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## REGIONAL FUNCTIONING SPECIFICS OF THE UKRAINIAN ECONOMY INDUSTRIAL SECTOR IN CONDITIONS OF DEVELOPMENT INSTABILITY

### ABSTRACT

The purpose of the article is to identify transformations in the Ukrainian economy's industrial sector based on a comprehensive assessment of activity (production, labor, investment, and innovation) and the functioning efficiency (profitability) of the named sector in the regional section. The results of the evaluations carried out using the author's method made it possible to tentatively distinguish four groups of regions in Ukraine according to the type of their industry: first group – traditionally industrial regions with a high level of the industrialization of the economy and product innovation, a significant (with a tendency to increase) share of the extractive industry, the second group – regions that possessed sufficient industrial potential and/or demonstrated its active growth. The regions of this group are characterized by a highly developed processing industry, in which food occupied the largest share; the third group – regions with a high level of industrial and labor activity, the industrial sector of which was dominated by electricity production; the fourth group – the economy of these regions belongs to the non-industrial type, where the activity and efficiency indicators of industrial enterprises are mostly low (or tend to decrease). It is possible to ascertain the presence of certain transformational trends in Ukrainian industry over the last 10 years, the essence of which was the formation of new industrial centers that are still small in terms of activity scale, but with larger (compared to traditional industrial regions) values and higher positive dynamics of individual production and labor indicators, as well as investment activity of industrial enterprises. Such "new industrial" centers arose mostly in the western and central regions. The full-scale war of the Russian Federation against Ukraine in 2022 sharply and strongly intensified these transformational processes. All regions of the 1st group, which were industrial leaders, lost a significant part of their industrial potential. This applies primarily to metallurgical industries, which need radical modernization and innovative technologies. There was an increase in the industrial potential of a part of the regions assigned to the 2nd group instead, as well as a part of the regions belonging to the 3rd group, as a result of the enterprises' relocation, in particular.

**Keywords:** industrial sector of the economy, regions, activity, efficiency, production, products, potential, innovations, structure, development

**JEL Classification:** L50, O18

### INTRODUCTION

The updated Industrial Policy Strategy of the European Union considers industry as the basis of economic growth and therefore sets the task of supporting and strengthening Europe's industrial leadership in the era of globalization, rapid technological changes, and increasing challenges to sustainable development. The industrial sector of the economy makes the largest contribution to global commodity exports (70% of its total value), innovations (77% of the volume of scientific, research and development works in the private sector), and increasing the productivity of the economy (37%), which are prerequisites for sustainable economic development [22]. The industry ensures the reproduction of all sectors of the economy due to the mass production of means of production and consumer goods, and thus enables the economic stability of the country in general and the growth of GDP in particular. The industry also provides employment in related

fields, primarily in transport and trade. One job place in the processing industry ensures the creation of about 2 job places in other sectors of the European Union [6].

The industry is a key sector of the economy in Ukraine. Thus, the share of industry in GDP was 20.58% in 2021, while trade – 13.83%, and agriculture – 10.63% [20]. Industry provided the largest number of jobs – for 2167.2 thousand people, which was 23.93% of the total number of employed workers in economic entities. The share of large taxpayers in this sector of the national economy amounted to over 40% of total tax revenues to the State Budget. In addition, industry accounted for more than 70% of domestic commodity exports and 18% of GVA. However, the structure of the Ukrainian industry's GVA is highly concentrated – 40.97% of it was accounted for the extractive industry in 2020. The situation is similar in the processing industry, where more than 40% of GVA was formed by two types of production – food and metallurgical. On the other hand, the share of mechanical engineering in the structure of the Ukrainian industry's GVA has decreased almost 3 times over the past 13 years – from 16.7% in 2007 to 5.6% in 2020.

These and other negative trends reduce the efficiency of Ukrainian industry and the economy in general, and the dependence on raw materials sectors, the products of which prevail in domestic exports, increase instability and vulnerability to fluctuations in the situation on international markets. As a result, the domestic industry is significantly inferior to industrial EU member states in terms of performance indicators, the key of which is the level of labor productivity. The value of this indicator in Ukraine is 3 times lower than that in Poland and 9 times lower than one in Germany. Also, Ukraine has a relatively smaller (with a downward trend) share of VAT in industrial output (18.78% versus 30.49% in Poland and 35.82% in Germany) and a critically small share of innovative products in the volume of industrial products sold – 0,7%, while in Poland this indicator equals over 7%, and in Germany – over 25%. As a result, the share of imports in the total consumption of industrial products in Ukraine was 45% (against 30% in Poland and 25% in Germany).

The full-scale military aggression of the Russian Federation against Ukraine caused colossal losses to the national economy at large and its industrial sector in particular. As a result, the outlined problems of the domestic industry deepened even more. Under such conditions, the post-war reconstruction of Ukrainian industry should be based on fundamental technological modernization.

## LITERATURE REVIEW

Since the industrial sector plays a key role in ensuring socioeconomic development, scientists from many countries of the world capially researched various aspects of this issue. Thus, Wonsub Eum & Jeong-Dong Lee pointed out the need for industrial development as a prerequisite for the evolution of production and technical capabilities in their works [5]. Waqas R. determined the factors of innovative development of the industry for different countries [23], while the works of Gomes G. determined the influence of factors on the development of innovations in different sectors of industry [7]. An overview of the structural changes in the Polish food industry between 2000-2012 and optimization of the production factors' structure using nonlinear programming methods is provided by Włodarczyk A. [24]. Assessment of structural changes in the Czech economy between 1996-2002 using the DSGE (Dynamic stochastic general equilibrium) model, which was estimated using Bayesian methods, was carried out by Čapek J. [4]. A high correlation between Czech exports and German GDP, as well as significant integration of the Czech economy with Germany using the ADL (Autoregressive distributed lag) model, was proven by Taušer Jo. [21]. The sectoral approach and the error correction model were used to assess the competitiveness of the Czech processing industry and were reflected in the work of Olczyk M., & Kordalska A. [15]. Structure optimization of economic resources on an industry basis in order to maximize Turkey's income using linear programming methods is described in detail by Can T. [3] and Altan Ş., Dogan S., & İloğlu H. [1].

In the previous studies of the article's authors [10], a hypothesis was stated about the relationship between the structural parameters of the processing industry significantly affecting the efficiency of the latter. This author's hypothesis was confirmed by the results of studies of the processing industry in Ukraine. Based on this hypothesis, the structure of industrial production in Ukraine was optimized according to the criteria of increasing efficiency and manufacturability to target the level of Poland with the help of an original (developed by the authors) economic-mathematical model [19]. In the work of Ishchuk S., Sozansky L., & Pukała R. [11] with the help of correlation and regression analysis methods, the author's hypotheses regarding the effect on the processing industry efficiency (the value of the GVA share in the output) of the share of high- and medium-high-tech industries in the output structure, as well as the share of imports in the intermediate consumption of the named industries, was substantiated. Economic-mathematical optimization models of the production and intermediate consumption structure of the individual EU countries' processing industry were built according to the criteria of increasing the manufacturability level and decreasing the import dependence level, which were solved by the method of linear programming.

