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REGIONAL FEATURES OF INNOVATIVE ACTIVITY OF UKRAINIAN INDUSTRY IN THE CONDITIONS OF WAR ECONOMY

The article analyzes the dynamics and regional features of the innovation activity of industrial enterprises of Ukraine in 2020-2024 under the conditions of the COVID-19 pandemic and full-scale war. It is established that the industrial sector remains the main generator of innovations: in 2022-2024 it accounted for 65.4% of innovatively active enterprises and 74.7% of innovative products. It is proven that the defense sector became an important driver of innovation development during the wartime period, stimulating the growth of mechanical engineering and vehicle production. To assess the spatial differentiation of innovation activity, a system of indicators covering the main stages of the innovation cycle – from innovation expenditures to sales of innovative products – was developed. Based on these indicators, five stages of transformation of the innovative sphere of industry in 2020-2024 were selected, as well as a regional «innovation core» consisting of Vinnytsia, Zaporizhzhia, Lviv, Ternopil, and Kharkiv regions was identified. It is concluded that the innovation activity of Ukraine's industry is gradually recovering, however, its level remains below average European standards due to limited financing, insufficient interaction between science and business, and the underdevelopment of technological infrastructure.

Keywords: *industry, innovation activity, innovatively active enterprises, innovative products, innovation expenditures, transformation, regions.*

Іщук С. О. РЕГІОНАЛЬНІ ОСОБЛИВОСТІ ІННОВАЦІЙНОЇ ДІЯЛЬНОСТІ ПРОМИСЛОВОСТІ УКРАЇНИ В УМОВАХ ВОЄННОЇ ЕКОНОМІКИ

Досліджено динаміку та просторові особливості інноваційної діяльності промислових підприємств України у 2020-2024 рр. в умовах масштабних економічних і безпекових викликів, зумовлених пандемією COVID-19 та повномасштабною війною. Встановлено, що промисловий сектор залишається ключовим генератором інновацій у національній економіці: у 2022-2024 рр. на нього припадало 65,4% інноваційно активних підприємств та 74,7% обсягу інноваційної продукції. Попри значні втрати, спричинені війною, українська промисловість демонструє поступове відновлення виробничої та інноваційної активності. Обґрунтовано, що важливим чинником інноваційної динаміки у воєнний період став оборонний сектор, розвиток якого стимулював зростання машинобудування та виробництва транспортних засобів, включно з літальними апаратами. Показано, що розширення оборонних потреб сприяло збільшенню витрат на інноваційну діяльність, зростанню кількості підприємств, які впроваджують нову або значно вдосконалену продукцію, а також підвищенню техніко-економічної ефективності окремих виробництв. Водночас виявлено, що значна частина інновацій має характер новизни лише для окремих підприємств, тоді як частка продукції, нової для ринку, залишається відносно низькою. Для аналізу регіональної диференціації інноваційної діяльності сформовано систему із чотирьох відносних показників, які відображають різні фази інноваційного циклу: частку інноваційно активних підприємств, частку підприємств, що впроваджують інновації, частку витрат на інновації в капітальних інвестиціях та частку інноваційної продукції в загальному обсязі реалізованої промислової продукції. На основі цих показників проведено кластеризацію регіонів і виокремлено п'ять етапів просторової трансформації інноваційної діяльності промисловості: етап докризової диференціації (2020 р.), ковідної кризи (2021 р.), шокової адаптації (2022 р.), поглиблення кризи (2023 р.) та структурної реконфігурації (2024 р.). Результати дослідження засвідчили формування в Україні певних стійких груп регіонів за рівнем інноваційної активності. Зокрема, визначено «інноваційне ядро», до якого належать Вінницька, Запорізька, Львівська, Тернопільська та Харківська області, де спостерігається відносно стабільна інноваційна активність промислових підприємств. Водночас встановлено, що високі витрати на інновації не завжди забезпечують пропорційний результат у вигляді збільшення обсягів реалізованої інноваційної продукції. Зроблено висновок, що інноваційна діяльність промисловості України поступово відновлюється, однак її інтенсивність залишається нижчою порівняно з індустріально розвиненими країнами-членами Європейського Союзу. Основними бар'єрами для розвитку інновацій залишаються обмежене фінансування, недостатня взаємодія між науковими установами та бізнесом, а також недостатній рівень технологічної і цифрової інфраструктури. Перспективи подальших досліджень пов'язані з обґрунтуванням пріоритетів інвестування у промислові інновації для забезпечення економічної та технологічної стійкості держави в умовах глобальних викликів.

