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Prospects for Restoring the Economic Potential of Ukraine in the Post-War Period

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ABSTRACT

Since February 24, after the beginning of the full-scale military aggression of the Russian Federation against Ukraine, the country's economy has suffered significant losses. According to preliminary estimates by world experts, direct losses from the war are estimated at trillions of US dollars. As a result of the full-scale war in Ukraine, the volume of production of goods and services continues to decrease, as does the GDP. The inflation rate is expected to increase. Experts estimate the Business Expectations Index of enterprises at 72.6 %, before the start of full-scale military aggression in February 2022, this Index was 108.2 %. The destruction of the material and technical base, the reduction of the amount of intellectual capital due to migration flows of forcibly displaced persons, and the decrease in indicators of business and investment activity led to a significant drop in the main financial and economic indicators. In accordance with the definition of the current problems of economic development, the purpose of the article was determined, which consists of the development of practical mechanisms and methodological approaches to finding ways to restore the country's economic potential as a basic task of post-war reconstruction. In accordance with the set goal, the object of research in the article is the system of formation and development of economic potential at the national level. The article analyzes theoretical approaches to the definition of the concept of economic potential, its functions, and factors of formation, which was carried out on the back of the use of methods of literature review, comparative analysis, and epistemological methods of cognition. The use of these methods made it possible to make a factor analysis of the world's leading experience of post-war economic reconstruction. Although, it is worth noting that the scale of destruction and economic decline in Ukraine cannot be compared with the latest military conflicts in the world. As a result of the analysis, the factors were determined and the analysis results were predicted by using the methods of economic and mathematical modeling, and the algorithm for monitoring the processes of restoring the economic potential after the war was broken down.

HIGHLIGHTS

◉ The article analyzes theoretical approaches to the definition of the concept of economic potential, its functions, and factors of formation, which was carried out on the back of the use of methods of literature review, comparative analysis, and epistemological methods of cognition.

◉ As a result of the analysis, the factors were determined and the analysis results were predicted by using the methods of economic and mathematical modeling, and the algorithm for monitoring the processes of restoring the economic potential after the war was broken down.

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The war in Ukraine began in 2014. The limited territory of the conflict determined the locality of the problems of forced population migration and the destruction of economic potential. As a result of the anti-terrorist operation, the economic ties of the Donetsk and Luhansk regions of the Autonomous Republic of Crimea were disrupted. Residential, industrial, and commercial real estate, and infrastructure objects, including transport, were destroyed. The ties of production cooperation with those enterprises that remained in the temporarily occupied territory were destroyed. The social security system was transformed, including an increased burden on the state budget because of the need to make payments for internally displaced persons. At the same time, revenues to the state budget decreased. However, the local nature of influences on socio-economic processes allowed the economic system of the state to transform in accordance with new challenges. Since the beginning of full-scale military aggression in Ukraine on February 24, 2022, more than 4,431 residential buildings, 92 enterprises, 378 educational institutions, 138 health care institutions, 8 civilian airports and 10 military airfields, 7 thermal power plants and hydroelectric power stations have already been partially or completely destroyed. With the beginning of the war, business and investment activity almost completely stopped, there was a significant reduction in the volume of industrial and agricultural production, and the service sector suffered significant losses. Significant destruction of the material, technical and infrastructural base, and destruction of transport routes led to significant challenges for the economy of Ukraine. Post-war recovery includes the implementation of effective investment mechanisms aimed at finding investments in the development of innovative infrastructure projects as the basis for the formation of economic potential, the basis of which must be created today. Therefore, the urgent issue of ensuring the post-war reconstruction of Ukraine is the formation of mechanisms for the restoration of economic potential.

The purpose of the article. Therefore, the purpose of the article is to develop practical mechanisms and methodological approaches to finding ways to restore the country's economic potential as a basic task of the country's post-war reconstruction.

To achieve the goal, the following tasks are performed in the article:

- an analysis of the theoretical basis of the research was carried out, the specifics of the concept of economic potential were determined,
- factor analysis of economic development processes that can be implemented in Ukraine is carried out,
- a hierarchical structure of influencing factors on the formation and development of economic potential was developed,
- a projection was formed of the results of the development factor of a matrix of the effectiveness of investments in the post-war reconstruction of the economic potential.