Areas of structural transformations in the economy of regions, and transformations in the industry of Ukraine in particular, as well as the analysis of individual sectors of industry in the regional dimension, are widely presented in the works of Shynkaruk L. [17; 18]. The work of Babenko K., Iarmosh O., Malykhina Y., & Fedorova Y. is devoted to the study and assessment of the current state of innovation and investment processes in the industrial complex, as well as to the outline of ways to strengthen the domestic industrial sector in the conditions of Ukraine's involvement in the world market [2]. Issues of innovative development are widely discussed in the works of many Ukrainian scientists. We can single out the work of Pidorycheva I., & Antoniuk V., in particular, in which the principles of modernization and development of Ukrainian industry are defined, an analysis of the innovative activity of the branches of national industry is carried out, and innovative industrial policy measures are proposed, aimed at the neo-industrialization of Ukraine and its withdrawal from the innovative technological decline [16]. In the work of Lisovska L., Mrykhina O., Terebukh A., & Kozmuk N., a methodical approach to modeling the results of innovative development of the regional business environment's subjects is developed and substantiated [14]. Lagodiienko V., & Lagodiienko N. made an attempt to identify the level of innovative capacity using Harrington's desirability function, which allowed to identify the level of the innovative capacity of enterprises as an addition to determining the development trends in dynamics [13]. Goncharenko O., Tohochynskyi O., Anishchenko V., & Sirenko K. developed an algorithm for econometric modeling of industrial potential's innovative development [8]. The dynamics of the main elements-indicators' components characterizing the innovative activity of the domestic industry are defined, calculated, and analyzed in this work.

All in all, the works of domestic scientists reveal the development peculiarities of the Ukrainian economy at large and its industrial sector in particular, as well as form a methodological and methodical basis for further research in this direction.

## AIMS AND OBJECTIVES

The purpose of the article is to identify transformations in the industrial sector of the Ukrainian economy based on a comprehensive assessment of the activity and efficiency of the named sector's functioning in the regional section. Achieving the set goal involves solving a number of tasks, namely: developing a methodology for assessing activity (production, labor, investment, and innovation) and efficiency (profitability) of the economy industrial sector at the macro- and meso-levels; assessment of the functioning results of the Ukrainian industry and its regions in the current period and in dynamics (10-year trend of indicators); grouping Ukrainian regions by the type of their industry, based on the industrial production structure and the industrialization level of the regional economy.

## METHODS

The authors have developed an original method of the comprehensive assessment of industry functioning trends and results based on its socio-economic efficiency. This technique was tested at the industrial sector's level of the Polish economy and its voivodships [12]. In order to conduct a similar study for the Ukrainian industry and its regions, the methodology was improved in terms of evaluation indicators that can be calculated based on official data of the State Statistics Service of Ukraine (SSSU), in particular. The implementation algorithm of the developed methodology includes three main stages.

The first stage of assessment involves calculating the industrialization level of the economy and the innovativeness of the country's industry in terms of its regions. The authors offer to determine this level based on the indicators of the industry share in each of the regions in the key absolute indicators of the industrial sector's functioning in the country's economy. Indicators characterizing the level of the economy's industrialization include the volume of realized industrial products, the GVA of industry. Indicators that characterize the level of innovativeness of the industrial sector include the volume of implemented innovative products and the costs of innovative activities of industrial enterprises. According to the calculations results of each of the country's region's share in the named indicators for the selected period of time (10 years), appropriate regional structures are built. Such structures clearly demonstrate the current state and dynamics of the regional economy's industrialization level and the innovativeness of its industrial sector.

The second stage of the study involves conducting an integrated assessment of the industrial sector's efficiency at the macro- and meso-levels. The algorithm for implementing this stage is schematically presented in the table. 1. Based on the results of the detailed applied analytical studies and the applied expert-logical approach, the authors determined that the most important indicators of the industry functioning (from the standpoint of economic and social efficiency and development prospects) are production, labor, investment and innovation activity, as well as the profitability of the activity. These indicators are both results and factors of the development of industrial enterprises, as they are closely interrelated.

**Table 1. Algorithm for determining the functioning efficiency of the economy industrial sector.** Notes: \* - Profitability of products manufactured by one worker is an author's indicator, calculated as the ratio of the net financial result attributable to one worker employed in the industry to the average annual salary of one full-time worker in the industry.

Efficiency indicators	Current state indicators	Dynamics indicators (for a period of 10 years)
Production and labor activity	Volume of sold industrial products per employed worker ( $x_2^{lf}$ )	Index of the industrial products' volume sold per employed worker ( $x_2^{ld}$ )
	GVA in industry per employed worker ( $x_2^{lf}$ )	GVA index in industry per employed worker ( $x_2^{ld}$ )
	Average monthly nominal salary of one full-time employee in industry ( $x_3^{lf}$ )	Index of the average monthly nominal wage of one full-time employee in industry ( $x_3^{ld}$ )
	<i>Taxonomic index of current labor activity</i> $X^{lf} = (x_1^{lf} + x_2^{lf} + x_3^{lf})/3$	<i>Taxonomic dynamics index of labor activity</i> $X^{ld} = (x_1^{ld} + x_2^{ld} + x_3^{ld})/3$
	<b>General taxonomic index of production and labor activity</b> $X^l = (X^{lf} + X^{ld})/2$	
Investment activity	Capital investment per employed worker in the industry ( $x_1^{kf}$ )	Index of capital investment per employed worker in the industry ( $x_1^{kd}$ )
	Foreign direct investment per employed worker in the industry ( $x_2^{kf}$ )	Index of foreign direct investment per employed worker in the industry ( $x_2^{kd}$ )
	Costs of innovation activity per employed worker in the industry ( $x_3^{kf}$ )	Index of costs for innovation activity per employed worker in the industry ( $x_3^{kd}$ )
	<i>Taxonomic index of current investment activity</i> $X^{kf} = (x_1^{kf} + x_2^{kf} + x_3^{kf})/3$	<i>Taxonomic index of dynamics of investment activity</i> $X^{kd} = (x_1^{kd} + x_2^{kd} + x_3^{kd})/3$
	<b>General taxonomic index of investment activity</b> $X^k = (X^{kf} + X^{kd})/2$	
Innovative activity	The share of innovative products in the total volume of industrial products sold ( $x_1^{if}$ )	Index of the share of innovative products in the total volume of realized industrial products ( $x_1^{id}$ )
	The share of products sold outside of Ukraine in the total volume of innovative industrial products sold ( $x_2^{if}$ )	Index of the share of products sold outside of Ukraine in the total volume of innovative industrial products sold ( $x_2^{id}$ )
	The share of innovation costs in industry investment ( $x_3^{if}$ )	Index of the share of innovation costs in industry investment ( $x_3^{id}$ )
	<i>Taxonomic index of current innovative activity</i> $X^{if} = (x_1^{if} + x_2^{if} + x_3^{if})/3$	<i>Taxonomic index of dynamics of innovative activity</i> $X^{id} = (x_1^{id} + x_2^{id} + x_3^{id})/3$
	<b>General taxonomic indicator of innovative activity</b> $X^i = (X^{if} + X^{id})/2$	
Profitability of activity	Operational activities' profitability of industrial enterprises ( $x_3^{pf}$ )	Increase in the operational activities' profitability of industrial enterprises ( $x_3^{pd}$ )
	Assets profitability of industrial enterprises ( $x_2^{pf}$ )	Increase in assets profitability of industrial enterprises ( $x_2^{pd}$ )
	Profitability of products manufactured by one worker in industry * ( $x_1^{pf}$ )	Increase in the profitability of products manufactured by one worker in an industry ( $x_1^{pd}$ )
	<i>Taxonomic index of current economic efficiency</i> $X^{pf} = (x_1^{pf} + x_2^{pf} + x_3^{pf})/3$	<i>Taxonomic index of dynamics of economic efficiency</i> $X^{pd} = (x_1^{pd} + x_2^{pd} + x_3^{pd})/3$
	<b>General taxonomic indicator of the profitability of the activity</b> $X^p = (X^{pf} + X^{pd})/2$	
<i>Integral indicator of the current state</i> $I^f = \sqrt[4]{X^{kf} X^{lf} X^{if} X^{pf}}$		<i>Integral indicator of dynamics</i> $I^d = \sqrt[4]{X^{kd} X^{ld} X^{id} X^{pd}}$
<b>The final integrated indicator of the functioning efficiency of the industry</b> $I = \sqrt[4]{X^k X^l X^i X^p}$		