Ключові слова: *промисловість, інноваційна діяльність, інноваційно активні підприємства, інноваційна продукція, витрати на інновації, трансформація, регіони.*

Problem statement. Innovation activity in Ukraine during 2022-2025 has become a fundamental component of national security and economic recovery. The full-scale Russian invasion has turned Ukraine into a global hub for testing and implementing advanced technologies, particularly in the fields of military technologies, green technologies, and digitalization. One of the key drivers of innovation in Ukraine has been the Brave1 coordination platform, which brings together domestic (both public and private) and international developers of defense technologies. The launch of this platform has enabled Ukraine to become one of the global leaders in the development of autonomous electronic warfare systems, robotic systems incorporating elements of artificial intelligence (AI), and advanced combat management software. At the same time, the need to restore damaged energy infrastructure and decentralize the national power system has stimulated the active development and implementation of Smart Grid technologies, which enable the efficient management of distributed electricity generation. In parallel, the reconstruction of destroyed settlements is increasingly based on the principles of Green Recovery, which emphasize the use of environmentally friendly construction materials and energy-efficient solutions.

The full-scale war has also strengthened the role of the startup ecosystem in Ukraine. Despite significant risks, Ukrainian startups continue to attract investment resources. The Ukrainian Startup Fund (USF) has reoriented its support toward dual-use technological projects. Nevertheless, despite these transformative changes, the majority of industrial enterprises in Ukraine continue to demonstrate significant spatial disparities in development, periodic declines in innovation activity, and a high dependence on external economic and institutional factors. The main centers of innovation remain Kyiv, Lviv, and Dnipro, where strong IT clusters operate.

The relevance of studying the spatial transformation of innovation activity among industrial enterprises in Ukraine is determined by several interconnected economic, social, and security-related factors. First, in the context of structural transformations of the national economy intensified by the full-scale war, there has been a significant relocation of industrial production across regions. This process directly affects the spatial concentration of innovation activity, contributes to the emergence of new industrial and innovation centers, and leads to the decline of traditional industrial regions. Second, regional disparities in innovation development remain one of the key challenges for ensuring the stable functioning of the national economy. The study of spatial transformations makes it possible to identify regional imbalances, assess the innovation potential of territories, and determine directions for stimulating innovation activity among industrial enterprises while taking into account local specificities. Third, the relevance of this topic is increasing in the context of Ukraine's European integration, since an effective regional innovation policy is an important component of alignment with EU economic and technological standards. The spatial approach makes it possible to adapt European models of smart specialization and cluster development to Ukrainian realities. Fourth, the innovation activity of industrial enterprises is a key factor in increasing economic competitiveness, technological modernization, and post-war recovery. The analysis of spatial transformations provides a basis for developing scientifically grounded recommendations aimed at restoring industrial potential and innovation infrastructure at the regional level.

Thus, the study of spatial transformations in the innovation activity of industrial enterprises in Ukraine is highly relevant from both scientific and practical perspectives, as it contributes to the development of effective national and regional innovation policies in the context of rapid technological change and growing global instability.

Analysis of recent research. Modern theories of innovation development view innovation as a complex, systemic, and institutionally embedded process. In contemporary economic discourse, emphasis has shifted from merely increasing production volumes to the intellectualization of production processes, flexibility, sustainability, and environmental responsibility. In particular, study [1] provides an in-depth analysis of technological competition and the role of innovation in global economic strategies, highlighting the political and economic dimensions of technological rivalry between China and the United States. The research demonstrates how technological capabilities, social values, and governance models shape the long-term development trajectories of these countries. In [2], based on comprehensive economic and historical analysis, the authors demonstrate that technological and economic progress is not guaranteed and may often be followed by periods of stagnation or decline, even in the most developed economies. The study presented in [3] shows that the strongest positive impact on industrial productivity is generated by combined innovation strategies, particularly when product innovation is complemented by other forms of innovation such as process or organizational innovation. Article [4] focuses on the sensitivity of empirical research results on enterprise innovation activity to the choice of indicators and econometric methods. The authors demonstrate that innovation policy recommendations may be unreliable if they are based on methodologically unstable empirical findings. This research is particularly valuable for scholars working in innovation studies, industrial economics, and applied econometrics. The study [5], which examines the impact of innovation activity on the performance of enterprises in economically lagging regions, also provides important insights relevant to Ukraine.

