# ІННОВАЦІЙНО-ІНВЕСТИЦІЙНІ ПРОЦЕСИ

UDC 338.45:338.24
JEL Classification: L20, O10, O14, R11
DOI: https://doi.org/10.20535/2307-5651.34.2025.341978

**Kovalchuk Alona**
Ph.D. in Economics,
Associate Professor at the Department of Economics and Entrepreneurship
*(corresponding author)*
*ORCID ID: 0000-0002-9059-8303*

**Melnychuk Viktoriia**
Ph.D. in Economics,
Associate Professor of the Department of Economic Cybernetics
*ORCID ID: 0000-0001-8246-4076*
*National Technical University of Ukraine*
*"Igor Sikorsky Kyiv Polytechnic Institute"*

## PREREQUISITES FOR IMPLEMENTATION OF DIGITAL TECHNOLOGIES AND INNOVATIONS INTO MANAGEMENT PROCESSES OF INDUSTRIAL ENTERPRISES IN THE CONTEXT OF REGIONAL IMBALANCES

*The purpose of the study is to substantiate the modern prerequisites and factors for introducing digital technologies and innovations into the system of industrial enterprise management processes, taking into account regional imbalances in the economy of Ukraine. The study is based on the methods: comparison, analysis, synthesis, generalization. The results of the survey are the identified modern prerequisites for the introduction of digital technologies and innovations into the processes of industrial enterprise management in the context of regional imbalances: increasing digital gaps between regions, unevenness of innovation activity in the regional context, regional heterogeneity of industrial enterprise spending on innovation. The study results allow us to form a strategy for adapting the industrial enterprise management system based on digital technologies and management innovations.*

***Keywords:*** *industrial enterprise management, digital technologies, innovations, digital transformation, regional development, innovation processes, industrial enterprise.*

**Ковальчук А.М., Мельничук В.Е.**
*Національний технічний університет України*
*«Київський політехнічний інститут імені Ігоря Сікорського»*

## ПЕРЕДУМОВИ ВПРОВАДЖЕННЯ ЦИФРОВИХ ТЕХНОЛОГІЙ ТА ІННОВАЦІЙ В ПРОЦЕСИ УПРАВЛІННЯ ПРОМИСЛОВИМИ ПІДПРИЄМСТВАМИ В КОНТЕКСТІ РЕГІОНАЛЬНИХ ДИСБАЛАНСІВ

*У статті здійснено дослідження передумов впровадження цифрових технологій та інновацій в процеси управління промисловими підприємствами в умовах регіональних дисбалансів. Метою дослідження є обґрунтування сучасних передумов та факторів впровадження цифрових технологій та інновацій в систему процесів управління промислового підприємства враховуючи регіональні дисбаланси в економіці України. Актуальність дослідження визначається прискореними темпами цифровізації економіки та нерівномірності регіонального розвитку в Україні та визначення їх впливу на управління промисловими підприємствами. Аналіз передумов дозволить виявити вплив регіональних факторів на формування ефективної інноваційної системи управління промисловими підприємствами, яка побудована на основі цифрових технологій. Методи використані під час проведення дослідження: порівняння – для визначення основних тенденцій сучасних досліджень за темою; аналізу та синтезу – для оцінки витрат на інновації, Індексу цифрової трансформації регіонів, інноваційно активних промислових підприємств; узагальнення – для формування виділення ключових передумов використання цифрових технологій та інновацій промисловим підприємствам та формування висновків з дослідження. Результатами дослідження є виявлені сучасні передумови впровадження цифрових технологій та інновацій в процеси управління промисловими підприємствами в контексті регіональних дисбалансів: посилення цифрових розривів між регіонами, нерівномірність інноваційної діяльності в регіональному розрізі, регіональна неоднорідність витрат промислових підприємств на інновації. Результати дослідження дозволяють сформувати стратегію адаптації системи управління промисловим підприємством на основі цифрових технологій та управлінських інновацій. Перспективами подальших досліджень за напрямом є аналіз галузевих факторів, що впливають на здатність промислових підприємств до інноваційної діяльності та цифрової трансформації.*

***Ключові слова:*** *управління промисловими підприємствами, цифрові технології, інновації, цифрова трансформація, регіональний розвиток, інноваційні процеси, промислове підприємство.*