12 indicators were chosen for the analysis. They reflect the functioning results of the economy industrial sector at the macro- and meso- levels. Each of these indicators is a stimulator, that is, the higher the value of the indicator is – the higher the result of the activity direction that it characterizes is. Selected indicators can be calculated based on open statistical data.

In addition, it is suggested to evaluate the functioning efficiency of the economy industrial sector both by the current values of the selected indicators and by the indices of their dynamics (for a period of 10 years). This will make it possible to compare the current (actual) level of industrial efficiency of the country and its regions with the previous one (achieved in the past period), as well as to diagnose the tendency of this level to change.

The method of Hellwig Z. [9] was used to compare the multidimensional values of the selected stimulator indicators. This method allows you to place all the actual values of the indicators given in the table. 1 in the range from 0 to 1. Regions with the highest value of each of the indicators will correspond to the maximum level – 1, and with the minimum – 0. Thus, all regions for each of the indicators will be placed in order of distance from the region with the maximum value of the indicator.

For each of the four selected indicators of efficiency (production and labor, investment, innovation activity, and profitability of activity), the calculation of taxonomic indicators of the current state and dynamics is provided, which are defined as the

arithmetic mean of 3 standardized values for each indicator. General taxonomic indicators are calculated as the average arithmetic value of taxonomic indicators of the current state and dynamics. The integral indicator of the current state is defined as the geometric mean of 4 taxonomic indicators of the current state (for each of the 4 performance indicators). Similarly, the integral indicator of dynamics is defined as the geometric mean of 4 taxonomic indicators of dynamics. The final integrated indicator of the industry's efficiency is defined as the geometric mean of 4 general taxonomic indicators.

The third stage of the study involves the conditional grouping of regions according to the values of structural and integral indicators of the current state and dynamics of the economy industrial sector's efficiency.

## RESULTS

The developed methodology was tested at the level of Ukrainian regions. The calculation results of indicators of the economy industriality proved that domestic industrial production is mainly concentrated in traditionally industrial regions. Thus, 58.8% of the volume of industrial products sold fell on five regions in 2021: Dnipropetrovsk, Donetsk, Zaporizhzhia, Poltava, and Kharkiv (Table 2).

**Table 2. The regional structure of the industry in Ukraine according to indicators of industriality and innovativeness, %.** (Source: author's calculations based on SSSU data [20])

Region	Industriality						Innovativeness					
	Realized industrial products			Industry GVA			The amount of innovative products realized			Innovative activity costs of industrial enterprises		
	2010	2021	Increase (p.p.)	2010	2020	Increase (p.p.)	2010	2020	Increase (p.p.)	2010	2020	Increase (p.p.)
Vinnitsia	1.84	2.91	1.07	1.77	3.26	1.49	1.02	1.56	0.54	1.33	1.69	0.36
Volyn	0.88	1.40	0.52	0.88	1.40	0.52	0.97	1.05	0.08	1.32	0.88	-0.44
Dnipropetrovsk	18.94	21.52	2.58	20.55	18.55	-2.00	2.81	14.85	12.04	5.63	11.15	5.52
Donetsk	22.56	12.45	-10.11	21.92	10.79	-11.13	11.99	35.76	23.77	11.65	12.65	1.00
Zhytomyr	1.30	1.95	0.65	1.57	2.07	0.50	0.54	0.17	-0.37	0.42	0.50	0.08
Zakarpattia	0.79	0.91	0.12	1.15	1.10	-0.05	2.89	0.21	-2.68	1.08	0.16	-0.92
Zaporizhzhia	7.79	9.66	1.87	6.05	7.43	1.38	6.50	4.62	-1.88	1.91	14.17	12.26
Ivano-Frankivsk	1.59	3.13	1.54	1.86	2.79	0.93	1.00	0.55	-0.45	30.97	2.19	-28.78
Kyiv	3.49	5.07	1.58	3.06	6.14	3.08	2.00	3.49	1.49	1.93	7.09	5.16
Kirovohrad	0.97	1.50	0.53	1.41	1.95	0.54	1.17	3.30	2.13	1.59	2.83	1.24
Luhansk	8.64	0.79	-7.85	8.46	0.81	-7.65	22.17	1.72	-20.45	3.60	0.26	-3.34
Lviv	2.89	4.72	1.83	2.80	5.95	3.15	1.26	2.91	1.65	2.06	5.51	3.45
Mykolaiv	2.15	2.69	0.54	2.12	2.56	0.44	4.97	2.98	-1.99	7.69	6.27	-1.42
Odesa	3.43	3.04	-0.39	3.15	3.21	0.06	0.77	1.91	1.14	2.33	0.88	-1.45
Poltava	6.49	7.75	1.26	6.77	10.45	3.68	18.45	9.99	-8.46	1.84	8.52	6.68
Rivne	1.37	1.88	0.51	1.61	2.00	0.39	0.26	0.27	0.01	0.56	0.81	0.25
Sumy	1.70	1.97	0.27	2.28	1.82	-0.46	3.97	0.96	-3.01	3.24	1.38	-1.86
Ternopil	0.62	0.96	0.34	0.72	1.08	0.36	0.91	1.24	0.33	0.12	3.19	3.07
Kharkiv	5.75	7.43	1.68	5.39	7.62	2.23	4.84	7.33	2.49	7.79	10.66	2.87
Kherson	0.94	1.31	0.37	1.01	1.36	0.35	1.56	0.98	-0.58	0.73	0.60	-0.13
Khmelnytskyi	1.33	2.07	0.74	1.36	1.94	0.58	0.11	0.90	0.79	11.11	1.37	-9.74
Cherkasy	2.77	3.01	0.24	2.20	3.29	1.09	5.77	1.28	-4.49	0.21	3.96	3.75
Chernivtsi	0.37	0.62	0.25	0.48	0.67	0.19	0.51	0.08	-0.43	0.57	0.22	-0.35
Chernihiv	1.40	1.27	-0.13	1.43	1.76	0.33	3.56	0.76	-2.80	0.33	0.33	0.00
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>x</b>	<b>100.00</b>	<b>100.00</b>	<b>x</b>	<b>100.00</b>	<b>100.00</b>	<b>x</b>	<b>100.00</b>	<b>100.00</b>	<b>x</b>