Literature Review

Analyzing the system of post-war reconstruction of the economic potential of Ukraine, it is important to consider the European integration vector of the state's development. Integration processes play one of the key roles in the system of economic development because they determine new requirements for the economic system that can ensure its competitiveness, new challenges through different standards, regulatory and legal frameworks and other features of market functioning, new opportunities to enter new markets from obtaining new levels of profits. For the purpose of the analysis and to determine the influencing factors on the development of economic potential, theoretical foundations and empirical approaches to the formation of economic relations of decision-making centers in the EU and its periphery were analyzed (Pascariu, G. C. and Țigănaşu, R., 2017). Accordingly, these data became the basis for the formation of theoretical and methodological approaches to defining the concept of economic potential and conducting factor analysis.

Separately, it is advisable to single out the issue of forced migration and a significant reduction of the working population. Europe has extensive experience of labor migration in conditions of lifting restrictions on movement and work within the EU (Pauli, U. and Osowska, R., 2019). These studies can be taken into account in the analysis of labor productivity and the results of negative impacts on the economic potential for the purpose

of further building a system of their tracking and minimization of impacts.

The rethinking of economic planning systems in the face of new challenges and the formation of a new theoretical and methodological basis for such changes is the basis of the literature review of the article, which allowed us to identify three conceptual approaches to defining the concept of economic potential (Ali, A., 2014; Townsend, A., 2009).

The formation of approaches to determining the place of economic potential in a specific stage of the life cycle of the economy is an important basis for research, because of it allows you to project the indicators of the formation and development of economic potential in the conditions of crisis phenomena (Liakos, N., Kumar, V., Pongsakornrungsilp, S., Garza-Reyes, J. A., Gupta, B. and Pongsakornrungsilp, P., 2019).

The system of innovative provision of economic processes is considered, in connection with the development of economics forms the innovative component of economic potential, adding to its other elements: infrastructure, equipment, operational processes, etc. High added value, as a result, and the effectiveness of using the economic potential depends on the introduction of an innovative component (Shin, C., 2016).

Systems of international support for practical mechanisms for the development of economic potential, its factors and the system of implementation indicators were analyzed separately (Fox, S. and Grösser, S., 2015). In particular, the factors influencing the post-war reconstruction of economic systems after the military conflicts in Bosnia and Herzegovina, which developed with an emphasis on traditional identity, are separately highlighted (Kudumovic, L., 2020), restoration of economic systems of post-conflict processes in African countries (Geda, A., 2011), infrastructure restoration after the military conflict in Syria [Porras-Gómez, A.-M., 2021), the implementation of the Marshall Plan in the post-war reconstruction of destroyed Europe (in particular, the scale of the consequences of the military conflict in Ukraine, the economic recession in the world as a consequence of the conflict, the humanitarian migration crisis can be compared only with the consequences of the Second World War) (Green, R., 1995).

The analysis of the system integration policy for the development of economic potential made it possible to develop a comprehensive system for monitoring the effectiveness of the realization of economic potential in the post-war period (Chako, G. K., 2000; Nath Bhattacharyay, B., 2011).

Methodology

The research is based on theoretical and methodological approaches to defining the concept of economic potential. To understand ways of restoring a certain economic system, it is advisable to turn to the definition of its essence and specifics. After conducting a literature review of the research of scientists who worked in the direction of developing issues of the essence of economic potential, three groups of approaches to the definition of the concept of "economic potential" were identified (Pascariu, G. C. and Țigănașu, R., 2017). Numerous authors consider the concept of economic potential from the point of view of the totality of its elements. This approach is defined as element-oriented. It can be summarized as follows: economic potential is a set of criteria for quantitative assessment of the effectiveness of economic activity at the micro or macroeconomic level (Ali, A., 2014; Townsend, A., 2009). The second approach, which was highlighted as a result of the literature review, was called functional, which defines the set of functions performed by economic potential, which include economic development, the efficiency of business processes, social security, formation and development of intellectual capital, etc. (Chako, G. K., 2000; Nath Bhattacharyay, B., 2011). The third approach, which was determined as a result of literature review, comparative analysis and synthesis, is systemic. This approach is taken as a basis in the study with the aim of forming a conceptual approach and systematizing the category of economic potential.

