

UDC 338.054.23:334.02
JEL: C61, E61, E69

BRANCH STRUCTURE OF THE NATIONAL ECONOMY AND DIRECTIONS OF ITS OPTIMIZATION IN THE POST-WAR PERIOD

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Received: 18/05/2023

Accepted: 04/09/2023

DOI:10.31520/2616-7107/2023.7.3-1

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Introduction. The war in Ukraine caused significant damage to the economy, but also provided many new opportunities, made adjustments to the paradigm of post-war economic development, in particular, in view of the need to rebuild industries and ensure the reliability of their operation in the future, the variability of logistics supply routes. The complexity of post-war reconstruction is aggravated by the fact that Ukraine must modernize the defence industry and, at the same time, reduce the country's budget deficit, which requires an increase in budget revenues. The radical changes necessary for this will require optimization of the sectoral structure of the country's economy.

Aim and tasks. The purpose of the study is to create a methodological approach to the sectoral optimization of the national economy in the post-war period and, for this, to develop a structural-mathematical model, determine priority areas of development of branches, and mechanisms of structural optimization of branch development.

Results. A methodological approach to sectoral optimization of the national economy in the post-war period was developed, in which a structural-mathematical model was implemented. To optimize the industry structure, the use of a "trigger" mechanism is proposed: when the stimulation of the development of individual projects in high-tech industries leads to the rapid development of adjacent sectors of the economy, The need for comprehensive use of intensive and extensive mechanisms of post-war economic restructuring is indicated due to the specifics of the development of industries, the significant industry differentiation of damages and losses, and the need for expenses for the transformation and restructuring of industries. A diversification approach with the selection of short-, medium-, and long-term industry strategies was proposed.

Conclusions. The developed mathematical model allows for the combination of sectoral optimization strategies of the economy and optimization coordination of sectoral strategies at the national level. An assessment of the costs of reconstruction and industry transformation was carried out, and the application of internal financing mechanisms, in particular, an increase in the level of added value, was substantiated. The mathematical model illustrates the possibility of maximizing the added value. Considering this, directions for industry optimization and prerequisites for restoration, reconstruction, and optimization of the industry structure in the post-war period are proposed. The given areas of industry-wide impact of the trigger mechanism indicate the prospects of its introduction.

Keywords: branch structure, post-war period, strategy differentiation, trigger principle, structural-mathematical model.

1. Introduction.

The long-lasting war in Ukraine caused the destruction of industrial enterprises, burned agricultural lands, destroyed infrastructure, and, as a result, significant losses to the economy, but also provided many new opportunities. For example, the closure of coal mines, which burdened the country's economy because they were unprofitable or on the verge of break-even, could lead to unemployment, which is catastrophic for city-forming enterprises. This affects the industry structure because it reduces the importance of the extractive industry and the paradigm of economic development (Qu and Mardani, 2023). However, large-scale military actions made significant adjustments to the development paradigm of the post-war economy of Ukraine, particularly because of the need to ensure the reliability of infrastructure in view of the need for differentiated deployment of technological capacities and warehouses, fragmentation of technological systems, and creation of transport networks with a significant level of variability. Military, metallurgical, chemical, and other industries require significant structural transformations. Construction standards and environmental requirements for the restoration of industrial enterprises should be revised as new risks and significant threats have emerged that require a change in views on technological and environmental safety (Kaletnik and Lutkovska, 2021).

After the end of the intensive phase of hostilities, the Ukrainian economy will not recover quickly (Pavlov et al., 2022; Soroka and Ovcharenko, 2022; Kucherenko, 2023). This stage will be long and difficult not only because of the need to restore the destroyed objects but also because of the need for a fundamental restructuring of industries, modernization of the economy to a competitive level with neighboring European countries, inclusion of industry structures in chains of added value in the global market, etc. The complexity of the tasks of post-war reconstruction is increased by the fact that Ukraine must maintain a strong army, significantly modernize the defence industry while simultaneously reducing the budget deficit, promote the development of a democratic society, and successfully integrate into the EU, which will also require additional efforts and resources.

The radical changes necessary for this will require optimization of the sectoral structure of the country's economy.

2. Literature review.

Issues of economic recovery in the post-war period have been considered in scientific studies. Thus, Ivanov (2019), Yakushik (2021) and Gochua and Gibradze (2022) analyzed economic recovery programs after the end of hostilities. These programs were designed for a period of two to 20 years, and this approach was used in the present study.