These regions also accounted for 54.8% (in 2020) of GVA generated in the industry. The named industrial regions were innovative at the same time: 65.73% of the volume of innovative products sold in Ukraine was produced in Dnipropetrovsk, Donetsk, Zaporizhzhia, Poltava, and Kharkiv regions in 2020. At the same time, the costs of innovative activity of industrial enterprises in these regions totaled 44.1% of the all-Ukrainian indicator, which demonstrates a high return on investment in innovation. Thus, the share of the latter in the volume of implemented innovative products in Dnipropetrovsk, Donetsk, Zaporizhzhia, Poltava, and Kharkiv regions was only 20.3%, while in Ukraine in general – 30.3%.

During 2011-2021, Ivano-Frankivsk, Kyiv, and Lviv regions significantly increased their industrial potential, while the industrially developed (until 2014) Luhansk region lost its production capacity as a result of military aggression by the Russian Federation.

The implementation results of the second stage of the methodology (assessment of the functioning efficiency of the economy industrial sector) revealed a high degree of the regions' differentiation in Ukraine according to the indicators' values of the current state and dynamics of production, labor, investment and innovation activity of industrial enterprises. The highest level of production and labor activity in terms of the volume of industrial products sold and GVA per employee (or labor productivity) is traditionally characteristic of the 4 most powerful industrial regions – Dnipropetrovsk, Donetsk, Zaporizhzhia and Poltava regions (table 3). At the same time, such regions as Vinnytsia, Volyn, Zhytomyr, Zakarpattia, Ivano-Frankivsk, Kyiv, Kirovohrad, Lviv, Ternopil, Kherson, Khmelnytskyi, Cherkasy, Chernivtsi, and Chernihiv regions showed a significant increase in the values of the mentioned indicators during 2010-2020 (table 4). The most powerful industrial regions (Dnipropetrovsk, Donetsk, Zaporizhzhia, and Poltava regions), as well as Kyiv, Mykolaiv, and Rivne regions, consistently had the highest nominal wages in the industry. However, the increase in the values of this indicator during the analyzed period in the named regions (with the exception of the Mykolaiv and Rivne regions) was relatively insignificant.

The highest investment activity of industrial enterprises is characteristic of the Dnipropetrovsk, Donetsk, and Poltava regions, which accounted for 35.3% of capital and 43.7% of direct foreign investments in the Ukrainian industry in 2020. Kyiv and Kherson (since 2017) regions were also among the leaders in terms of capital investment per employed worker in this sector of the economy, and Zaporizhzhia, Lviv, and Chernihiv (since 2017) regions were among the leaders in terms of direct foreign investment. At the same time, the highest dynamics of capital investments in the industry were demonstrated by Vinnytsia, Volyn, Donetsk, and Ternopil regions, and direct foreign investment – by Kirovohrad, Poltava, and Chernihiv regions. The most innovative investment activity was in the industrial regions (Donetsk, Zaporizhzhia, and Poltava regions), as well as in Kyiv, Kirovohrad, Mykolaiv, Ternopil, and Cherkasy regions. The named regions maintained a high level of positive dynamics of spending on innovative activity in the industry per employee.

**Table 3. Functioning indicators of the economy industrial sector in Ukraine and its regions (2020).** (Source: author's calculations based on SSSU data [20])