In Ukraine, the leading role in research on innovation development belongs to scholars affiliated with the National Academy of Sciences of Ukraine. Their research focuses primarily on mechanisms of innovation-based reindustrialization, aimed at restoring industrial capacity after wartime destruction through the introduction of modern technologies. In particular, study [6] provides a comprehensive methodological framework for assessing innovation activity and structural transformations in Ukraine, taking into account updated OECD methodologies and EU statistical standards, and outlines directions for harmonizing innovation policy in the context of post-war recovery. Research presented in [7]

emphasizes the role of digital technologies as a key driver of innovation transformation in the Ukrainian economy through the development of a system of digital indicators and monitoring mechanisms for sectoral development. A broader macroeconomic and civilizational perspective on innovation-driven growth is provided in [8], which examines the contradictions of Ukraine's economic development in the context of war, environmental challenges, and climate change, and substantiates the need for an innovation-oriented industrial policy. Finally, study [9] provides a comprehensive analysis of the relationship between the innovativeness of industrial products and indicators of socio-economic development.

The paper purpose is to analyze the regional differentiation of innovation activity of industrial enterprises in Ukraine and to identify the spatial transformations of the industrial innovation sphere in 2020-2024 under the conditions of the war economy.

Major research findings. Traditionally (and permanently) the bulk of innovations are produced in industry. In Ukraine, almost two thirds (65.4% in 2022-2024) of innovatively active enterprises fall on the industrial sector of the economy. The latter produces three quarters (74.7% in 2024) of innovative products. Despite the huge direct (14.7 bill USD as of the beginning of 2025 [10]) and indirect (142.3 bill USD) losses incurred, as well as a reduction in the number of employees employed by business entities (-24% compared to 2021), Ukrainian industry is gradually restoring pre-war performance indicators. According to the results of the three quarters of 2025, the increase in the volume of products sold in industry as a whole amounted to 13.6%, and in processing – 17.1% compared to the same period last year [11].

In the current conditions of confronting Russian armed aggression and external challenges caused by global turbulence, the defense sector is naturally the key driver of reconstructive recovery of the national economy and the producer of innovations. The volume of sold products of weapons and ammunition production in Ukraine increased almost 15 in times compared to 2021. The constant growth of the defense needs stimulated the accelerated development of mechanical engineering, primarily the production of other vehicles: the volume of sold products of this production increased by 120.2%, and, in particular, the production of aircraft – more than 3.6 in times. At the same time, the technical and economic efficiency of the production of other vehicles also increased: the share of added value at production costs in the volume of produced products (goods, services) of this production in 2023 reached 39.59% (vs 32.60% in 2021) [12].

The development of the defense sector not only strengthens national security, but also simultaneously strengthens the innovation potential. Thus, the accelerated development of machine-building industries in Ukraine became a driver of the growth of innovation activity of industrial enterprises, which exceeded the pre-war level in key indicators. In particular, spending on innovation activities in industry increased by 1.48 in times compared to 2021, while during 2022-2023 they decreased by 1.31 in times. However, compared to 2020, the value of this indicator increased by only 4.8%.

In innovation spending, the share of funding for research and the development work increased slightly: in 2024, 33.65% fell on R&D performed by our own forces (vs 30.59% in 2021) and 3.67% on R&D performed by other enterprises (vs 2.70%). At the same time, in the structure of these expenses, the share of enterprises' own funds decreased by 8.10 percentage points (pp.) from 79.78% to 71.68% during the analyzed period. Despite the fact that the number of innovatively active industrial enterprises in Ukraine increased by 1.36 in times during 2022-2024, the value of this indicator (616 enterprises) was only 76.14% of the 2020 level to 40.1% of such enterprises spent money on innovative activities that did not involve R&D. Compared to 2021, the share of innovatively active enterprises in the total number of industrial enterprises increased by 6.10 pp. in industry as a whole and by 6.80 pp. in processing and in 2024 amounted to 15.7% and 17.3% respectively.