Unfortunately, the increase in the intensity of hostilities and the amount of destruction in subsequent periods required the introduction of significant corrections in Ivanov's proposal (2019).

An assessment of the amount of destruction caused after February 2022, a forecast and an analysis of the features of economic reform in the post-war period are generally proposed by Khmarska et al. (2022). Detailed forecasts of industry losses and recovery are presented in Deineko et al. (2022), which are used in this study.

Irtysheva et al. (2022) identified bottlenecks in the economy that led to significant losses after the start of a full-scale war and indicated the need for economic restructuring in the postwar period to avoid the appearance of such bottlenecks in the future.

Amosha et al. (2023) stated that "the creation of European-style industrial and household infrastructure can be the formula of the country's post-war recovery strategy". Amosha and Amosha (2023) interpret the concept of "infrastructure" in a broad sense, which includes innovation, transit, and social infrastructure as components. Under this interpretation, the proposed formula for the infrastructure restoration strategy assumes a generalizing character.

Based on the experience of structural changes in European countries (Kindzerskyi, 2022), step-by-step strategies for the reindustrialization of Ukraine are proposed. Zveryakov (2022) states that reindustrialization should begin with sectors of the economy that would extend the raw material processing chains and promote import substitution.

Zveryakov (2022) also indicated that the sectoral restructuring of the economy in the post-war period should contribute to the formation of national chains of added value, for which it is necessary to increase the rate of capital accumulation. In a study by Borodina and Lyashenko (2022), recovery of Ukraine's economy is proposed in three stages: recovery of critical infrastructure, recovery of the economy as a whole, and stable growth. From our point of view, the above needs to be clarified and the tasks of economic recovery and restructuring need to be highlighted. On the basis of the analysis of the dynamics of investments in fixed capital, Borodina and Lyashenko (2022) indicate that the investment the resource may not be enough to restore the economy and state that the resources should come according to the "Marshall plan" for Ukraine.

Arefieva and Antonenko (2023) point to sectoral differences in war damage and losses and analyzed significant differences between sectors in their reconstruction needs. In contrast to other studies, it is stated that the needs for industrial reconstruction have an insignificant level of correlation with losses during military operations and are caused, first of all, by the need for radical restructuring of industries, which is specified and supplemented in the presented study.

Researchers in all the above-mentioned scientific works rely on the mandatory use of foreign aid in post-war reconstruction or directly indicate the need for a "Marshall Plan" for Ukraine. Redziuk (2022) and Kucherenko (2023) argue that a detailed analysis of the IMF memorandum proves that hopes for free foreign aid are exaggerated, and Ukraine should rely mainly on its own resources. Different mechanisms of post-war recovery of economic activity have been proposed; for example, Kosovych (2022) analyzed the features of the introduction of innovative development of industries after the war. Bioko and Bioko (2023) proposed the use of industrial parks as a mechanism to attract investments in the post-war period. Izha and Pakhomova (2022) proposed an innovative restructuring of the public management of territories as the main mechanism for the recovery of the economy in the post-war period, which will help to avoid the mono-industry development of the regions.

Khatser (2022) indicates the need to coordinate sectoral and territorial plans for the recovery of Ukraine. Ostrovska et al. (2021) and Kaletnik and Lutkovska (2021) proposed an expansion of the scope of public-private partnerships to acquire financial and other resources for post-war reconstruction. Redziuk Y. (2022), pointing to important sectors in post-war reconstruction: "critical infrastructure, public life support, social infrastructure, transport network", note the importance for investment promotion of the implementation of the risk insurance mechanism, in particular, military risks.

Okhrimenko et al. (2022) by comparing the strategies of other countries proves the need for reindustrialization of the country in the post-war period, and for this purpose a "structural-logical scheme of the economic strategy of Ukraine" is proposed, which is based on a systematic combination of defining the goals of sectoral restructuring, taking into account dynamic changes in conditions and numerous mechanisms for implementing these strategies. This confirms the opinion of the impossibility of singling out one of the economic mechanisms and identifying it as the main one; and second, the limited application in Ukrainian realities of the experience of crisis management of past periods (Kinash et al., 2019; Humenyuk, 2022; Shapran, 2022; Zayed et al., 2022).

A review of the literature indicates the need to create a methodological approach to the sectoral optimization of the national economy in the post-war period, to detail sectoral development strategies, and to determine the priority directions for the optimization of sectoral development.