Region	Production and labor activity			Investment activity			Innovative activity			Profitability of activity		
	The volume of realized industrial products per employee, thousand UAH/per person	GVA per employee, thousand UAH/per person	Average monthly nominal salary per full-time employee, thousand UAH/per person	Capital investments per employee, thousand UAH/per person	Direct foreign investments per employee, thousand UAH/per person	Spending on innovative activities per employee, thousand UAH/per person	The share of innovative industrial products to the total volume of realized industrial products, %	The share of innovative industrial products sold outside of Ukraine in the total volume of innovative products, %	The share of innovation costs in industry investment, %	Return on assets, %	Profitability of manufactured products by one employee, %	Profitability of operational activities of industrial enterprises, %
<b>Ukraine</b>	<b>76.54</b>	<b>170.84</b>	<b>6.11</b>	<b>321.69</b>	<b>1051.96</b>	<b>12.76</b>	<b>1.90</b>	<b>54.20</b>	<b>7.98</b>	<b>-0.56</b>	<b>-6.17</b>	<b>3.90</b>
Vinnytsia	70.43	123.56	2.69	317.75	1113.41	12.45	0.90	8.60	3.81	-1.00	-7.26	1.40
Volyn	70.78	121.25	1.80	191.97	646.87	10.77	1.40	7.20	1.50	-1.45	-8.38	4.90
Dnipropetrovsk	97.98	270.42	3.71	380.01	1280.83	13.47	1.40	58.30	3.79	3.76	46.04	10.80
Donetsk	87.19	202.77	7.81	409.93	1421.38	14.03	6.30	90.20	8.96	-4.51	-55.41	-1.40
Zhytomyr	37.21	109.37	0.74	190.94	633.50	10.37	0.20	28.70	2.00	-0.97	-4.91	4.00
Zakarpattia	32.85	96.96	0.34	139.94	449.61	11.68	0.40	31.70	1.03	-4.51	-16.65	2.30
Zaporizhzhia	51.11	230.60	10.08	325.22	1199.39	14.78	1.20	35.00	19.72	-2.08	-15.98	1.30
Ivano-Frankivsk	32.84	118.35	3.30	286.66	923.74	12.16	0.50	19.60	9.06	-4.71	-30.54	7.50
Kyiv	91.64	141.33	6.08	324.06	970.96	13.57	1.00	77.40	6.64	4.01	41.57	7.30
Kirovohrad	34.01	69.41	6.49	275.37	721.48	10.28	4.70	55.90	19.08	0.37	2.19	3.10
Luhansk	12.36	67.42	0.54	103.70	354.28	11.27	4.60	7.00	4.38	-26.43	-109.71	-25.10
Lviv	54.41	174.94	4.06	269.97	737.94	11.27	1.00	17.70	7.46	-1.01	-7.27	2.50
Mykolaiv	35.93	39.44	11.03	277.42	985.06	15.17	2.40	10.20	30.69	-3.35	-17.36	4.20
Odesa	49.22	107.15	1.16	262.40	842.56	10.85	1.30	37.00	2.37	-2.34	-19.00	2.50
Poltava	112.75	515.69	9.88	746.12	1662.64	13.50	2.70	7.00	8.76	11.50	106.71	18.30
Rivne	26.00	70.58	1.44	218.48	714.08	14.53	0.40	33.40	5.54	-10.40	-27.89	-6.00
Sumy	35.57	111.04	2.47	200.35	738.59	10.87	1.10	77.40	6.95	-1.83	-8.43	3.50
Ternopil	50.29	15.97	9.78	202.78	584.54	10.18	2.40	8.60	19.44	0.40	2.01	6.20
Kharkiv	26.65	73.53	5.33	234.86	791.39	10.21	2.50	10.70	20.01	1.75	9.57	3.10
Kherson	81.54	79.80	1.71	237.93	836.89	10.79	1.90	3.90	2.09	-6.15	-62.09	1.90
Khmelnytskyi	35.31	28.18	2.41	210.59	749.37	11.83	1.00	13.00	6.81	-2.61	-12.82	6.10
Cherkasy	25.09	41.49	5.99	306.66	1040.10	11.13	0.80	4.70	23.88	-3.54	-32.25	0.10
Chernivtsi	16.93	25.96	0.60	113.75	346.38	9.57	0.40	15.00	3.56	-0.15	-0.41	1.70
Chernihiv	34.52	230.23	0.76	246.35	705.82	10.13	1.10	1.00	2.20	7.50	43.25	11.00

**Table 4. Indicators of the functioning dynamics of the economy industrial sector in Ukraine and its regions (2020/2010).** (Source: author's calculations based on SSSU data [20])

Region	Production and labor activity			Investment activity			Innovative activity			Profitability of activity		
	Index of the volume of industrial products sold per employee	GVA index per employee	Average monthly nominal wage index per full-time employee	Capital investment index per employee	Index of direct foreign investment per employee	Index of costs for innovation activities per employee	Index of the share of innovative industrial products to the total volume of realized industrial products	Index of the share of innovative industrial products sold outside of Ukraine in the total volume of innovative products	Index of the share of innovation costs in industry investment	Increase in profitability of assets	Increase in the profitability of products manufactured by one employee	Increase in the profitability of the operational activities of industrial enterprises
<b>Ukraine</b>	<b>3.49</b>	<b>4.30</b>	<b>4.95</b>	<b>4.78</b>	<b>4.52</b>	<b>2.63</b>	<b>0.50</b>	<b>1.08</b>	<b>1.14</b>	<b>-3.28</b>	<b>-35.33</b>	<b>0.30</b>
Vinnitsia	6.17	6.30	6.11	5.77	10.95	2.53	0.45	0.54	0.68	-2.84	-19.32	-1.70
Volyn	4.84	4.99	5.53	8.32	4.79	1.12	0.33	0.24	1.24	-3.04	-21.38	2.30
Dnipropetrovsk	3.42	3.23	4.71	4.76	1.58	4.11	2.33	1.47	0.42	-5.78	-29.61	3.50
Donetsk	4.15	4.25	4.67	5.89	4.25	5.45	3.32	1.31	0.76	-2.00	-63.18	-1.90
Zhytomyr	4.98	4.30	5.50	3.94	6.57	2.23	0.13	1.06	0.02	-0.56	-2.13	1.60
Zakarpattia	4.53	3.34	6.52	4.88	2.94	0.31	0.03	0.34	1.03	-6.50	-4.81	2.40
Zaporizhzhia	3.64	4.37	5.25	3.90	9.01	15.37	0.39	0.55	0.59	-8.60	-75.51	4.70
Ivano-Frankivsk	4.98	4.58	5.46	1.48	3.02	0.11	0.22	0.56	14.42	-1.29	3.17	7.90
Kyiv	4.54	5.96	4.81	4.21	3.28	6.34	0.48	3.83	5.01	9.67	47.20	6.00
Kirovohrad	4.86	4.40	5.01	4.41	32.36	3.28	0.90	0.71	6.00	-0.47	-27.72	-2.70
Luhansk	1.25	1.29	4.02	0.85	4.45	0.56	0.48	0.20	1.93	-25.26	-100.76	-23.10
Lviv	5.22	6.78	5.34	4.67	10.55	4.94	0.63	2.03	2.22	-3.09	-9.11	1.10
Mykolaiv	4.23	4.17	5.48	2.05	6.67	1.63	0.28	0.19	1.45	-5.44	-32.28	0.40
Odesa	2.90	3.39	5.02	3.82	4.82	0.73	1.63	2.06	0.39	2.09	32.34	1.60
Poltava	3.90	5.79	5.06	4.70	24.93	10.05	0.26	1.03	1.06	3.67	23.85	11.50
Rivne	4.22	3.78	5.55	2.83	5.23	2.56	0.57	1.26	2.31	-8.16	-16.08	-5.30
Sumy	4.59	3.19	5.12	4.48	4.30	0.99	0.13	0.84	0.16	2.19	-43.81	-1.60
Ternopil	5.08	5.19	6.14	7.50	10.84	53.82	0.43	0.12	0.22	1.89	14.79	5.40
Kharkiv	3.94	4.30	4.67	3.21	7.50	2.41	0.81	0.16	1.29	-2.53	-19.75	-1.80
Kherson	5.55	5.03	5.95	12.00	8.72	1.78	0.31	0.34	2.39	-2.42	-29.83	1.10
Khmelnyskyi	4.83	4.58	5.46	2.18	1.88	0.23	3.33	2.17	15.40	-8.83	-21.91	2.40
Cherkasy	3.72	4.77	5.45	2.32	1.93	34.40	0.10	0.07	4.86	-2.80	-22.17	-0.90
Chernivtsi	4.22	3.77	5.43	3.36	3.65	0.60	0.08	1.10	1.24	3.97	21.90	4.00
Chernihiv	3.98	4.70	5.16	4.63	26.68	2.27	0.12	0.47	0.19	5.74	33.83	6.50

It is worth noting the significant increase in the values of this indicator during 2010-2020 in the Lviv and Dnipropetrovsk regions, which, in turn, caused the acceleration of innovative activity in them. In particular, there was a significant increase in these regions in the values of the innovative products' share in the total volume of sold industrial products and the share of products sold outside of Ukraine in the total volume of sold innovative industrial products. Similar processes took place in Donetsk, Kyiv, Odesa, Rivne, and Khmelnytskyi regions.