By using the methods of comparative analysis and epistemological methods of cognition, a comparative analysis of the world's leading experience of post-war economic reconstruction, presented in the research results, was performed.

Factors influencing the formation and development of economic potential at the macroeconomic level were determined by applying factor analysis. By using methods of economic and mathematical

modeling, a projection of the results of the analysis was made, which made it possible to develop a matrix of the effectiveness of investments in the post-war reconstruction of economic potential, which is based on a complex multifactorial analysis of the effects on the processes of economic development.

RESULTS

As a result of the grouping of approaches identified in the research of numerous authors who were engaged in the development of the problems of theoretical and methodological substantiation of the concept of economic potential and the determination of its specificity, the author's definition was developed. It is based on a set of definitions that have a systematic and complex nature, respectively, were grouped into one approach, which is called systemic. The system approach involves consideration of the concept by determining its structural elements, their interaction, the performance of individual functions by each element, and the functions of the aggregate. Additionally, the systemic approach involves the relationship of the analyzed system with external and internal factors, determining their impact on the system, the specifics of its functioning, and directing it to specific results (achieving the system's life goals). In accordance with these conceptual features of the theoretical and methodological substantiation of the concept of economic potential, it is proposed to use the following definition: a set of external and internal factors of the economic system, which, accumulating functional directions, determine the ways of ensuring economic growth in the conditions of social demands and transformations aimed at the formation of qualitatively new indicators of the existing economic system by using available and hidden resources, as well as opportunities for their application. Therefore, the formation of a systemic approach to the definition of the concept of economic potential made it possible to identify requirements for the further development of conceptual foundations for the formation of mechanisms for the restoration of economic potential in the conditions of post-war reconstruction, in particular:

- the multifactorial processes of ensuring the formation and development of economic potential,

- the interaction of factors of economic development,

- consideration of elements of economic potential as a set of available and hidden resources,

- determination of the factors of the most efficient use of resources,

- targeting the formation of qualitatively new indicators that are formed because of the transformation processes of economic systems.

Therefore, for further analysis, the task was set to conduct a factor analysis and determine the totality and parametric nature of factors influencing the formation and development of economic potential. The results of the factor analysis are presented in Fig. 1.
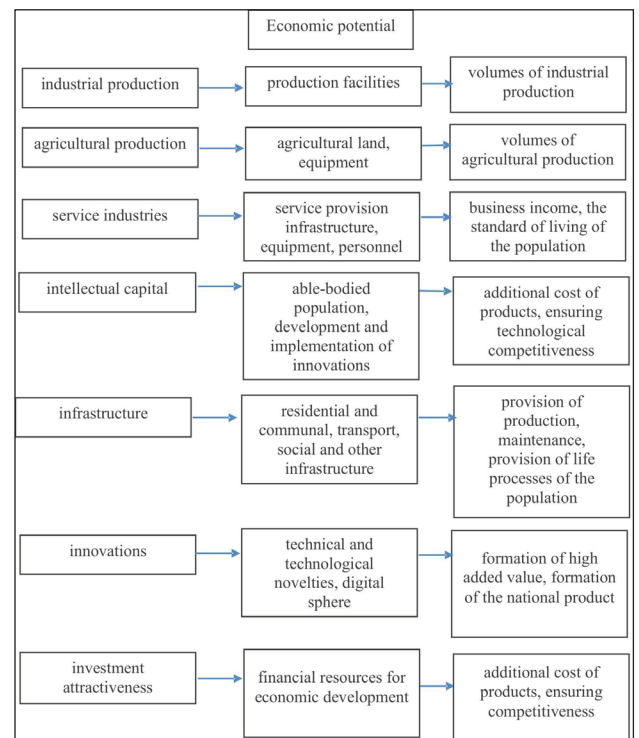
Source: Developed by the author.