The number of industrial enterprises that introduced innovations (products and innovative processes) in 2024 exceeded the figure of 2021 in twice and amounted to 686 enterprises, however, this was only 81.6% of the level of 2020. At the same time, it is worth emphasizing that the share of such enterprises in the total number of industrial enterprises (14.9%) reached the level of 2020. In 2024, 89.8% of industrial enterprises (i.e. 526 enterprises) introduced new or significantly improved products (goods, services), while new innovative processes were introduced by 82.6% of enterprises. For comparison, in 2020, the values of indicators were, respectively, 81.5% and 90%. Hence, we can note a trend towards an increase in the share of enterprises that introduce new or significantly improved products. However, only 17.7% of enterprises (or 93 enterprises) introduced new products to the market in 2024, while in 2020 – 25.5% (or 149). The remaining enterprises introduced new products only for themselves. The number of innovative products (goods, services) introduced in 2024 amounted to 3382 units (83.2% of 2020 figure), of which only 11.9% were new to market (vs 17% in 2020). The share of machinery and equipment in the total number of innovative products introduced was 16.3% or 551 units, of which 87 were new to the market.

The number of industrial enterprises that sold innovative products (goods, services) in Ukraine is very small – 329 enterprises in 2024 (vs 573 in 2020), which only 81 enterprises sold innovative products new to the market (145 in 2020). Despite this, the growth in the volume of sold innovative industrial products by 3.72 in times in 2024 (compared to the previous year) led to an increase in the share of these products in the total volume of sold products (goods, services) of industrial enterprises to 3.0% (vs 1.9% in 2020). In the processing industry, the value of this indicator was 4.7% (vs 0.92%), however, it remains significantly lower compared to industrial EU countries, in particular, Poland (>10%) and Germany (>20%). At the same time, there is a positive trend towards an increase in the share of products that are new to the market, not just to enterprises, in the volume of innovative industrial products sold. In 2024, the value of this indicator reached 29.90%, exceeding the pre-war level by 23.50 pp.

To analyze the dynamics of innovation activity in Ukrainian industry into a regional context, the system of four relative indicators was formed, which reflect: the share of innovatively active enterprises in the total number of industrial enterprises; the share of enterprises that introduced innovations in the total number of industrial enterprises; the share of innovation costs in the total volume of capital investments; the share of innovative products in the total volume of industrial products sold. The indicators selected for analysis reflect different phases of the innovation cycle: from input (innovation costs) to output (sale of innovative products).

As shown by the results of the analysis of the data presented in Table 1, during 2020-2024, the innovation activity of industrial enterprises in Ukraine was characterized by significant variability in the values of the selected indicators by region. The instability of innovation activity indicators is due to a combination of factors, including: the economic (consequences of war, low investments), the institutional (lack of a coordinated strategy, barriers to business), the social (human resource shortages), as well as global influences. The interaction of these factors destroyed the basis for stable growth of innovation activity in the analyzed period, each year of which stood out with its own characteristics. As a result, five stages of spatial transformation of the innovation sphere of the industrial sector of the economy of Ukraine during 2020-2024 were identified.

The Stage of Pre-Crisis Differentiation (2020). The results of 2020 demonstrate a complex hierarchical structure, which included 5 clusters: 1) absolute leader – high intensity and effectiveness of innovation activity (Ternopil region); 2) effective – high degree of commercialization of innovations at moderate costs (Donetsk, Kirovohrad, Luhansk, Poltava, Chernivtsi regions); 3) investment – significant costs for innovations, delayed effect (Zaporizhzhya, Mykolaiv, Kharkiv, Cherkasy regions); medium-active – stability with weak commercialization of innovations (Vinnytsia, Dnipropetrovsk, Ivano-Frankivsk, Kyiv, Lviv, Odesa, Rivne, Sumy, Kherson, Khmelnytskyi, Chernihiv regions); low-active – depressive state of the innovation sphere (Volyn, Zhytomyr, Zakarpattia regions). The separation of Ternopil region into a separate cluster is explained by the extremely high intensity of innovation activity in the industrial sector of the economy of this region: almost 40% of industrial enterprises were innovatively active. At the same time, traditionally industrial regions (Kharkiv and Zaporizhia regions) formed a kind of investment hub, accumulating 19% of all innovation costs in Ukraine, however, these costs were upfront, since they did not give the proper result in the form of sold innovative products. Instead, the absolute leader in terms of the level of return on investment in innovation was Donetsk region.

