DOI: https://doi.org/10.30525/2256-0742/2025-11-2-174-183

ANALYSIS OF THE DEVELOPMENT OF THE LOGISTICS SERVICES MARKET IN THE CONTEXT OF EUROPEAN INTEGRATION PROCESSES

Bohdan Samoilenko[1], Olena Pavlova[2], Otabeg Azizov[3]

Abstract. The *subject of research* is an analysis of the development of the logistics services market in the context of European integration processes. *Methodology.* The study employed economic research methodologies. Specifically, the content analysis method was used to process scientific sources and review thematic literature on the concepts of modernisation and competitiveness of rail transport. Furthermore, the abstract-logical method was utilised in order to substantiate the fundamental principles and criteria for enhancing the competitiveness of rail transport in the context of European integration. In addition to these approaches, statistical observations and economic and statistical calculations were employed to analyse rail transport indicators. The *purpose of the research* of the article is to analyse the profound impact of World Bank support in the revival of the Ukrainian logistics structure, mainly the railway, to modernise the infrastructure and increase the competitiveness of rail transportation in the context of European integration. *Research coclusion.* The article under scrutiny here demonstrates the importance of international investment and European funds in supporting transport initiatives that enhance the quality of road and border infrastructure. The report identifies the primary areas of modernisation of the logistics infrastructure, including the renewal of railway tracks and the replacement of turnouts, with a strong emphasis on the integration of innovative management practices and technologies. The theoretical provisions for defining the essence of "logistics" and the structural elements of logistics activities in the market are thoroughly analysed. The article further demonstrates how adherence to international educational standards and collaboration with foreign universities can elevate the competitiveness of Ukrainian educational institutions. The role of innovative management approaches in ensuring high-quality education and adaptation to global challenges is explored. The critical areas for the effective implementation of international practices in the Ukrainian educational context aimed at enhancing logistics activities are identified. The directions for the adaptation of Ukrainian logistics companies to the requirements of the European market, the expansion of their participation in international logistics, and the assurance of safety, environmental friendliness, and efficiency through the active introduction of advanced technologies are determined, ultimately contributing to the optimism about the future of Ukrainian logistics in the context of European integration processes.

Keywords: logistics services, state regulation, logistics activities, European integration processes, market, war, logistics flows, management.

JEL Classification: Q1, Q10, M14

1. Introduction

An essential part of developing the logistics industry effectively is modernising and developing infrastructure. This involves physically renewing transport routes and integrating advanced technologies to ensure the movement of goods is fast and reliable. Thanks to its strategic location, Ukraine has the potential to become a vital transport corridor between Europe and Asia. However, significant investment is needed to rebuild and modernise existing infrastructure

[1]Lesya Ukrainka Volyn National University, Ukraine *(corresponding author)*
E-mail: samoilenko.Bohdan@vnu.edu.ua
ORCID: https://orcid.org/0009-0006-2380-314X
[2] Lesya Ukrainka Volyn National University, Ukraine
AGH University of Krakow, Poland
E-mail: pavlova.olena@vnu.edu.ua
ORCID: https://orcid.org/0000-0002-8696-5641
[3] LLC METAL FLEX, Ukraine
E-mail: tmcool777@gmail.com
ORCID: https://orcid.org/0000-0003-0035-5007

to meet European standards. This necessitates prudent financial and economic decisions, as well as the establishment of a suitable regulatory framework. Such a framework will enable the industry to adhere to European standards and compete effectively in the global market. Consequently, Ukraine faces numerous challenges and prospects that necessitate a comprehensive approach to reforming its logistics activities in order to integrate it into the European economic space.