3. Methodology.

Using the method of induction and deduction, the development of a methodological approach to the sectoral optimization of the national economy in the post-war period is fragmented into sub-tasks, among which the task of developing a structural-mathematical model of sectoral optimization is singled out.

The structural-mathematical model of industry optimization in the post-war period can be presented as a solution to the problem of determining the optimal multi-objective solution of the hypercube scan.

This formulation of the problem is due to the fact that the optimization model of a multi-industry economy cannot be based on the search for the optimum of only one objective function. There are several such functions. In particular, further consideration is given to the optimization of the value-added function, which, considering structural intra-industry and inter-industry interactions, can be represented as:

$$\Delta S = \bigcup_{j=1}^k \left\| \begin{array}{l} \sum_1^n \Delta S_{i1} \rightarrow \max \\ \dots \\ \sum_1^n \Delta S_{ij} \rightarrow \max \end{array} \right\| \rightarrow \text{opt} \quad (1)$$

where, ΔS – total added value; ΔS_{ij} – added value at each stage of industry production; $i = 1 \dots n$ – industry stage index. $j = 1 \dots z$ – index of inter-branch interaction.

When performing multi-objective optimization, equation (1) can be represented as one of the cells of a hypercube. Then the task of finding the optimal multi-objective solution for optimizing the sectoral structure of the economy can be reduced to the well-known task of scanning the hypercube using the Peano method:

$$\text{opt} \{ \varphi(y) \}, y \in D, \mu_k(y) \leq 0 \quad (2)$$

where, φ is the function of cross-industry optimization; y is the function of intra-industry optimization; D is the domain of the function, μ_k is the constraint, $k=1 \dots m$ is the constraint index.

The proposed model combines the strategy of sectoral optimization of the economy and optimization coordination of sectoral strategies at the national level.

Using the method of analysis and synthesis, the need for diversification and sectoral differentiation of strategies for structural reconstruction and recovery in the post-war period is indicated. The method of critical analysis made it possible to determine the priority directions of development of industries and to propose mechanisms of structural optimization of industry development.

4. Aim and tasks.

The purpose of the study is to create a methodological approach to sectoral optimization of the national economy in the post-war period.

This determines the formulation and solution of the following tasks:

- development of a structural-mathematical model of industry optimization in the post-war period;
- research on diversification and sectoral differentiation of strategies for structural restructuring and recovery of the country's economy in the post-war period;
- determination of priority areas for the development of branches and mechanisms for structural optimization of branch development.

5. Results.

Before the beginning of the phase of intensive hostilities in February 2022, Ukraine's economy had already begun to undergo sectoral transformation. However, this transformation was mainly exogenous in nature, which led to an increase in the volume of production in the agrarian sector with a low level of processing. Even for industrial production, the processing industry at that time made up only 65% of the total volume of production, which is less than 1.38 times that of EU countries. The exogenous development of the extractive industry led to it occupying a significant share of the total volume of production (14.3%), which is more than 14 times the similar indicator for EU countries with an exceptionally low level of processing of extracted minerals. This has led to an increase in the share of raw materials in exports. To optimize the industry structure in the post-war period, both intensive and extensive mechanisms of economic policy should be used based on the system of public orders, leasing at low rates, preferences for promising industries and enterprises that implement innovative projects, start-up subsidies to small- and medium-sized processing enterprises, and stimulation of corporate cooperation among large, medium, and small businesses.

The need for the integrated use of intensive and extensive mechanisms points to the main problem of the structural restructuring of the economy in the postwar period. On the one hand, it will be necessary to urgently increase the efficiency of traditional sectors of the economy, which, for a long time, have mainly used intensive development mechanisms. On the other hand, it will be necessary to maximally promote sectors that provide post-industrial development of the country and use intensive mechanisms. The significant difference between specified tasks and limited resources calls for significant diversification and sectoral differentiation of structural restructuring strategies. According to the short-term strategy (up to three years), the main focus should be on the reconstruction of critical infrastructure and the restoration of the work of enterprises in critical spheres of economic activity (medical, pharmaceutical, water supply).

According to the medium-term strategy (up to seven years), the main focus should be on the restoration and reconstruction of the energy, transport, and digital infrastructure. According to the long-term strategy (more than seven years), the formation of such an industry structure ensures the sustainable development of a competitive economy.

