-the-top-50/

31. INSEAD (2024). *Global Talent Competitiveness Index 2024.* Retrieved from https://www.insead.edu/global-talent-competitiveness-indexм

32. Cabinet of Ministers of Ukraine (2023). *Order on approval of the list of indicators of the Digital Economy and Society Index (DESI), No. 774-r. Kyiv*. Retrieved from https://zakon.rada.gov.ua/laws/show/774-2023-%D1%80#Text

Макроекономічні виклики й глобальний контекст повоєнного відновлення України

Г. Й. Островська[*1], *Л. М. Мельник*[1], *І. А. Ясінецька*[2], *М. С. Михайлов*[3], *С. В. Шевчук*[3]

1 – Тернопільський національний технічний університет імені Івана Пулюя, м. Тернопіль, Україна

2 – Заклад вищої освіти «Подільський державний університет», м. Кам'янець-Подільський, Україна

3 – Національний університет кораблебудування імені адмірала Макарова, м. Миколаїв, Україна

* Автор-кореспондент e-mail: h.ostrovska@gmail.com

Мета. Комплексне дослідження макроекономічних викликів повоєнного відновлення України й розроблення науково-практичних рекомендацій для забезпечення суспільно-економічного розвитку на засадах інтелектуалізації, інноваційного поступу та європейської інтеграції.

Методика. Дослідження базується на техно-соціо-економічній парадигмі економічного розвитку. Для досягнення цілей дослідження застосовані методи порівняльного, системного, структурно-логічного, економіко-статистичного й критичного аналізу, групування та логічного узагальнення.

Результати. Проаналізовані глобальні політичні, соціальні й економічні наслідки російсько-української війни для України та світової економіки, окреслені сценарії розвитку макроекономічних показників у середньо- й довгостроковому періоді. Проведено порівняльний аналіз досвіду країн, що ефективно впровадили повоєнні трансформаційні стратегії, і виокремлені універсальні принципи структурного оновлення економіки, засновані на консолідації нації навколо спільних цілей і мобілізації всіх ресурсів. Досліджено інноваційний і науково-технологічний потенціал України, визначені її позиції у світових рейтингах і можливості інтегрування у єдину європейську економічну й науково-технологічну спільноту. Доведено, що визначальною передумовою сталого розвитку є інтелектуалізація економіки, що передбачає синергію науково-освітніх, інноваційних і культурних складових суспільного потенціалу. Надані пропозиції щодо активізації потенціалу України. Оцінене значення зовнішньої підтримки для забезпечення стійкості трансформаційних процесів. Розроблена система організаційних, нормативних та управлінських заходів, спрямованих на впровадження державної політики у сегменті науки, технологічного прогресу й інновацій.

Наукова новизна. Системно поєднано аналіз глобальних політичних та економічних наслідків війни з розробкою моделі відновлення, що базується не лише на інфраструктурній і фінансовій реконструкції, але й на формуванні економіки знань. Запропоновано інтегрувати до стратегії відбудови інструменти розвитку людських ресурсів, передових цифрових технологій та інноваційних екосистем як довгострокових драйверів економічного поступу.

Практична значимість. Отримані результати дослідження мають практичне значення для розробки концепцій державної політики, програм модернізації й формування комплексної стратегії інтелектуального розвитку України в умовах післявоєнної реконструкції.

Ключові слова: *повоєнне відновлення, інтелектуалізація економіки, техноінноваційна політика, технологізація, євроінтеграція*

The manuscript was submitted 03.09.25.