The notion of the concept of "logistics" and logistics activities has been the subject of consideration in several scientific works. In the study undertaken by O. Tridid (2008), the term 'logistics' is understood to denote the organisation of a continuous flow of materials and information from the supplier to the end user within a single process. According to O. Yastremska et al. (2015), logistics can be defined as the science of planning, organisation, management, control, and regulation of material and information flows in space and time from the initial source to the final consumer. T. Dudar and R. Voloshyn (2012) define the term "logistics" as the planning, management, control and regulation of the movement of material and related information flows in space and time from their primary source to the place of their final consumption. N. Smirnova (2018) identifies three key approaches to managing logistics activities within an organisation's management system.

In the works of Hrynash L. et al. (2022), Schultz et al. (2021), N. Popadynets (Schultz S., et al. 2021), K. Pavlov (Pavlova et al., 2021; Pavlov et al., 2018; Pavlova, et al., 2024; Siryk et al. 2024), O. Pavlova (Pavlova et al. 2021; Pavlov et al., 2018; Pavlova et al., 2024; Wołowiec et al. 2022), Pruntseva (2021), Akimova et al. (2019), Novosad et al. (2021), A. Yakymchuk (2022; 2021; 2020) and others, the concept of logistics is considered in the processes of developing the consumer market, strengthening further markets, ensuring economic and energy security of Ukraine. From the standpoint of the functional approach, logistics activities are considered by the following scholars: Konishcheva & Trushkina (2005) and Skrypko (2021) consider it as the movement and storage of commodity flows in the process of their transportation through various stages within the supply chain; O. Sumets (2013) as a system of integrated management of logistics flows, which includes organisational structures, information systems and communication channels that support the functioning of a market economy and covers various forms, methods and tools that ensure the efficient movement of goods and services from the producer to the end consumer; Tyurina et al. (2015) define the implementation of operational management of logistics processes and operations as a means to ensure the efficient movement of material resources and products. As Oklander (2008) define it, *logistics activities* represent an organisational and managerial coordination mechanism that ensures efficiency through the synergistic effect achieved through the coordinated interaction of specialists from different functional units involved in the management of material flow. The coordinated work of various services allows for the smooth movement of goods, the minimisation of delays, and the increase in the overall efficiency of the supply chain. This, in turn, has a positive effect on the competitiveness of the enterprise in the market. D. Chechel considers logistics activities to be an adaptive logistics system with feedback. This system performs various logistics functions and operations, consists of several integrated subsystems and interacts complexly with external factors. A. Zaverbnyi and Y. Lomaga (2022) posit that the conditions of European integration impose novel challenges on an enterprise's logistics processes, particularly in the context of expanding production capacity and entering international markets. A. Hukaliuk (2015) posits that contemporary consumers demand the most efficient and high-quality provision of goods and services, thereby imposing significant demands on the organisation of transport routes. It is asserted by American researchers J. Stock and D. Lambert (2016) that within the logistics management framework, there is a planning, implementation, and control of the movement of goods, their stocks, services, and related information from the place of their formation to the place of consumption to meet customer needs. D. Waters (2018) offers an interpretation of the logistics flow as the movement of material resources, encompassing the organisation's incoming, internal, and outgoing flows.

As posited by E. Krykavsky (2006), the field of logistics is concerned with the study of an integrated system of material, information, and financial flows within an enterprise. It is evident that the fundamental nature of logistics activities constitutes a pivotal element within the ambit of scientific works, as it represents the primary conduit through which the comprehensive intricacies of the market system can be thoroughly analysed.

The *purpose of the present article* is to analyse the market for logistics services and determine the main patterns of its development in the context of European integration processes.

2. Current State of Logistics Services in the Context of European Integration Processes

The World Bank's support facilitates the restoration of damaged infrastructure and the assurance of the efficient operation of freight and passenger transportation services. The season of track renewal works has commenced on the railroad sections

with high traffic levels, allowing infrastructure modernisation in critical areas. According to the plans, by the end of 2024, the railroad intends to renew more than 1,195 km of tracks and replace 1,073 sets of switches. In order to implement the aforementioned works, the company has already received the initial delivery of 25,000 tons of rails from the Japan International Co-operation Agency (Industry trends. The state of the logistics industry in Ukraine: trends and features, 2024).