The diversification of strategies does not exclude the need for systematic coordination or the possibility of a certain combination over time (Prokhorova et al., 2021). The sectoral differentiation of strategies should be based on multilevel planning, consistent not only at the vertical level but also at the horizontal level, first of all with regard to resource provision, strict operational control, maximum transparency for the public regarding resource allocation, and performance reports. Not only determining the goal of the strategy but also forming the mechanisms of interest of all parties in the implementation of this goal is important, as documented sources of funding and planning the use of investment resources are only indicative sources of financing.

One of the main factors determining the need for sectoral differentiation of reconstruction strategies is the significant difference between sectors in the amount of critical damage, irreparable damages, and financial costs for the transformation and restructuring of industries (Fig. 1). Identifying damages and estimating approximate costs for reconstruction are provided, particularly in the studies by Deineko et al. (2022), Bortnik (2022), Arefieva and Antonenko (2023) and the analytical report of Gorodnichenko et al. (2022).

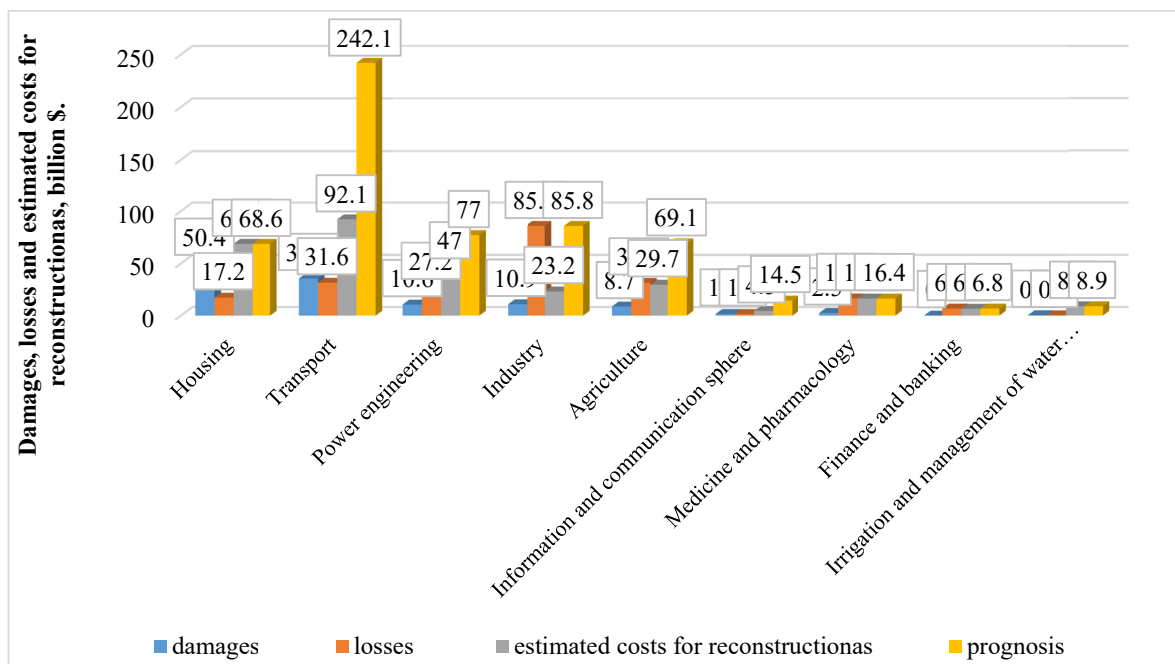


Fig. 1. Damages, losses and estimated costs for reconstruction 24.02.2023), billion \$.
 Source: based on data by Arefieva and Antonenko (2023).

Given the fact that Arefieva and Antonenko's (2023) recovery cost estimate does not include the costs of reconstruction and industry transformation, for example, it does not take into account the need for significant costs for the reconstruction of railway transport, the first for the transition to the European track (~\$130 billion); the need for spending on the reconstruction of the infrastructure of the IT industry, in particular, the formation of digital platforms; processing of agrarian products and restoration of fertility of war-damaged soils, etc., these data were revised. The evaluation of costs for reconstruction and industry transformation was carried out by analogy with the costs of industry restructuring in Baltic countries.