Fig. 1: System of factors of formation and development of economic potential

According to the carried-out structuring of factors influencing the formation and development of economic potential, a three-level structure was selected. The first milestone of the three-level structure accumulates directions for the formation of economic potential, among which the levels of production of goods and services (industrial, agricultural production, production of services) and

service elements: infrastructure, investment and innovation support, HR are directly determined. This level defines numerous of elements that can be grouped together to provide economic potential. At the second level of the three-level structure, the author defined the forms of providing elements of the first level: production facilities, equipment, machinery, etc. The third level of the three-level structure is consequential and determines the results of the realization of economic potential, which can be considered as volumes of production or provision of services, the level of provision of intellectual, investment, innovative resources, etc. Accordingly, with the goal from a system of indicators (factors) of influence on the development of economic potential, the article proposes to refer specifically to the resulting indicators of the proposed three-level structure. With the goal to provide a quantitative analysis of the resulting indicators of the three-level structure, it is proposed to introduce criteria for evaluation. As a result of the literature review and accumulation of experience of researchers dealing with issues of theoretical and methodological justification, it was proposed to implement the following function of influencing factors on the development of economic potential – formula 1:

$$\int_i^n \left(IP; AP; BI; MP; NP; TC; AC\right) \qquad \dots(1)$$

where *IP* – industrial production;

AP – agricultural production;

BI – business income;

MP – maintenance production;

NP – national product;

TC – technological competitiveness;

AC - additional cost of products.

Having formed a system of indicators, it is expedient to determine their quantitative criteria for the development of an evaluation methodology, consequently, having accumulated the experience of scientists who dealt with issues of quantitative description of the processes of ensuring economic potential, a system of criteria was formed, which are determined by formulas for evaluating each specific indicator. The results of the analysis are summarized in Table 1.

Table 1 presents the formulas for calculating indicators of factors influencing economic potential, which were developed as a result of the analysis. Furthermore, criteria for each indicator were determined. The criteria were calculated based on the analysis of statistical data of the financial and economic activity of Ukrainian enterprises in the period 2015–2021 and averaged.

For the analysis of each indicator, it is planned to develop three optimistic scenarios, which predict that the indicators of the pre-war period of economic potential will remain unchanged. For this, statistical information was accumulated, calculations of the analyzed indicators were averaged, which are presented in Table 1.

According to the conducted analysis, three possible scenarios of the development of economic potential were developed – realistic, pessimistic, and optimistic. The results were presented in Table 3, and then the arithmetic mean of the criteria for each indicator was found, which determined the integral criterion of the indicator of factors influencing economic potential. To determine the criteria for indicators of realistic and pessimistic scenarios, an analysis was carried out using methods of economic and mathematical modeling the method of strategic projection, which is based on the definition of the quadratic deviation of indicators and the formation of a system for determining three quadratic deviations as the critical minimum and maximum value of the analyzed indicator. The square deviation of indicators was calculated according to formula 2:

$$\sigma = +\sqrt{D} = \sqrt{E\left[\left(X - \mu\right)^2\right]} \qquad \dots(2)$$

where *E* – the law *f* (rule), according to which each element *x* of the set *X* (domain of definition – criterion) corresponds to a certain element *y* of the set,

D – display style, the variance of the random variable *X*.

μ – expectation matrix, which is a generalized concept of the average value of a set of numbers in the case when the elements of the set of values of this set have different "weight", price, importance, priority, which is characteristic of the values of a random variable.