In general, innovative activity in the industrial sector of the Ukrainian economy is very low – the share of innovative products in the total volume of industrial products sold was only 1.9% in 2020 against 3.8% in 2010. The vast majority of innovations were produced in the Donetsk region – 32.4% of the total volume of innovative industrial products and 71.4% of the products sold outside of Ukraine. Kirovohrad, Mykolaiv, Poltava, Ternopil, and Kharkiv regions also demonstrated a relatively high level of the innovative products' share in the total volume of industrial products sold. At the same time, the highest indicator's value of the share of products sold outside of Ukraine in the total volume of sold innovative industrial products (or exports of industrial innovations) during the analyzed period was achieved in Kyiv, Lviv, Odesa and Khmelnytskyi regions. The innovative activity of industrial enterprises in the named regions was closely correlated with their investment activity. The most innovative investments were made in Mykolaiv, Kharkiv, Zaporizhzhia, Ternopil, Kirovohrad, and Cherkasy regions. The last two regions, together with Kyiv and Khmelnytskyi, demonstrated the highest positive values dynamics for the indicator of the share of costs for innovation in industry investments.

The industrial sector of the economy functioned the most effectively in two industrial regions – Dnipropetrovsk and Poltava regions, as well as in the Chernihiv region, despite the relatively low innovative activity of their enterprises. Throughout

the analyzed period, the Poltava region was the unchanging leader (by a large margin from the rest of the regions) in terms of industrial enterprises' profitability. The operational activity of industry in the Ivano-Frankivsk, Kyiv, Ternopil, and Chernihiv regions was also highly profitable. The named regions also demonstrated the highest positive dynamics of this indicator's values.

Only seven regions (Dnipropetrovsk, Kyiv, Kirovohrad, Poltava, Ternopil, Kharkiv, and Chernihiv) received a positive financial result of the industrial enterprises' activities before taxation in 2020. Accordingly, the profitable assets of industrial enterprises were in these areas. However, only Kyiv, Poltava, Ternopil, and Chernihiv regions achieved an increase in the values of the assets' profitability index during the analyzed period. Also, there was profitable production per one industrial worker in the named 7 regions.

The results of the taxonomic indicators' calculation that was carried out according to the author's calculation method showed the highest level of profitability, as well as the production, labor, and investment activity of industrial enterprises in the Poltava region, while the innovative activity (and its dynamics too) was relatively low (table 5). This situation can be explained by structural changes in the economy industrial sector of this region, which took place during 2011-2021, namely: a decrease in the share of the processing industry by 34.8 percentage points (mechanical engineering – by 14.5 percentage points, in particular) and, instead, increase in the share of the extractive industry by 34.6 percentage points.

The second highest value of the final integrated indicator of the economy industrial sector efficiency (0.52) was achieved by the Kyiv region, which achieved a high level of all analyzed enterprises' activity and profitability types. The industrial structure of this region is dominated by the processing industry by a large margin, the share of which has increased by 4.7 percentage points over the last decade, and in 2021 it was one of the largest in Ukraine (after Cherkasy and Volyn regions) – 81.4%.

**Table 5. Taxonomic functioning indicators of the economy industrial sector in Ukraine and its regions.** (Source: author's calculations based on SSSU data [20])

Region	Production and labor activity			Investment activity			Innovative activity			Profitability of activity			Integral index		
	Current status indicator	Indicator of dynamics	General indicator	Current status indicator	Indicator of dynamics	General indicator	Current status indicator	Indicator of dynamics	General indicator	Current status indicator	Indicator of dynamics	General indicator	Current status indicator	Indicator of dynamics	General indicator
<b>Ukraine</b>	<b>0.48</b>	<b>0.46</b>	<b>0.47</b>	<b>0.50</b>	<b>0.17</b>	<b>0.33</b>	<b>0.37</b>	<b>0.16</b>	<b>0.26</b>	<b>0.61</b>	<b>0.58</b>	<b>0.60</b>	<b>0.48</b>	<b>0.29</b>	<b>0.40</b>
Vinnitsia	0.48	0.92	0.70	0.34	0.26	0.30	0.09	0.10	0.09	0.58	0.60	0.59	0.30	0.35	0.33
Volyn	0.19	0.67	0.43	0.31	0.26	0.29	0.08	0.05	0.06	0.61	0.64	0.62	0.23	0.27	0.27
Dnipropetrovsk	0.61	0.36	0.48	0.56	0.14	0.35	0.31	0.37	0.34	0.78	0.60	0.69	0.54	0.32	0.45
Donetsk	0.70	0.46	0.58	0.61	0.21	0.41	0.76	0.46	0.61	0.46	0.51	0.48	0.62	0.39	0.51
Zhytomyr	0.17	0.63	0.40	0.16	0.16	0.16	0.11	0.10	0.10	0.61	0.70	0.65	0.20	0.29	0.26
Zakarpattia	0.17	0.68	0.43	0.12	0.14	0.13	0.12	0.05	0.08	0.55	0.64	0.59	0.19	0.23	0.23
Zaporizhzhia	0.64	0.51	0.58	0.58	0.27	0.42	0.38	0.09	0.24	0.56	0.48	0.52	0.53	0.28	0.42
Ivano-Frankivsk	0.40	0.64	0.52	0.23	0.03	0.13	0.17	0.06	0.12	0.56	0.76	0.66	0.30	0.18	0.27
Kyiv	0.51	0.61	0.56	0.53	0.16	0.34	0.39	0.49	0.44	0.75	0.95	0.85	0.53	0.46	0.52
Kirovohrad	0.23	0.57	0.40	0.30	0.46	0.38	0.65	0.28	0.46	0.62	0.60	0.61	0.41	0.45	0.45
Luhansk	0.10	0.00	0.05	0.04	0.03	0.04	0.29	0.10	0.19	0.00	0.00	0.00	0.00	0.00	0.00
Lviv	0.29	0.78	0.53	0.36	0.24	0.30	0.17	0.28	0.23	0.59	0.65	0.62	0.32	0.43	0.39
Mykolaiv	0.59	0.57	0.58	0.43	0.10	0.26	0.48	0.07	0.27	0.57	0.57	0.57	0.51	0.22	0.39
Odesa	0.28	0.37	0.33	0.21	0.13	0.17	0.20	0.35	0.27	0.56	0.80	0.68	0.29	0.34	0.32
Poltava	0.90	0.59	0.75	0.96	0.43	0.70	0.24	0.13	0.18	1.00	0.89	0.95	0.67	0.42	0.55
Rivne	0.45	0.56	0.50	0.12	0.11	0.12	0.18	0.21	0.19	0.41	0.53	0.47	0.25	0.29	0.27
Sumy	0.23	0.49	0.36	0.21	0.14	0.18	0.40	0.08	0.24	0.59	0.60	0.59	0.32	0.24	0.31
Ternopil	0.15	0.78	0.46	0.42	0.63	0.53	0.35	0.05	0.20	0.65	0.79	0.72	0.34	0.37	0.43
Kharkiv	0.22	0.45	0.34	0.24	0.15	0.20	0.37	0.11	0.24	0.65	0.60	0.63	0.33	0.26	0.31
Kherson	0.27	0.78	0.52	0.31	0.42	0.37	0.10	0.10	0.10	0.46	0.61	0.53	0.25	0.38	0.32
Khmelnytskyi	0.29	0.63	0.46	0.15	0.04	0.10	0.14	0.85	0.50	0.60	0.58	0.59	0.25	0.34	0.34
Cherkasy	0.37	0.57	0.47	0.24	0.26	0.25	0.29	0.11	0.20	0.51	0.61	0.56	0.34	0.32	0.34
Chernivtsi	0.01	0.54	0.27	0.03	0.10	0.07	0.08	0.12	0.10	0.61	0.82	0.71	0.05	0.27	0.19
Chernihiv	0.20	0.54	0.37	0.23	0.40	0.31	0.11	0.05	0.08	0.81	0.88	0.85	0.25	0.31	0.30