**Problem statement.** Ensuring competitiveness and accelerating economic development encourage industrial enterprises to introduce digital technologies and innovations, particularly in management processes. However, when planning changes in management processes, managers need to consider the impact of the external environment on an industrial enterprise. One of the characteristic features of the Ukrainian economic system is the uneven socio-economic development of regions, which determines different initial conditions and opportunities for the introduction of digital technologies and innovations. Such regional imbalances can be significant barriers to innovation and digitalization of industrial enterprise management. The industrial enterprise management system must consider regional aspects to maximize the positive effect of digitalization and innovation. That is, there is a need to study regional imbalances as a prerequisite for introducing digital technologies and innovations in the management processes of industrial enterprises. Substantiation of such studies will allow us to deepen our understanding of the influence of regional factors on the formation of an effective innovative management system for industrial enterprises built based on digital technologies.

**Analysis of recent research and publications.** The problems of industrial enterprise management considering the introduction of digital technologies and innovations were investigated in their works by Ostrovska G., Ostrovsky O. [2], Zub P., Kovalchuk A., Safonik N. [4], Kalach G. [5], Melnychuk V., Boyarynova K. [10], Khimich S. V. [11]. Individual factors of the introduction of digital technologies and regional aspects of industrial enterprise management have become the subject of research by Tulchynska S., Dergalyuk M. [3], Brechko O. [6] Slastyanykova A., Sorokina S. [9]. Despite the significant number of works on the features of the use of digital technologies and innovations in the management system of industrial enterprises, the definition of prerequisites and analysis of external conditions and the regional environment require extensive research.

**Formulating the purposes of the article.** The purpose of the article is to substantiate the current prerequisites and factors for introducing digital technologies and innovations into the system of management processes of an industrial enterprise, taking into account regional imbalances in the economy of Ukraine.

**Presentation of the main research material.** The strengthening of the processes of digitalization of the economic system encourages industrial enterprises to introduce innovations not only into production processes, but also into management processes. One of the main factors that can determine the potential for introducing innovations and digital technologies into the management of an industrial enterprise is its location and the level of regional development. At the same time, the realities of the development of Ukrainian regions indicate significant unevenness between regions, which in the future leads to the emergence of barriers to the growth of industrial enterprises. Differences between the digital development of regions are also observed [1]. That is why it is necessary to investigate the existing prerequisites and opportunities for introducing digital technologies and innovations into the management of industrial enterprises.

However, it is also necessary to consider the digital differentiation of industrial enterprises, which has formed industry-wide digital disconnections. The main factors of digital disconnections in industrial enterprises are: the level of innovation (technological) and digital maturity of industrial enterprises; business management models and the position of the enterprise in the value chain; differences in data generation and use; regulatory changes by the state and the region; industry structure and the general economic situation [2]. Under the influence of these factors, the implementation of digital technologies in industrial enterprises in Ukraine is slower compared to other countries [3]. That is why implementing digital technologies and innovations in enterprises contributes to overcoming digital disconnections at the regional and industry levels.

For industrial enterprises, digital technologies allow optimizing production and management processes, forming a new paradigm of business functioning. The main processes of industrial enterprise management in which it is necessary to introduce innovations and digital technologies are the processes of accounting, analytics and decision-making [4]. The use of innovations and digital technologies in the business processes of industrial enterprises is a driver for radical changes in current activities and the potential for enterprise development. However, an essential prerequisite for introducing digital technologies and innovations into management processes is a thorough analysis of existing business processes, highlighting their problems and opportunities. Only after this can one choose scenarios for introducing digital technologies and innovations into the management of an industrial enterprise: either digitalization of existing business processes or development of fundamentally new ones based on digital technologies [5]. In both the first and second scenarios, it is necessary to consider regional and industry imbalances.

The activation of the introduction of digital technologies and innovations into the management processes of industrial enterprises has a positive effect on the enterprise and the region. That is, there is a reverse effect. For such regions, an increase in investments and foreign exchange earnings from exports is inherent, as well as attracting financial resources through grants, projects and initiatives, venture financing from the European Union, etc. [6].