The data shown in Figure 1 indicate that in most industries, the costs of transformation and reconstruction of industries significantly exceed the amount of critical damage and costs

for restoring industries. That is why the stage of short-term strategies aimed at restoring critically important structural elements of industries should be coordinated and extended in the long term with the long-term restructuring strategy (Michňová and Megyesiova, 2022).

The diversification of short-, medium-, and long-term strategies is also conditioned by the need to solve the problem of the state budget deficit (Fig. 2). Even with the effective implementation of the specified strategies, a significant level of the state budget deficit is predicted, which will remain until 2028, provided that the war ends in 2024. In 2023, only a slight increase in GDP of ~0.5% was forecasted, which is incomparable with a reduction of ~30% by 2022. And this is provided that the World Bank allocates more than \$37.5 billion and significant financial assistance from leading Western countries (International Monetary Fund Data, 2023).

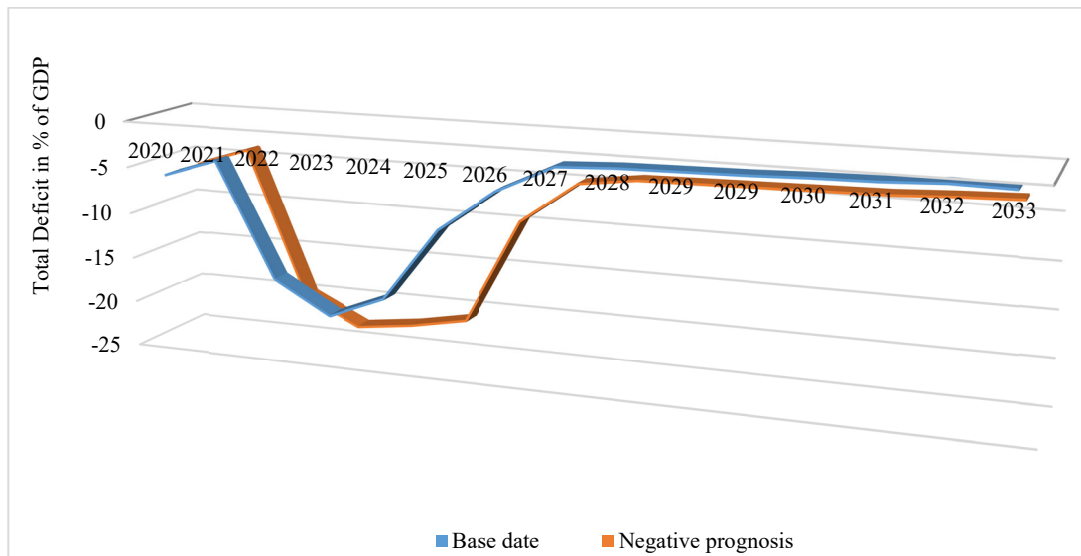


Fig. 2. Prognostication state budget deficit of Ukraine.

Source: based on International Monetary Fund Data (2023).

As a result, among the priority tasks of the post-war reconstruction, restoring the activity of export industries, first of all, those where higher added value is formed, will be set as a priority task by institutional structures. Changes in added value over time are not only an economic indicator of industry development. It is also an indicator of the success of the strategic management of the dynamic changes of the industry, an indicator of the level of utilization of the opportunities of renewal of the industry,

and an indicator of the level of budget replenishment. That is why, as one of the elements of the structural-mathematical model of industry optimization in the post-war period, the approach of industry maximization of added value was first proposed (equation 1). The study by Kucherenko (2023), Kubalskyi (2022), Kyrylenko et al. (2022) proves that in the process of recovery and transformation of Ukraine's economy, it is useless to count only on free help from external donors.

Therefore, other financing mechanisms for reconstruction and industry transformation will require significant attention from institutional structures, in particular, at the expense of a significant increase in the level of added value.

In the past, there was significant industry differentiation in value added changes over time. Thus, the agricultural sector showed stagnation over a fairly long period of time - for the period of 2015-2019 and even a reduction in this indicator for the period of 2012-2013 (Fig. 3).