The integration of Ukraine into the European market has the potential to create new opportunities for logistics companies to attract foreign capital. However, this integration also requires significant financial resources to modernise logistics systems. Ukraine's involvement in European integration programmes, such as the TEN-T Transport Network initiative, facilitates the attraction of European grants and loans for the enhancement of its transport infrastructure.

It is important to note that European integration has been a significant driver in the development of a competitive environment in which Ukrainian companies are compelled to compete with powerful European logistics operators. This necessitates a reduction in operating costs and an increase in productivity. In such an environment, the primary objective is to optimise logistics processes, encompassing inventory management, route selection, and the integration of automation and digital technologies.

In the initial three months of 2024, Kuehne + Nagel attained revenue amounting to 5.5 billion CHF, marking a decline of 18% in comparison to the corresponding period in 2023, during which the revenue stood at 6.7 billion CHF. The Swiss group's net profit for the first quarter of 2024 amounted to 270 million CHF, representing a decline of 40% compared to the previous year (Trends in the world of logistics, 2024).

In recent quarters, a persistent downward trend in financial performance has been observed, primarily attributable to underwhelming outcomes in the domain of maritime logistics. This phenomenon can be attributed to a decline in sea freight rates. After reaching a peak in 2021-2022, these rates returned to pre-pandemic levels in 2023.

Consequently, the maritime logistics division's revenues exhibited a 27.8% year-on-year decline in the first quarter of 2024, amounting to 1.926 billion CHF. A substantial decline was also documented in the aviation segment, although the rate of decline was marginally lower than in maritime logistics. Revenue from air transportation amounted to 1.583 billion CHF, representing a 15% decrease compared to the previous year.

In the road transportation segment, the decline in revenue was less pronounced than in maritime and air logistics, with a 10% year-on-year decrease to 860 million CHF. However, EBIT (earnings before interest and taxes) also experienced a significant decline, amounting to 30 million CHF (Trends in the world of logistics, 2024).

The contract logistics segment exhibited relative resilience, a characteristic of logistics operators in recent quarters. In this sector, a 9.8% decrease in revenues was observed, resulting in an aggregate total of 1,139 million CHF in comparison with the previous year.

A similar trend is evident in the financial performance of the Danish logistics operator DSV. Specifically, in the initial quarter of 2024, the company's revenues amounted to 38.34 billion DKK, representing a 5% decrease compared to the same period in 2023 (Trends in the world of logistics, 2024).

It is evident that the segment of sea and air transportation has been the most unprofitable, with revenues amounting to 22.7 billion DKK in the initial quarter of 2024. This signifies a decline of 11.5% in comparison with the previous year. The segment's profit before tax witnessed a 16% decline, while its EBIT decreased by 26%, indicating a more substantial drop compared to the group's overall results (Trends in the world of logistics, 2024). This finding suggests a persistent decline in efficiency within the sea and air transportation segments, in comparison with previous years.

A decline in financial performance in the logistics sector was confirmed during the initial quarter of 2024. The decline in revenues in the maritime and aviation segments was particularly pronounced, driven by lower transportation tariffs. This development had a substantial impact on the financial results of Kuehne + Nagel and DSV. The most stable segment is contract logistics, which demonstrates less revenue fluctuation.

In 2023, 68 countries increased their investments in infrastructure development. The World Bank's analysis indicates that the volume of investments in infrastructure projects with the participation of private capital (PPI) this year amounted to 86 billion USD, thereby surpassing the average annual figure of the preceding five years by 0.5 billion USD. The number of infrastructure projects worldwide has been observed to be increasing steadily, with 260 projects being implemented in 2022 and 322 in 2023. The infrastructure portfolio in Europe and Central Asia has doubled, reaching 35 projects per year. Notwithstanding the preponderance of investments in renewable energy in global PPI, expenditure on port infrastructure development also doubled in 2023.