The key prerequisites for introducing digital technologies and innovations into the management processes of industrial enterprises in the regions are forming a digital environment and actively digital transforming all spheres of activity. Since 2022, the Ministry of Digital Transformation has created the Digital Transformation Index of Regions. In 2024, it included nine sub-indices: institutional capacity, Internet development, ASC development, implementation of the “paperless” regime, digital education, the region’s business card, penetration of basic e-services, industry digital transformation, individual CDTO projects [7]. The value of the Digital Transformation Index of Regions indicates a regional imbalance in the field of digitalization. Thus, the highest indicators of the Index are in Lviv (0.85), Dnipropetrovsk (0.844), Odessa (0.804), and Vinnytsia (0.755) regions. Note that this Index hardly reflects the results of digital transformations of enterprises, but it shows the level of digitalization of the public sphere. From the point of view of the implementation of digital technologies in the management processes of industrial enterprises, this index allows us to capture the regional potential for innovation and digitalization.

Regarding general trends in the field of innovation, according to preliminary information from the State Statistics Service of Ukraine [8] , innovation spending in Ukraine in 2024 amounted to 26,290.1961 million UAH, of which almost half fell on the city of Kyiv (47.37%), which indicates the existing uneven distribution of innovation activity and, accordingly, innovation activity in other regions of Ukraine. The leaders in innovation spending were Kyiv (47.37%), Dnipropetrovsk (6.46%), Kharkiv (6.44%), Vinnytsia (5.02%) and Khmelnytskyi (3.61%) regions (Fig. 1). It should be noted that there is a significant gap between the leading region and other regions. This situation confirms the fact of the existence of substantial regional imbalances that affect the implementation of innovations and digital technologies in individual regions.

As for the expenses of industrial enterprises on innovations (Figure 2), in 2024, industrial enterprises in Ukraine made expenses on innovations in the amount of UAH 15,092.259 million, of which 33% were directed to financing their own R&D, 4% – financing R&D performed by other enterprises and 63% – expenses on other innovations. As for regional redistribution, the situation is similar with expenses on innovations – the leader in expenses of industrial enterprises on innovations is Kyiv, which accounts for 36.22%. There is also an uneven regional distribution of expenses of industrial enterprises on innovations, for example, the lowest indicators are in the Zakarpattia region (0.15%) and Sumy region (0.38%), which differ in geographical location and infrastructure of industrial enterprises.

Suppose we return to the Digital Transformation Index of Regions [7]. In that case, we see that in 2024, according to this index, the Dnipropetrovsk region showed one of the highest results (0.844), while innovation spending in this region was 6.46% of total spending in Ukraine and 9.74% of spending by industrial enterprises (also the 2nd indicator in Ukraine). However, according to the Digital Transformation Index of Regions, the Lviv region ranks first in Ukraine. Still, in terms of spending by industrial enterprises on innovation, it is only 10th, with an indicator of 3.16% of spending by industrial enterprises on innovation in Ukraine. That is, active digital transformation in Lviv region does not apply to industrial enterprises. Such a disproportion indicates that industrial enterprises are encouraged to spend on innovation not only by a favourable digital environment, but also by other factors: developed industrial infrastructure, concentration of enterprises in leading industries, market availability, raw materials, etc.

An equally important factor in forming the prerequisites for the introduction of digital technologies and innovations into the management processes of industrial enterprises is the share of innovatively active industrial enterprises of Ukraine in the region (to the total number of industrial enterprises in the corresponding region) (Fig. 3). In general, in Ukraine, as of 2024, only 15.7% of industrial enterprises are innovatively active. This indicator is not high enough to overcome imbalances in regional development and activate digital transformation processes.

Once again, there is uneven regional development regarding the share of innovatively active industrial enterprises in Ukraine in the region. Of particular interest is that some of the worst indicators of innovation spending and innovative activity of enterprises are observed in relatively calm regions of Ukraine (Zakarpattia, Rivne, and Chernivtsi regions). This indicates the problems of these regions with digital transformations, especially in the field of digitalization of industrial enterprises.

Management innovations at industrial enterprises activate production and intra-economic business processes, allow maximizing efficiency. At the same time, industrial enterprises that implement digital technologies and innovations increase their potential, contribute to regional development, and enable regions to overcome existing