The Stage of the Covid Crisis (2021). At this stage, three clusters of regions were identified: highly effective – significant return with limited innovation costs (Donetsk, Khmelnytskyi, Chernihiv regions); active-expenditure – intensive activity and investment in innovation (Vinnytsia, Dnipropetrovsk, Zaporizhia, Ivano-Frankivsk, Kirovohrad, Lviv, Mykolaiv, Sumy, Ternopil, Kharkiv, Cherkasy regions); inertial – moderate innovation activity (Volyn, Zhytomyr, Zakarpattia, Kyiv, Luhansk, Odesa, Poltava, Rivne, Kherson, Chernivtsi regions).

In 2021, 8 regions joined the outsider regions in terms of innovation activity (Volyn, Zhytomyr and Zakarpattia regions), demonstrating relatively low innovation activity of industrial enterprises with insignificant investments in innovation. At this stage, there was a significant decrease in the share of innovative products in the volume of sales (from 1.9% in 2020 to 0.9% in 2021 on average in Ukraine), and only three regions (Donetsk, Khmelnytskyi and Chernihiv) maintained the value of this indicator at a relatively high level (5.7%, 8.7% and 7.6%, respectively).

The Stage of Shock Adaptation (2022). The beginning of a full-scale war caused a phenomenon that can be called an «innovation squeeze» or a narrowing of innovation activity. There was a certain unification of the economic behavior of industrial enterprises, which was manifested in the rejection of risky projects and a reorientation to support existing capacities. This primarily concerned the regions that were included in the crisis-adaptive cluster (Volyn, Zhytomyr, Zakarpattia, Ivano-Frankivsk, Kyiv, Odessa, Poltava, Rivne, Khmelnytskyi regions). However, Vinnytsia, Kirovohrad, Lviv and Ternopil regions, even in difficult conditions, maintained a high level of innovative activity of enterprises and, thus, formed the «core of resilience» cluster. At the same time, Zaporizhia, Mykolaiv, Sumy, Kharkiv, Cherkasy and Chernihiv regions (the «advance investment» cluster) actively invested in innovations, despite the risks of wartime. In contrast, the highest performance of innovation activity in 2022 was demonstrated by Dnipropetrovsk and Chernivtsi regions, which entered the productive cluster – a relatively high share of sales of innovative products.

The Stage of Deepening the Crisis (2023). Under the influence of the war, there was a certain smoothing of the differences between the regions that formed the «unified» cluster (Volyn, Dnipropetrovsk, Zakarpattia, Ivano-Frankivsk, Kyiv, Poltava, Rivne, Chernivtsi regions). At this stage, the average value of the share of innovative products in the total volume of industrial products sold in Ukraine in 2023 decreased to a critically low level (0.5%). The lowest efficiency of innovation activity with the highest value of the share of innovation costs in the total volume of capital investments (11.2%, with an average in Ukraine of 3.2%) was observed in Cherkasy region, which was allocated to a separate cluster (low-performance). Although it is worth emphasizing the prolonged effect of investments in innovation, that is, obtaining a return is possible after a certain period, provided that investments are made in new technologies or equipment. At the same time, industrial enterprises in Zhytomyr, Kirovohrad, Lviv, Mykolaiv, Odessa, Khmelnytskyi and Chernihiv regions managed to achieve innovation results that were proportional to the volume of expenses (the «balanced» cluster). High innovation activity of enterprises and relatively significant volumes of investments in innovation were demonstrated by regions that were included in the «progressive» cluster (Vinnytsia, Zaporizhia, Sumy, Ternopil, Kharkiv regions).