Table 1: Criteria for assessing economic potential

Factor	Indicator	Calculation formula	Parameters
Industrial production	• Profitability of assets;	$ROA = \dfrac{\text{Net income}}{\text{Total assets}} * 100$	15–19 %
	• Return on equity;	$ROE = \dfrac{\text{Net income}}{\text{Equity}} * 100$	10–13 %
	• Profitability of production;	$PP = \dfrac{\text{Ratio of net income}}{\text{Cost price}} * 100$	15–19 %
	• Profitability of operating activities;	$POA = \dfrac{\text{Operating profit}}{\text{Net revenue}} * 100$	9–11 %
Agricultural production	• Profitability of assets;	$ROA = \dfrac{\text{Net income}}{\text{Total assets}} * 100$	15–19 %
	• Return on equity;	$ROE = \dfrac{\text{Net income}}{\text{Equity}} * 100$	10–13 %
	• Profitability of production;	$PP = \dfrac{\text{Ratio of net income}}{\text{Cost price}} * 100$	15–19 %
	• Profitability of operating activities;	$POA = \dfrac{\text{Operating profit}}{\text{Net revenue}} * 100$	9–11 %
Business income	• Profitability of production;	$PP = \dfrac{\text{Ratio of net income}}{\text{Cost price}} * 100$	18–22 %
	• Profitability of operating activities;	$POA = \dfrac{\text{Operating profit}}{\text{Net revenue}} * 100$	15–20 %
Maintenance production;	Productivity	$P = \dfrac{\text{Costs of working time}}{\text{Volume of manufactured products}} * 100$	12–15 %
Technological competitiveness	• Profitability of innovative activity,	$PIA = \dfrac{\text{Profit from innovative activity}}{\text{Expenses for innovative activity}} * 100$	5–8 %
	• Effectiveness of the direction of innovative development,	$EDID = \dfrac{\sum_{i=1}^{T} E * (1+r)^{-1}}{\sum_{i=1}^{T} IC * (1+r)^{-1}}$	10 %
		T – t^{th} period	
		E – the expected effect of the implementation and implementation of the direction in the t-th period, USD	
		IC – expected innovation capital for the implementation and implementation of the direction in the tth period, USD	
		r – the discount rate	
Additional cost of products	• Return on invested capital;	$RIC = \dfrac{\text{Return of funds on capital invested by the company}}{\text{Funds capital invested by the company}} * 100$	5-6%

The results were presented in Table 2.

So, because of the analysis, three scenarios of the development of the economic potential of Ukraine in the post-war period were calculated. With the help of the projection, a matrix of the effectiveness of investments in the post-war reconstruction of the economic potential was developed, which is based on a complex multifactorial analysis of the effects on the processes of economic development – Fig. 2.

The investment effectiveness matrix presented in Fig. 2 is aimed at ensuring the implementation of practical monitoring of the effectiveness of

Table 2: Scenarios of changes in economic potential development factors

Scenario	Indicators	Criteria	Standard deviation*	Arithmetic mean / With standard deviation
Optimistic	Industrial production	15–19 %	3,41	14,47
		10–13 %		
		15–19 %		
		9–11 %		
	Agricultural production	15–19 %	3,41	14,47
		10–13 %		
		15–19 %		
		9–11 %		
	Business income	18–22 %	2,3	18,44
		15–20 %		
	Maintenance production	12–15 %	1,29	13,5
	Technological competitiveness	5–8 %	1,92	7,2
		10 %		
	Additional cost of products	5–6 %	0,71	5,5
Realistic	Industrial production		3,41	11,06
	Agricultural production		3,41	11,06
	Business income		2,3	16,14
	Maintenance production		1,29	12,21
	Technological competitiveness		1,92	5,28
	Additional cost of products		0,71	4,79
Pessimistic	Industrial production		3,41	7,65
	Agricultural production		3,41	7,65
	Business income		2,3	13,84
	Maintenance production		1,29	10,92
	Technological competitiveness		1,92	3,36
	Additional cost of products		0,71	4,08