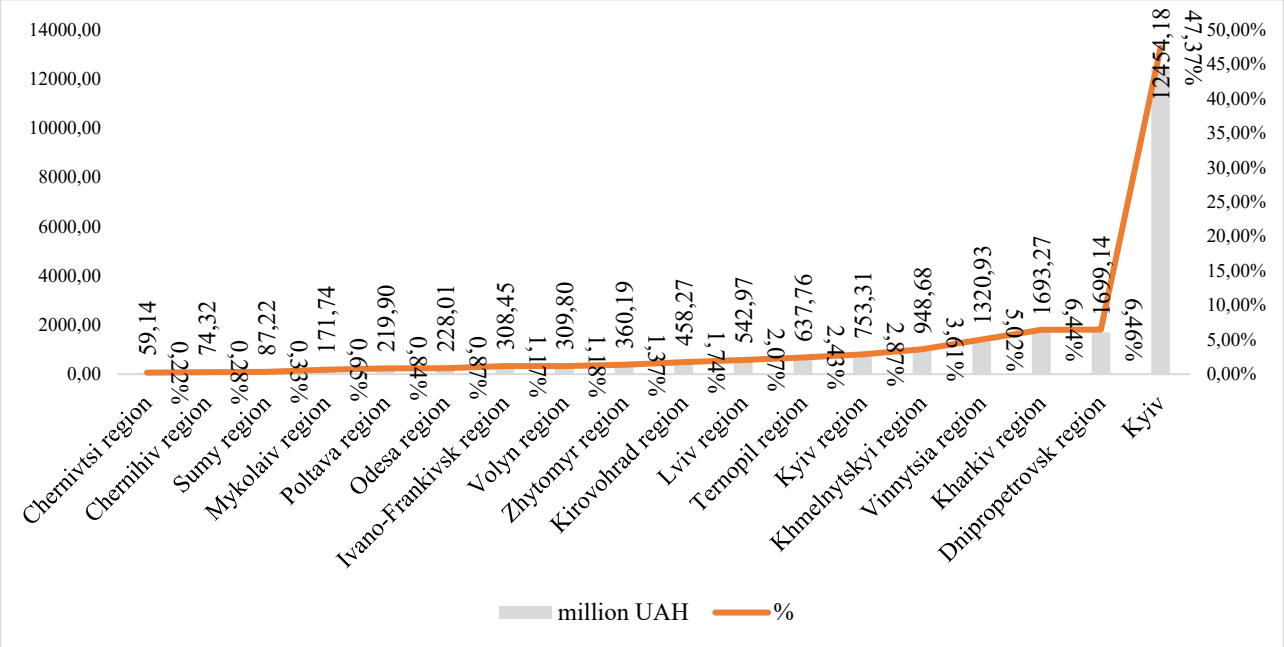


**Figure 1. Regional distribution of innovation spending in Ukraine, 2024**

*Source: constructed by the authors based on data from [8]*

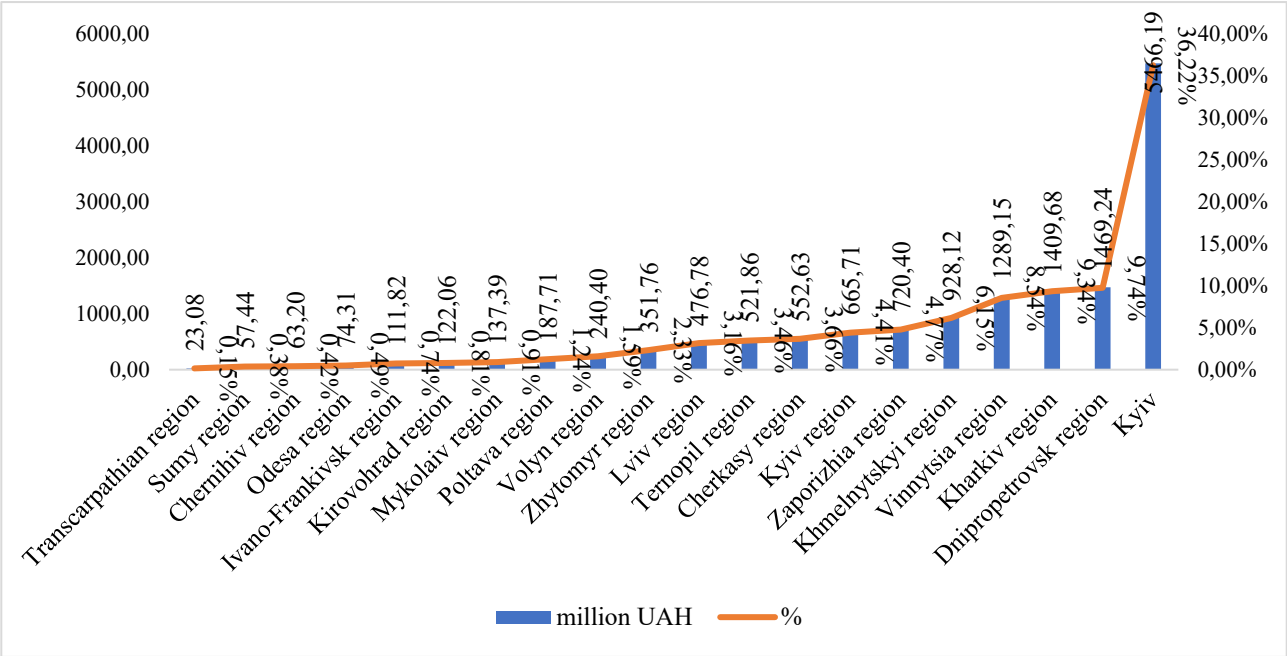


**Figure 2. Industrial enterprises' innovation spending by region, 2024**

*Source: constructed by the authors based on data from [8]*

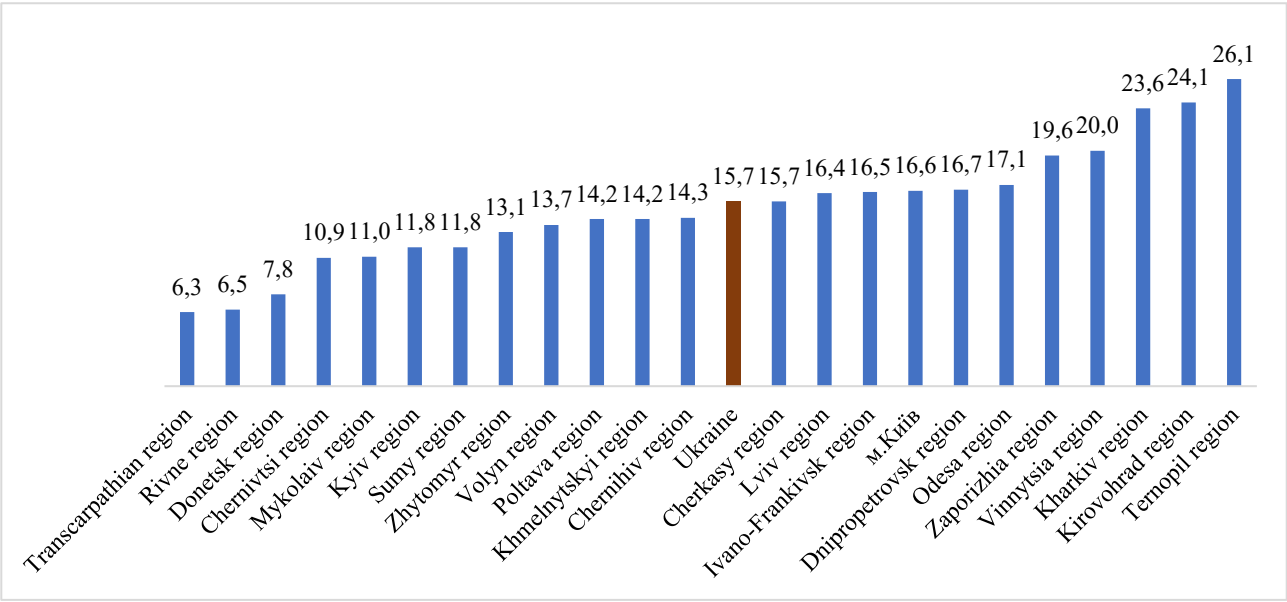


**Figure 3. Share of innovatively active industrial enterprises in Ukraine in 2024, % of the total number of industrial enterprises in the corresponding region**

*Source: constructed by the authors based on data from [8]*

imbalances. Management innovations are a process of modernization and adaptation of management practices (process in) to increase an industrial enterprise's competitiveness and efficiency. They may include developing new management methods and stimulating the innovative potential of an industrial enterprise to achieve competitive advantages in the market [9]. From the perspective of implementing management innovations, one of the key factors is the availability of qualified personnel in the region and opportunities for their training (retraining). Due to the war, the most promising regions in terms of human resource potential are the western regions of Ukraine. However, as the analysis of innovatively active enterprises shows, in Kharkiv, Zaporizhia, and Dnipropetrovsk regions, there are more innovatively active enterprises than, for example, in Transcarpathia or Rivne.