The third leadership place was occupied by the Donetsk region, which demonstrated the highest level of innovative activity, but relatively low activity profitability. The industry of this region is narrowly specialized: 53.2% of the sold products volume fell on metallurgical production in 2021 (against 40.6% in 2010), while only 3.8% (against 9.5%) – fell on mechanical engineering.

The same values of the final integrated indicator of the economy industrial sector's functioning efficiency (0.45) were recorded in Dnipropetrovsk and Kirovohrad regions. These regions are characterized primarily by a high level of profitability, as well as the investment and innovation activity of enterprises. However, while the Dnipropetrovsk region shows high values of the current production and investment activities indicator, the positive dynamics of the latter are much higher in the Kirovohrad region. Also, these regions have a completely different (even opposite) structure of the industry. Thus, while the extractive industry (35.4% in 2021 versus 25.2% in 2010) and metallurgy (34.2% versus 35.7%) dominated in the Dnipropetrovsk region, the production of food products (45.3% against 49.2%) and power industry (20.5% against 14.1%) – dominated in Kirovohrad region.

The economy of the Ternopil region traditionally does not belong to the industrial type, however, it achieved a relatively high value of the final integrated indicator of the industry functioning efficiency (0.43). Thus, the share of industrial GVA in this region's GVA was only 11.75% in 2020, while the share of agriculture was 21.62%. Ternopil region (as well as the Kirovohrad region, whose economy is also not industrial) is characterized by a high level of profitability and significant positive dynamics of industrial enterprises' investment activity. There have also been noticeable positive changes in favor of high-tech products in the structure of this region's industry: the production shares of rubber and plastic products increased by 11.4 percentage points during the years 2011-2021, and the share of mechanical engineering – by 2.5 percentage points.

The traditionally industrial Zaporizhzhia region demonstrated a decrease in innovative activity and profitability of industrial enterprises. Structural transformations in the industrial sector of the region's economy were also negative (from the point of view of the technological level of production), the share of mechanical engineering decreased by 8.9 percentage points, in particular, while the share of metallurgy increased by 5.1 percentage points.

Lviv and Mykolaiv regions achieved fairly high identical values (0.39) of the final integral indicator of the industry functioning efficiency. However, if the latter showed a high current level of production and innovation activity indicators of industrial enterprises, the former, on the contrary, demonstrated a noticeable increase in the values of these indicators. The economy industrial sector efficiency of the Mykolaiv region was dominated by electric power, the share of which increased by 14.3 percentage points over the last 10 years. (up to 39.5% in 2021). At the same time, the production of food products, beverages, and tobacco products was key among processing industries in this region, as well as in the Lviv region.

Kharkiv region, as one of the industrial leaders, did not show sufficient production, labor, and investment activity during the analyzed period, despite the generally profitable activity of industrial enterprises. To some extent, this can be explained by the relatively low productivity of industrial personnel in this region. Thus, the number of the latter in the Kharkiv region decreased by only 6.7% during the period of 2011-2020 (while on average in Ukraine – by 31.9%), and according to the author's methodology, the indicators' values of production, labor and investment activity were determined per employed worker in industry. The decrease in the level of innovative activity at large and the share of products sold outside of Ukraine, in particular, in the total amount of innovative industrial products sold in the region is explained by external influence, namely the loss of traditional sales markets after 2014. As a result, the share of mechanical engineering decreased by 8.6 percentage points in the structure of industrial production of the Kharkiv region, and the share of food industry products decreased by 10.4 percentage points.

Luhansk region – one of the Ukrainian industrial leaders in the past – lost most of its industrial potential as a result of Russian armed aggression. As a result, since 2018, the main volume of GVA in this region has been formed by agriculture. Very low production and investment activity were characteristic of industrial enterprises of the Odesa region, the positive dynamics in their activity's profitability laid only in reducing their unprofitability. All other 12 regions instead showed a significant increase in production and labor activity. It is worth highlighting the traditionally "agrarian" Vinnytsia region among them, which achieved the highest growth in the volume of industrial products sold per employee, as well as the Ivano-Frankivsk, Rivne, and Cherkasy regions, whose economies belong to the industrial type. The latter in particular is the leader in terms of the processing industries' share in the structure of the economy industrial sector (82.8% in 2021 versus 86.1% in 2010).

## DISCUSSION

The industrial sector of the economy functions under the influence of a significant number of various dynamic (or rapidly changing) factors, such as the situation in the world market, conditions of access to external commodity and raw material markets, global competition, and concentration of products, and force majeure circumstances. In addition to dynamic factors, relatively stable factors have a significant (and in some cases decisive) influence on the results of the functioning of industry, among which, first of all, it is worth highlighting the scale of production activities, the adequacy and efficiency of the placement of capital investments, the innovativeness of industrial products, and labor productivity. The named categories are both factors and results of the functioning of the economy's industrial sector. The results of the analysis of each of these categories, as well as their comprehensive assessment, in general, form the basis for diagnosing problems and prospects for the functioning of industry, and as a result, the development of management tactical and strategic decisions regarding the regulation of the economy industrial sector activity at the macro- and meso- levels in the direction of its purposeful structural transformation.