Despite the ongoing hostilities, Ukrainian transport and logistics sector representatives maintain a positive outlook. The Infrastructure Index 2023 survey, conducted by the European Business Association in co-operation with Arzinger and Sayenko Kharenko,

found that 84% of companies are prepared to resume shipping operations as soon as Ukrainian ports are unblocked. The majority of respondents intend to do so in the near future. Furthermore, 66% of logistics industry representatives prioritise investments in developing highways connecting Ukraine with the European Union. Additionally, a significant proportion of transport and logistics companies, amounting to 70%, deem it imperative to establish a network of strategic transport hubs in the western regions of Ukraine. It is important to emphasise that 85% of Ukrainian companies in the industry either continued operating or were thoroughly restored.

The full-scale war has had a considerable impact on traditional supply chains and has led to a marked deterioration in Ukraine's foreign trade position. The obstruction of maritime routes, the demolition of production facilities, and the orchestration of terrorist attacks on port and energy infrastructure have precipitated a precipitous decline in the exportation of goods.

In response to these challenges, attempts to expand and modernise existing logistics routes began almost immediately; particularly, transportation through the Danube ports, which had previously been of secondary importance in logistics, intensified. In 2023, a series of substantial measures were implemented to enhance their capacity, including the inauguration of 23 terminals, dredging operations, the expansion of pilotage infrastructure, and the refinement of dispatching and operational processes. Consequently, the USPA reports that the volume of traffic through the Danube ports increased to 29 million tons in 2023, which is twice the volume of 2022 and almost six times the volume of 2021.

In addition, endeavours were being made to augment the capacity of railway crossings, thereby contributing to the expansion of rail exports. From March to December 2023, the total volume of rail transportation exhibited a 23% increase in comparison with the same period of the previous year, while export transportation demonstrated a 14% increase. The structure of rail exports was dominated by grain (40.6%), ores (35.2%), and ferrous metals (8.1%). On average, 12.6 million tons of cargo were transported by rail every month, of which 4.7 million tons were exported. The record level was attained in November 2023, when 14.1 million tons of cargo were transported, likely due to the reorientation of flows consequent to the blockade of road crossings on the border with Poland. Nevertheless, the railroad still requires enhancement in terms of capacity, owing to the disparity in gauges between Ukraine and the EU, the substantial depreciation of rolling stock and fixed assets at railroad stations, and the onerous bureaucratic procedures.

The introduction of the maritime "grain corridor" in July 2022 resulted in an expansion of opportunities for agricultural exports. During the most prolific months of operation, this route accounted for approximately one-third of total exports (The National Bank of Ukraine, 2023). Subsequent to Russia's withdrawal from the agreement in July 2023, the grain corridor was terminated (see Table 1).

An analysis of indicators by mode of transport shows that foreign trade flows have adapted to the new conditions of war, including a reorientation to road and rail transport to ensure the stability of trade operations (Figure 1).

Thanks to significant support from Ukraine's defence forces and international partners, Ukraine organised a new sea route through the Black Sea to specific destinations as early as August 2023. Since then, the volume of maritime traffic has increased every month. While the volume of cargo was 250 thousand tons in September, by December it had reached almost 7 million tons, exceeding the results of the most productive months of the grain corridor.

The newly established route facilitates the transportation of mining metals and chemical products, in addition to foodstuffs. Consequently, this has enabled a partial return to traditional markets for certain Ukrainian goods, including ore and metals (see Table 2 and Figure 2). Furthermore, trial imports of goods were executed within this route (see Table 3 and Figure 3).