In general, the identified imbalances of regional development in the context of innovation activity and the potential for implementing digital technologies by industrial enterprises indicate that they need to develop strategies for using management innovations. This will allow increasing the productivity of enterprises by increasing human capital. For industrial enterprises, the priority areas of digitalization should be the interaction between people and the

data based on which management is carried out [10]. From the strategic dimension, the use of digital technologies and innovations in the management processes of industrial enterprises should be gradual, according to a clear plan or algorithm [ 11 ]. At the same time, the stages of digital transformation of industrial enterprise management should correspond to the real state of the external environment (in particular, regional) and internal capabilities.

**Conclusions.** Having conducted a study of the prerequisites for the introduction of digital technologies and innovations into the management processes of industrial enterprises in the context of regional imbalances, the following conclusions can be drawn:

– In Ukraine, there is an increase in the digital disconnections between regions, as a result of which the digital transformation of regions is heterogeneous; moreover, it is exacerbated by sectoral differences in the implementation of digital technologies and innovations;

– unevenness of innovation activity in a regional context: the innovation activity of industrial enterprises differs dramatically by region, which has an impact on the ability of industrial enterprises in a particular region to implement management innovations and digital technologies;

– regional heterogeneity of industrial enterprises' spending on innovation (the leader in this factor is Kyiv, and its nearest region lags by almost three times), the analysis shows that in regions with a more powerful industrial infrastructure, industrial enterprises are more prone to spending on innovation (for example, the Dnipropetrovsk region).

Industrial enterprises that plan to implement digital technologies and innovations in management processes need to use a strategic approach that will consider the assessment of prerequisites (especially regional aspects) and their impact on adaptation to change. Prospects for further research in this area include the analysis of industry factors that affect the ability of industrial enterprises to innovate and digital transformation.

**References :**

1. Digital Transformation Index of Ukrainian Regions: 2024 Results. (2025) Available at: https://thedigital.gov.ua/storage/uploads/files/page/community/reports/%D0%86%D0%9D%D0%94%D0%95%D0%9A%D0%A1%202024%202%201.pdf

2. Ostrovsky G. Y. & Ostrovsky O. T. (2024). Digital transformation of industry : current realities and development priorities. *Economic Herald of Donbas*, no. (1–2), pp. 166–177.

3. Tulchynska S. O. & Derhalyuk M. O. (2025). Development of regional economy systems in the context of digital transformation: monograph. Kyiv : *Igor Sikorsky Kyiv Polytechnic Institute , 7BC Publishing House,* 153 p.

4. Kovalchuk A. M. and Safonik N. R. (2025) Digital Technologies as a Prerequisite for Innovative Provision of Economic Security of Enterprises: Challenges and Strategic Priorities. *Business Inform,* no. 5, pp. 169–176. DOI: https://doi.org/10.32983/2222-4459-2025-5-169-176

5. Zub P. & Kalach H. (2021). Digitization of business processes of industrial enterprises. *Economy and Society,* no. (26). DOI: https://doi.org/10.32782/2524-0072/2021-26-52

6. Brechko O. (2023) Digital transformation as a prerequisite for preserving the integrity and forming the potential for post-war reconstruction of the regions of Ukraine. *Regional aspects of productive forces development of Ukraine,* no. 28, pp. 24–33. DOI: https://doi.org/10.35774/rarrpsu2023.28.024

7. Index of digital transformation of Ukraine's regions. Available at: https://thedigital.gov.ua/storage/uploads/files/page/community/reports/%D0%86%D0%9D%D0%94%D0%95%D0%9A%D0%A1%202024%202%201.pdf

8. State Statistics Service of Ukraine. Available at: https://www.ukrstat.gov.ua/

9. Slastianykova A. & Sorokin S. (2024). Transfer of technology in the management innovation system: regional aspect. *Adaptive management: theory and practice. Series Economy,* no. 18 (36). DOI: https://doi.org/10.33296/2707-0654-18(36)-17

10. Melnychuk V. & Boiarynova K. (2023). Digitalization of human capital development. *Economic Bulletin of National Technical University of Ukraine "Kyiv Polytechnical Institute",* no. (25), pp. 21–25. DOI: https://doi.org/10.20535/2307-5651.25.2023.278414

11. Khimich S. (2024). Efficiency of industrial enterprise management in the context of future digital transformation. *Management and Entrepreneurship: Trends of Development,* no. 1 (27), pp. 138–147. DOI: https://doi.org/10.26661/2522-1566/2024-1/27-12

Стаття надійшла: 25.08.2025
Стаття прийнята: 15.09.2025
Стаття опублікована: 09.10.2025