The results of the assessments of the Ukrainian economy industrial sector functioning according to the author's methodology made it possible to tentatively distinguish four groups of regions according to the type of their industry:

- the first group – traditionally industrial regions with a high level of the economy's industrialization and product innovation, a significant (with a tendency to increase) share of the extractive industry (Dnipropetrovsk, Donetsk, Zaporizhzhia, Luhansk (until 2014), Poltava and Kharkiv regions);
- the second group – regions that possessed sufficient industrial potential and/or demonstrated its active growth (Vinnytsia, Kyiv, Kirovohrad, Lviv, Ternopil, and Cherkasy regions). The regions of this group are characterized by a highly developed processing industry, in which food occupied the largest share;
- the third group – regions with a high level of industrial and labor activity, the industrial sector of which was dominated by electricity production (Zakarpattia, Ivano-Frankivsk, Mykolaiv, Rivne, Khmelnytskyi and Chernivtsi regions);
- fourth group – the economy of these regions belongs to the non-industrial type, where the activity and efficiency indicators of industrial enterprises are mostly low (or tend to decrease) (Volyn, Zhytomyr, Odesa, Sumy, Kherson and Chernihiv regions).

## CONCLUSIONS

Summing up, we can state the presence of certain transformational trends in the industrial sector of the national economy in a regional context. The essence of these trends lies in the formation of new industrial centers in Ukraine, which are still small in the scale of activity, but with larger (compared to traditional industrial regions) values and higher positive dynamics in individual indicators of production, labor and investment activity of industrial enterprises. Such "new industrial" centers are mostly located in the western and central regions with relatively low wages. The development priorities in these regions were the production of products with a relatively higher share of gross added value and the degree of processing of raw materials (engineering, chemical, woodworking and food industries). Similar transformations are taking place in Poland as well, as evidenced by the results of the author's research [11]. Those in the past "non-industrial" voivodeships, in particular the Podkarpatsk voivodeship (which borders with Lviv region), have significantly increased the level of product innovation, the profitability of the turnover and assets of this region's industry, and the costs of innovative activities over the past ten years. This gives grounds for the assertion that such voivodeships potentially (provided positive trends continue) have prospects of becoming new innovation and industrial centers of Poland.

The outlined trends began after 2014 in Ukraine and caused identified during the assessment of the structural transformations in the industrial sector of the national economy in general and individual regions in particular. The main factors of such changes were Russian military aggression and the signing of the Agreement on a free-trade area with the EU. The full-scale war of the Russian Federation against Ukraine in 2022 sharply and strongly intensified these transformational processes. In particular, all regions of the 1st group (which were significantly affected by military actions) lost a significant part of their industrial potential. Industrial facilities in Kyiv, Mykolaiv, Sumy, and Chernihiv regions also suffered significant destruction.

As part of the business relocation program, 770 enterprises were relocated from the zone of active military actions to safe regions in Ukraine, 599 companies out of these have already resumed their work. Most enterprises moved their production equipment and part of their personnel (20÷30%) to Lviv (30% of relocated enterprises), Zakarpattia (17%), Chernivtsi (11%), Ivano-Frankivsk (8%), Khmelnytsky (7%) and Ternopil (7%) regions. Among the relocated businesses, almost a third belong to enterprises in the processing industry. As a result, the dispositions of the regions changed significantly:

there was an increase in the industrial potential of some of the regions assigned to the 2nd group, as well as some of the regions from the 3rd group. Instead, the regions that were industrial leaders in Ukraine will be forced to restore their potential after the war, but on a new basis. This applies primarily to metallurgical industries, which need radical modernization and innovative technologies.

Low efficiency, the irrational structure of assets and insufficient innovative activity of domestic industrial activity's subjects, as well as the high import dependence of the Ukrainian economy in the segment of industrial products' consumption create significant additional challenges to national security, especially in the conditions of handling armed aggression from Russia and other geopolitical challenges. Accordingly, the fundamental structural transformation of domestic industry is urgent. Such a transformation will be a catalyst for qualitative structural transformations in the national economy, increased motivation for innovative activities and technical re-equipment of production in favor of goods with high added value. Further author's research in this direction will be aimed at developing models for optimizing the structure of Ukrainian industry and its intersectoral connections, taking into account external influences (globalization, energy prices, etc.).

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## **РЕГІОНАЛЬНІ ОСОБЛИВОСТІ ФУНКЦІОНУВАННЯ ПРОМИСЛОВОГО СЕКТОРА ЕКОНОМІКИ УКРАЇНИ В УМОВАХ НЕСТАБІЛЬНОГО РОЗВИТКУ**

Метою статті є виявлення трансформацій у промисловому секторі економіки України на підставі комплексної оцінки активності (виробничо-трудова, інвестиційної й інноваційної) та ефективності (рентабельності) функціонування названого сектора в регіональному розрізі. Результати проведених за допомогою авторської методи оцінок дозволили умовно виділити чотири групи регіонів України за типом їхньої промисловості: перша група – традиційно промислові регіони з високим рівнем індустріальності економіки та інноваційності продукції, вагомою (із тенденцією до збільшення) часткою добувної промисловості; друга група – регіони, що володіли достатнім промисловим потенціалом та/або демонстрували його активне нарощення (Вінницька, Київська, Кіровоградська, Львівська, Тернопільська й Черкаська області). Для регіонів цієї групи характерна високорозвинена переробна промисловість, у якій найбільшу частку займала харчова; третя група – регіони з високим рівнем виробничо-трудова активності, у промисловому секторі яких домінувало виробництво електроенергії; четверта група – регіони, економіка яких належить до неіндустріального типу і в яких переважно низькі (або мають тенденцію до зниження) значення показників активності та ефективності діяльності промислових підприємств. За останнє 10-річчя можна констатувати в промисловості України наявність певних трансформаційних тенденцій, суть яких полягала у формуванні нових промислових центрів, іще невеликих за масштабами діяльності, але з більшими (порівняно з традиційно індустріальними регіонами) значеннями й вищою позитивною динамікою окремих показників виробничо-трудова та інвестиційної активності промислових підприємств. Такі «новопромислові» центри виникали здебільшого в західних і центральних областях. Повномасштабна війна російської федерації проти України 2022 року різко й сильно активізувала ці трансформаційні процеси. Усі регіони 1-ї групи, які були індустріальними лідерами, утратили значну частину свого промислового потенціалу. Це стосується передусім металургійних виробництв, які потребують докорінної модернізації та інноваційних технологій. Натомість відбулось посилення промислового потенціалу частини областей, віднесених до 2-ї групи, а також частини областей 3-ї групи, зокрема внаслідок релокації підприємств.

**Ключові слова:** промисловий сектор економіки, регіони, активність, ефективність, виробництво, продукція, потенціал, інновації, структура, розвиток

**JEL Класифікація:** L50, O18