In general, the table illustrates the challenges currently faced by Ukrainian exports, particularly with regard to maritime transportation. Problems with the export of grain, oil, ores and ferrous metals

Table 1

Comparative dynamics of exports and imports of goods by mode of transport in 2021 and in the period 03.2022-07.2023 (billion USD)

Transportation type	Export of goods		Import of goods	
	2021	03.2022-07.2023	2021	03.2022-07.2023
Road	22,6	40,3	45,4	67,6
Rail	12,2	22,4	14,3	10,2
Sea	62,4	35,6	20,5	7,5
Other	2,9	1,7	19,8	14,7

Source: (The State Migration Service of Ukraine)

Figure 1. Transportation of foreign trade flows, billion USD

Source: (The State Migration Service of Ukraine)

Table 2

Changes in average monthly exports of goods by transport

Transportation type	Cereal crops	Oil and oilseeds	Ores	Ferrous metals	Other products
Road	3,7	15,9	-0,1	-0,8	-6,2
Rail	13,7	12,7	-3,8	-6,9	-4,9
Sea	-48,6	-34,0	-63,4	-71,0	-20,0
Other	0,0	0,0	0,0	0,0	-5,1

Source: (The National Bank of Ukraine, 2023; The State Migration Service of Ukraine)

highlight the need to find new markets and optimise logistics routes.

The observed increase in the volume of exports transported by road and rail may be indicative of companies adapting to new conditions. However, further analysis is required to assess the overall performance, and a Strategy to improve the situation in the export sector must be developed.

The analysis of fluctuations in the imports of goods constitutes a pivotal component of economic evaluation, enabling the assessment of the prevailing state of the national economy and the identification of the repercussions of both domestic and international factors on market dynamics (see Table 3).

A detailed examination of the data presented in the table, which illustrates the contributions of various transport modes to the alteration in the average monthly imports of specific goods during the period from March 2022 to July 2023 in comparison with the year 2021, reveals substantial variations in the composition of imports and the influence of different modes of transportation on import flows.

In general, road transport is the most efficient mode of transport for imports in the period under

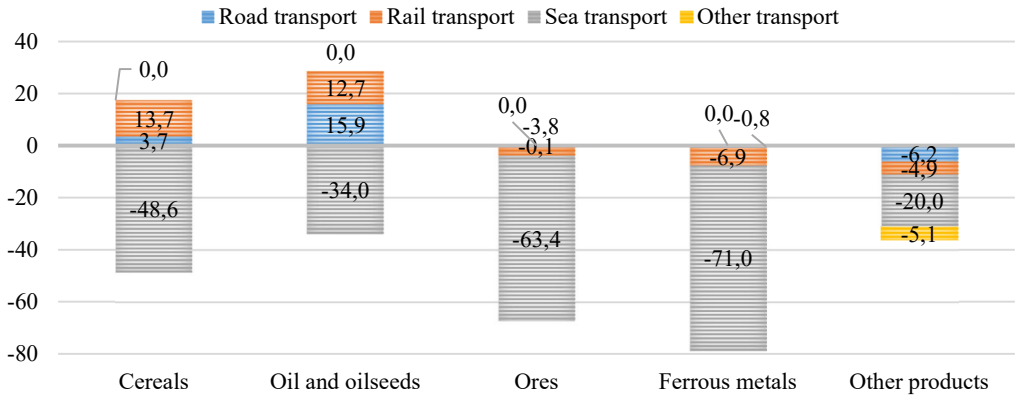

Figure 2. Contributions to the change in the average monthly export of goods by transport routes during 03.2022 - 07.2023 compared to 2021

Source: (The National Bank of Ukraine, 2023; The State Migration Service of Ukraine)

Table 3

Changes in the average monthly volume of imports of goods by transport

Transportation type	Food products	Energy carriers	Chemical products	Mechanical construction	Industrial products
Road	7,4	18,8	-1,0	0,2	11,2
Rail	-1,1	-20,7	-8,4	-0,3	-3,2
Sea	-22,2	3,9	-13,5	-17,7	-26,8
Other	-4,9	-36,0	-11,2	-11,1	-0,9

Source: (The National Bank of Ukraine, 2023; The State Migration Service of Ukraine)

study, showing positive results, while rail and sea transport suffered significant losses (Figure 3). The most vulnerable categories of imports were energy, chemicals, and industrial products, indicating the need to improve logistics strategies and develop alternative transportation routes.