Table 1

Indicators of innovative activity of industry in the regions of Ukraine

Regions	2020				2021				2022				2023				2024			
	Share of innovatively active enterprises in the total number of industrial enterprises	Share of enterprises that introduced innovations in the total number of industrial enterprises	Share of innovation costs in the total volume of capital investments	Share of innovative products sold in the total volume of industrial products sold	Share of innovatively active enterprises in the total number of industrial enterprises	Share of enterprises that introduced innovations in the total number of industrial enterprises	Share of innovation costs in the total volume of capital investments	Share of innovative products sold in the total volume of industrial products sold	Share of innovatively active enterprises in the total number of industrial enterprises	Share of enterprises that introduced innovations in the total number of industrial enterprises	Share of innovation costs in the total volume of capital investments	Share of innovative products sold in the total volume of industrial products sold	Share of innovatively active enterprises in the total number of industrial enterprises	Share of enterprises that introduced innovations in the total number of industrial enterprises	Share of innovation costs in total capital investments	Share of innovative products sold in the total volume of industrial products sold	Share of innovatively active enterprises in the total number of industrial enterprises	Share of enterprises that introduced innovations in the total number of industrial enterprises	Share of innovation spending in total capital investment	Share of innovative products sold in the total volume of industrial products sold
Vinnytsia	0,187	0,169	0,038	0,009	0,158	0,115	0,062	0,004	0,134	0,123	0,053	0,016	0,115	0,108	0,063	0,011	0,200	0,200	0,153	0,026
Volyn	0,104	0,087	0,003	0,014	0,072	0,036	0,002	0,008	0,060	0,018	0,002	0,006	0,059	0,034	0,003	0,005	0,137	0,127	0,045	0,004
Dnipropetrovsk	0,151	0,131	0,038	0,014	0,122	0,051	0,035	0,011	0,127	0,098	0,089	0,033	0,073	0,047	0,020	0,004	0,167	0,16	0,044	0,085
Donetsk	0,124	0,098	0,090	0,063	0,055	0,045	0,002	0,057	0,022	0,023	н.д.	н.д.	0,030	0,030	н.д.	н.д.	0,078	0,039	н.д.	н.д.
Zhytomyr	0,087	0,081	0,020	0,002	0,084	0,012	0,010	0,028	0,082	0,063	0,017	0,007	0,038	0,025	0,024	0,021	0,131	0,131	0,053	0,034
Zakarpattia	0,090	0,072	0,010	0,004	0,043	0,026	0,002	0,003	0,112	0,093	0,003	0,001	0,067	0,048	0,002	0,000	0,063	0,063	0,003	0,004
Zaporizhzhia	0,172	0,164	0,197	0,012	0,096	0,063	0,085	0,002	0,120	0,035	0,095	0,007	0,104	0,066	0,056	0,008	0,196	0,185	0,138	0,018
Ivano-Frankivsk	0,224	0,208	0,015	0,005	0,127	0,118	0,015	0,001	0,129	0,060	0,036	0,002	0,159	0,097	0,020	0,002	0,165	0,165	0,015	0,007
Kyiv	0,165	0,147	0,066	0,010	0,090	0,024	0,006	0,001	0,086	0,054	0,019	0,002	0,107	0,088	0,016	0,003	0,118	0,115	0,024	0,022
Kirovohrad	0,213	0,202	0,191	0,047	0,100	0,089	0,055	0,002	0,136	0,138	0,063	0,012	0,108	0,108	0,021	0,027	0,241	0,241	0,039	0,073
Luhansk	0,152	0,136	0,044	0,046	0,078	0,063	0,036	0,000	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.
Lviv	0,173	0,162	0,075	0,010	0,137	0,066	0,085	0,003	0,144	0,114	0,073	0,011	0,092	0,092	0,041	0,019	0,164	0,164	0,031	0,023
Mykolaiv	0,151	0,129	0,307	0,004	0,165	0,088	0,059	0,003	0,103	0,088	0,084	0,003	0,049	0,025	0,045	0,023	0,110	0,096	0,059	0,021
Odesa	0,160	0,150	0,024	0,013	0,079	0,074	0,024	0,006	0,086	0,086	0,048	0,010	0,084	0,084	0,026	0,017	0,171	0,171	0,013	0,002
Poltava	0,188	0,167	0,088	0,027	0,109	0,078	0,008	0,001	0,091	0,071	0,012	0,010	0,093	0,081	0,007	0,022	0,142	0,136	0,018	0,032
Rivne	0,144	0,121	0,055	0,004	0,089	0,081	0,002	0,001	0,086	0,055	0,004	0,001	0,092	0,092	0,002	0,001	0,065	0,057	0,030	0,004
Sumy	0,213	0,176	0,069	0,011	0,131	0,112	0,070	0,019	0,101	0,075	0,119	0,008	0,109	0,099	0,052	0,005	0,118	0,108	0,018	0,034
Ternopil	0,396	0,352	0,194	0,024	0,184	0,149	0,123	0,004	0,149	0,092	0,094	0,005	0,172	0,151	0,045	0,004	0,261	0,25	0,127	0,034
Kharkiv	0,227	0,194	0,200	0,025	0,105	0,077	0,136	0,016	0,110	0,080	0,198	0,012	0,105	0,086	0,058	0,006	0,236	0,229	0,160	0,015
Kherson	0,169	0,157	0,021	0,019	0,086	0,062	0,000	0,021	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.	н.д.
Khmelnytskyi	0,103	0,090	0,068	0,010	0,014	0,014	0,004	0,087	0,035	0,043	0,017	0,002	0,015	0,015	0,056	0,056	0,142	0,134	0,169	0,075
Cherkasy	0,201	0,188	0,239	0,008	0,108	0,076	0,079	0,002	0,092	0,086	0,152	0,002	0,085	0,065	0,112	0,001	0,157	0,144	0,103	0,008
Chernivtsi	0,197	0,197	0,036	0,045	0,076	0,061	0,011	0,034	0,089	0,071	0,011	0,036	0,118	0,078	0,012	0,039	0,109	0,091	0,013	0,043
Chernihiv	0,182	0,149	0,022	0,010	0,078	0,026	0,006	0,076	0,087	0,087	0,082	0,002	0,074	0,056	0,058	0,013	0,143	0,133	0,021	0,043