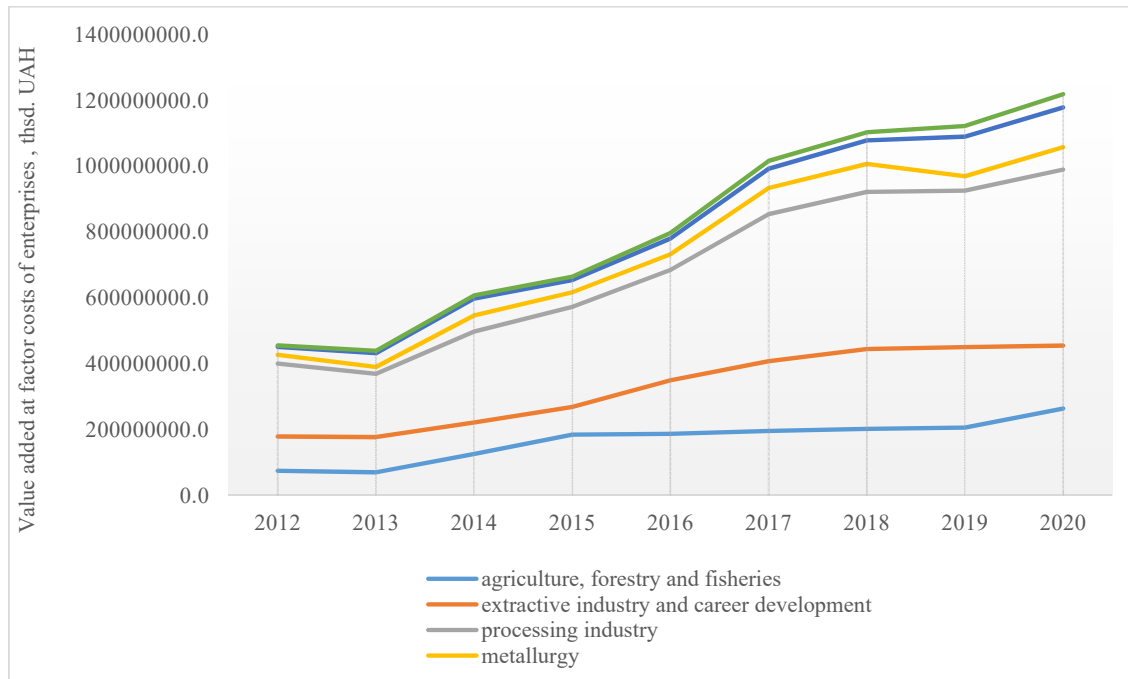


Fig. 3. Added value based on production costs of enterprises by sectors of the economy, ths. UAH.

Source: based on data State Statistics Service of Ukraine (2023).

The extractive industry is also characterized by insignificant rates of growth in added value, which has also been stagnating since 2018. The metallurgical industry is also characterized by significant unevenness in the dynamics of added value, for which, along with the period of intensive growth of this indicator for the period of 2014–2017, there are also periods of its decrease: 2014–2015 and 2018–2019. The growth of added value in the period 2013–2019 is noted in the processing industry more than twice; in the pharmaceutical and construction industries five times; and in computer programming, consulting, and related activities eight times (Fig. 3).

A certain problem in increasing the contribution to export volumes of industries with a higher added value of their products or services is that, in previous periods, exports were mainly formed by industries with a low level of added value.

Thus, according to the State Statistics Service of Ukraine (2023) for 2021, the traditional leaders in the volume of exports of commodity products were the agricultural sector (22.8% of the volume of exports in monetary terms, “Products of plant origin”), extractive industry (“Mineral products”), metallurgy (“Black metals”), mechanical engineering (“Machines, equipment, and mechanisms; electrical equipment”), and 7.7%. The level of processing is mostly low. Thus, “products of the flour milling and grain industry” in the mentioned export of plant products are only 0.2%. In the field of exporting services, before the start of full-scale hostilities, the transport and IT industries occupied prominent positions in terms of export volumes. This is evidenced by the fact that in 2021, transport services accounted for 40.4% of the volume of service exports; telecommunications, computer, and information services accounted for 29.3%.

Nevertheless, the dynamics of value-added indicators for these industries are also uneven. Taking into account the fact that the optimization of sectoral exports should be aimed at increasing the net, not the gross, export of the industry, the following can be proposed as directions for the sectoral optimization of these industries.

For the agricultural sector, this is the introduction of innovative methods of increasing productivity, in particular the approaches proposed by Koblianska et al. (2022) for revising crop rotations in view of crops with increased productivity and increasing the level of processing in view of the possibility of exporting products, in particular the approaches proposed by Sydoruk et al. (2021). One solution could be to send plant products to the meat and dairy industries as fodder, which will provide an opportunity to increase the value chain and export processed livestock products; by 2020, the export of ready-made livestock food products was 0.0%.