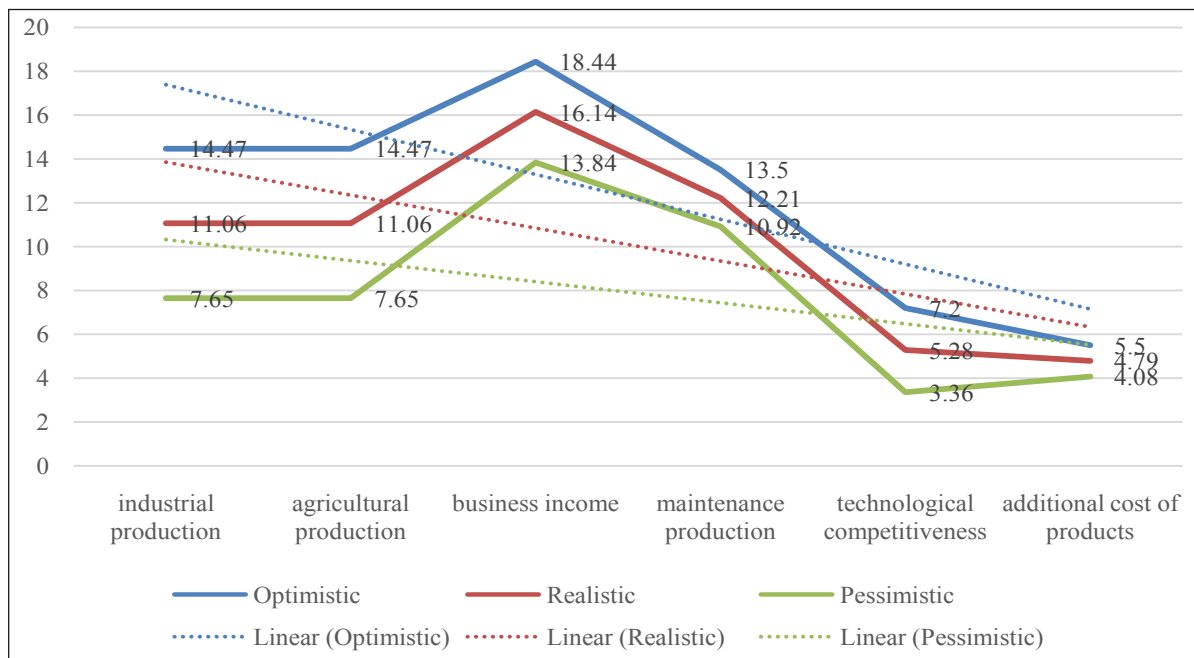* *Calculated using automated functions MC Excel.*

Fig. 2: Matrix of effectiveness of investments in the post-war reconstruction of the economic potential

investment infusions in restoring the economic potential of the country in the conditions of post-war reconstruction. To carry out monitoring, in parallel with the results of economic and mathematical modeling and the projection of scenarios for the restoration of economic potential, trend lines for each indicator were developed and presented on the diagram, which determine the minimum indicators of the curve of factors for the development of economic potential as an indicator of the effectiveness of post-war reconstruction.

DISCUSSION

So, as a result of the research, a systematized definition of the concept of economic potential was proposed, which consists of the following: a set of external and internal factors of the economic system, which, accumulating functional directions, determine the ways of ensuring economic growth in the conditions of social demands and transformations aimed at the formation of qualitatively new indicators of the existing economic system through the use of available and hidden resources, as well as opportunities for their application. To carry out a quantitative analysis of the prospects for the recovery of economic potential in the post-war period, a set of influencing factors was selected, the indicators characterizing each factor and the criteria for quantitative assessment were determined. As a result, the author developed a three-level system of factors for the formation and development of economic potential. The analysis of pre-war statistical data of the indicators characterizing the factors influencing the economic potential allowed to develop a basis for the projection and formation of the trend of the development of the economic potential in the post-war period. The trend line was formed by searching for standard square deviations of indicators of the three-level system, based on which optimistic, pessimistic, and realistic development scenarios were developed. Accordingly, a matrix of indicators is proposed, presented in the form of a diagram, where each indicator has three positions: optimistic, realistic, and pessimistic, based on these indicators, a trend line is built, which is combined by summarizing all the indicators that were analyzed. This system allows for monitoring the practical implementation of mechanisms for restoring economic potential

in the post-war period. Such a system may have practical implementation and may be the subject of further scientific discussions to ensure its improvement and increase efficiency.

CONCLUSION

Thus, the article analyzed ways of restoring economic potential and proposed a projection of a multifactorial complex of influences on economic recovery with the aim of developing mechanisms for post-war economic reconstruction. The research, which was conducted in the basis of the analysis of the world experience of post-war reconstruction, the use of the conceptual principles of the formation of economic potential as an element of competitiveness, made it possible to develop a projection of development trends and provide practical recommendations that can be used to ensure the growth of economic potential in the post-war reconstruction and further development of the country. So, because of the analysis, the factors were determined, and the analysis results were projected by using the methods of economic and mathematical modeling. As a result, a matrix of the effectiveness of investments in the post-war reconstruction of the economic potential was proposed, which is based on a complex multifactorial analysis of the effects on the processes of economic development.

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