Source: Compiled based on data from the State Statistics Service of Ukraine [13; 14; 15; 16; 17].

The Stage of Structural Reconfiguration (2024). In 2024, a gradual restoration of innovation activity in the industrial sector of the Ukrainian economy began. In the vast majority of regions (Volyn, Zhytomyr, Zakarpattia, Ivano-Frankivsk, Kyiv, Mykolaiv, Odesa, Poltava, Rivne, Sumy, Cherkasy, Chernivtsi and Chernihiv regions), which can be considered a «restoration» cluster, there was a revival of innovative activity of industrial enterprises. The «renovation driver» cluster (leadership in the activity of enterprises and investments in innovations) included Vinnytsia, Zaporizhia, Ternopil, Kharkiv regions. The optimal combination of innovation costs and results was achieved by Dnipropetrovsk, Kirovohrad and Khmelnytsky regions (the «effective» cluster). The mentioned regions demonstrated a high level of innovation activity (the share of innovative products in the total volume of industrial products sold in them was 7.3%÷8.5%), which was more than twice the average value of the indicator in Ukraine (3%). This indicates successful adaptation of the industrial sector of these regions and entry into the market with new products despite the challenges of wartime.

Conclusions. The full-scale war led to the formation of certain stable groups of regions in Ukraine according to the key characteristics of the innovative activity of industry. In particular, a certain «innovative core» was identified, which includes Vinnytsia, Zaporizhia, Lviv, Ternopil and Kharkiv regions. These regions were consistently included in clusters of high innovative activity of industrial enterprises, which emphasizes the role of the security factor and the presence of relocated enterprises (in the western regions) in supporting the national innovative potential of industry. On the other hand, traditionally industrial regions (Zaporizhia and Kharkiv regions), despite their proximity to the front line and, therefore, the presence of constant threats, maintain a high level of innovative activity of industrial enterprises. However, these 5 regions, classified as the «innovative core», in 2024 accounted for only 11.92% of innovative industrial products sold in Ukraine (compared to 16% in 2020). At the same time, Kharkiv region is one of the leaders (along with Dnipropetrovsk region) in terms of innovation spending. But the results of the assessments have convincingly proven that high innovation spending

does not always guarantee a quick adequate effect, i.e. an increase in innovative products in the volume of industrial products sold (the example of Cherkasy region). In this context, the most balanced model of innovation activity in the industrial sector of the economy in 2024 was demonstrated by regions included in cluster 3 (Dnipropetrovsk, Kirovohrad and Khmelnytsky regions). In them, moderate investment activity (a total of 16.69% of innovation spending in Ukraine in 2024) was accompanied by the maximum return on investment in the form of innovative products sold (46.04% of the indicator in Ukraine).

In conclusion, it can be stated that in Ukraine there is a gradual increase in the innovative activity of industrial enterprises, although the degree of innovation intensity remains below average European standards. The main factors that hinder the development of innovative activity in the industrial sector of the national economy remain limited funding, insufficient interaction between scientific institutions and business, as well as a relatively low level of digital and technological infrastructure. At the same time, there is a growth of the startup ecosystem, an increase in state innovation support programs and an intensification of international cooperation, primarily in the Military-Tech field. Therefore, the further development of innovative activity in Ukraine requires a holistic approach that combines the stimulation of private investment in industry, the modernization of the scientific and educational systems and the formation of a favorable legislative environment for the introduction of new technologies.

The prospects for further author's research in this direction lie in the scientific and analytical substantiation of the most effective priorities for investments in industrial innovations based on the criteria for ensuring the economic and technological stability of the country in the face of increasing global challenges.

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