For the extractive industry, the introduction of innovative technologies, avoiding monopolization, and improper use of valuable natural resources

In the fields of medicine and pharmaceutical production, the experience of military operations gave impetus to development. This war led to the emergence and testing of innovative medical products and rehabilitation technologies. New hemostatic and anti-burn agents were introduced into production, which opened up new opportunities for their export and innovative development of the industry in the post-war period.

The recovery of the economy also requires the formation of a highly liquid and stable banking and insurance sector. The formation of a highly efficient financial sector is necessary for the recovery of economic sectors. According to Holubov (2022), the financial stress index in 2022 shows a decreasing trend, and its level in 2023 is still alarming (Chkheailo and Kukhar, 2022).

The problems that must be solved for this sector in the short term in the post-war period are the elimination of destabilizing factors in the financial market, in particular, the repayment of military government bonds, the emission of which has significantly accelerated

since March 2022, the orientation of the insurance market to new conditions, and new types of insurance, such as insurance of sea transportation complicated by mine danger (Kaflyk, 2022).

To optimize the industry structure, it is proposed to use a "trigger" mechanism - when stimulating the development of individual projects in high-tech industries leads to the rapid development of other sectors of the economy. In particular, this may apply to the defense industry. Before the beginning of the Russian aggression in 2014, Ukraine already occupied fourth place in the global arms export market. The beginning of aggression led to the reorientation of defense production to meet domestic needs. Nevertheless, in 2021, Ukraine ranked fourteenth in terms of the volume of arms exports. The war led to favorable market opportunities for the development of the Ukrainian defence industry in the post-war period, primarily for the export supply of complex military systems with high added value. This can help solve the issue of national security, increase revenues to the country's budget, and provide orders for related industries, that is, the implementation of the "trigger mechanism."

The trigger mechanism will make it possible to solve not only economic but also social problems in a complex way: employment, the growth of the quality of human capital, the return of migrants. Projects in industries with a long history of development, such as the transportation industry, can also be used to trigger economic development.

In particular, railway transport during the war proved its importance for the defence of the country and, at the same time, pointed to certain structural deficiencies, particularly in providing lateral transportation and transportation on routes that bypass Kyiv. The structure of railway transportation in Ukraine was created in such a way that transportation between the southeastern and southwestern regions passed through Kyiv, which led to the loss of time and resources for the railway. That is, its structure does not correspond to the concept of the national railway network of independent Ukraine or the country's economic development strategy.

This structure supports the division of Ukraine formed during imperial times into regions focused primarily on agrarian development and regions focused on maintaining the mining industry and related metallurgical enterprises and heavy engineering enterprises as the predominant consumers of metal and fossil energy resources. The structural reconstruction of the railways with the simultaneous transition to the European track standard would be a significant incentive for strengthening the development of all branches of the economy. The cost of such a project will reach \$130 billion (Gorodnichenko et al., 2022).

The development of construction, first of all residential construction, can have a trigger effect. A significant amount of buildings destroyed during the war destroyed cities, and, as a result, an urgent need to provide the population with housing led to the development of residential construction in the post-war period. But at the same time, the long-term development of the country will require the fulfillment of certain prerequisites, in particular: the exclusion of the industry development strategy aimed at the construction of temporary housing; the basing of the strategy on the systematic planning of capital construction; the involvement of well-known foreign companies in the construction, which will lead to an increase in the quality of work and a decrease in the cost of construction.

It is also necessary to introduce: an increase in the level of taxation of private plots allocated for construction but not involved in it; minimization of the lending rate for social housing; and subsidizing the purchase of housing by low-income citizens. The trigger effect from the development of construction will be observed in the mining industry, the industry of construction material production, etc. An example of the action of a trigger mechanism for the expansion of post-war construction can also be the growth due to this demand for metal products, that is, the promotion of the development of the metallurgical industry. Under these conditions, the introduction of modern technologies such as powder metallurgy and "green steel" can stimulate investments in the metallurgical industry and lead to an increase in exports to the countries of the European Union. And this, in turn, will open up

new opportunities for the inclusion of metallurgical enterprises in the chains of added value of EU countries, for example, in the field of low-carbon metallurgy, which will become a new stimulus for the development of the industry.

But the trigger effect of the development of the IT industry can be more obvious. At present Ukraine has dropped 16 points compared to the indicator of 2021 - to the 50th position (StartupBlink, 2023) in the introduction of IT startups (one of the main indicators of the innovative development of this industry). The full-scale war and the large-scale outflow of qualified personnel caused by it together with the narrowing of the national market are the reasons for this. But the war is not only the loss of ranking positions, it is also new opportunities, new ways of development of the industry.

Until February 2022, the domestic IT industry mainly worked in the field of outsourcing. Accelerated restructuring of the economy in the post-war period will lead to an increase in the number of domestic customers and users of IT services. The inevitable transfer of domestic enterprises from "analog" to digital technological equipment, IT support for the development of Industry 4.0 should become a multiplier of orders.

A significant impetus to the development of the IT industry can be the experience of implementing artificial intelligence technologies in military equipment, in particular, in the control of unmanned aerial vehicles in conditions of radio-electronic countermeasures, target recognition, automatic targeting systems without GPS, artillery synchronization services for its differentiated deployment, etc.

The development of the IT industry will first require investments in infrastructure: broadband Internet; 5G technologies, Big Data; national cloud technologies; optical fiber local networks; implementation of distributed registers, etc. A prominent place in the innovative development of the IT sector should be given to digital platforms, as the primary direction of capitalization of the industry. State financing of the industry is predicted through the implementation of state programs in the field of IT, which will not be decisive in the total volume of orders.

Therefore, the main task of institutional structures for the development of the IT industry is the creation of a favorable regulatory and legal environment and stable tax legislation. The main role of the IT industry in the post-war reconstruction of the country's economy is to have a synergistic influence on the development of other sectors of the economy and to promote the improvement of people's quality of life. Therefore, in view of the European perspective on the country's development, it is advisable to join the initiatives of the European Union in the IT sector, particularly in the Connecting Europe Facility.

Promising directions of high-tech industrial activity, the development of which should be supported in the post-war period, are innovative projects of the pharmaceutical industry, production of own nuclear fuel using uranium and zirconium mined in Ukraine, titanium-lithium industry and aluminum processing in view of the development of Ukrainian deposits of these metals, powder metallurgy, innovative projects of the power engineering industry, and deep thermochemical processing of low-quality fossil fuels.

This allows one to formulate the prerequisites for the restoration, reconstruction, and optimization of the industry structure in the post-war period: planning, phasing, systematicity, concentration in directions and projects, strategic reliance on the trigger mechanism of the influence of innovative projects of transformation of industries, and the development of the national economy as a whole.

6. Conclusions.

A structural-mathematical model was developed to create a methodological approach to sectoral optimization of the national economy in the post-war period. To coordinate multi-objective optimization methods, this model implements the representation of the problem in the form of a multidimensional hypercube. This made it possible to consider the task of sectoral optimization as one of the cells of the hypercube and to optimize the sectoral structure of the economy as a task of unfolding the hypercube.

That is, the proposed model combines the strategies of sectoral optimization of the economy and coordination of sectoral strategies at the national level. The need for the comprehensive use of intensive and extensive mechanisms of post-war economic restructuring is indicated given both the urgent need to increase the efficiency of traditional sectors of the economy. This indicates that the significant difference between these tasks and the limited resources (organizational, financial, and material) causes the need for significant diversification and sectoral differentiation of structural reconstruction strategies. Therefore, a diversification approach with the selection of short-, medium-, and long-term industry strategies was proposed.

An assessment of the costs of reconstruction and industry transformation was conducted. Arguments are presented regarding the significant limitation of gratuitous aid from external donors in post-war reconstruction, which will require increased attention from institutional structures to internal financing mechanisms, in particular, an increase in the level of added value.

It should be noted that there is unevenness in the dynamics of changes in added value in previous periods, which proves the long-term genesis of sectoral differentiation. This indicates that one of the main factors determining the need for sectoral differentiation of reconstruction strategies is the significant difference between sectors in the amount of critical damage inflicted by the aggressor, irreparable losses, and financial costs for the transformation and restructuring of industries.

It is proposed to use the "trigger" mechanism to optimize the industry structure when stimulating the development of individual projects in high-tech industries leads to the rapid development of other sectors of the economy. Prospective directions for the industry-wide impact of the trigger mechanism are also provided. Such an approach in a comprehensive way will allow solving not only economic but also social problems such as employment, the growth of the quality of human capital, the return of migrants.

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