The active implementation of alternative transportation routes has had a considerable impact on the resumption of food exports. The development of road and rail transportation networks played a pivotal role in the enhancement of food exports during the war. The most significant changes in food exports were the development and restoration of sea routes. Between July 2022 and June 2023, approximately 75% of agri-food products were exported through the Danube ports and the "grain corridor". Consequently, the diminution in agricultural exports since the onset of the invasion has been less substantial than that experienced in other sectors, such as mining and metals.

Growth in road transportation also had a positive impact on the export recovery, and was one of the factors that helped to maintain high levels of imports in 2022 and increase them in 2023. In 2022, road transport proved instrumental in ensuring the delivery of gasoline and diesel fuel, particularly in the context of unprecedented demand, a consequence of the destruction of production facilities and oil product warehouses. It is evident that the significance of road transport with regard to the importation of industrial and food products has also been heightened.

The limited diversification of transportation routes for imports resulted in a substantial decline in imports, consequent to the blockade of the western borders. It is evident that, in accordance with the eChain system, a significant proportion of international road transportation is conducted across the border with Poland. Consequently, the disruption to cargo flows experienced on the Polish side of the border, which commenced on 6 November 2023, has had a substantial impact on international trade. During the aforementioned blockade (from November 6, 2023, to January 16, 2024), the average daily number of trucks crossing the border with Poland decreased by 45% in comparison with October 2023, and the total number of trucks decreased by 28%. The reorientation of traffic to alternative road routes was complicated by a number of factors. Firstly, border crossings experienced high levels of congestion. Secondly, additional logistics costs were incurred. Thirdly, carriers from other countries were involved in the blockade. Consequently, the substantial proportion of road transportation in imports gave rise to higher

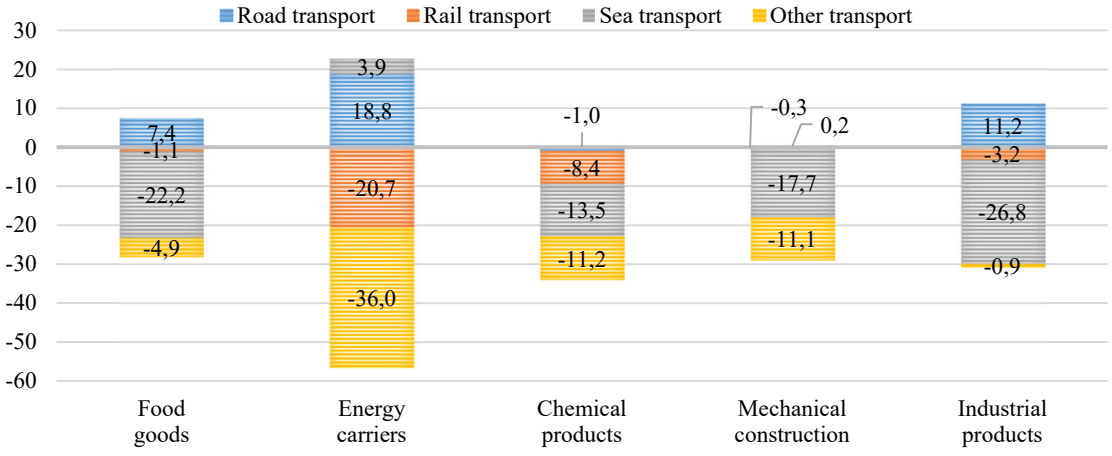

Figure 3. Contributions to the change in average monthly imports of selected goods by transport routes during 03.22 - 07.23 compared to 2021

Source: (The National Bank of Ukraine, 2023; The State Migration Service of Ukraine)

losses than exports. It is the contention of the National Bank of Ukraine that the extant logistics capacities, consequent to the new sea corridor, will be sufficient to facilitate the export of the 2023-2024 harvest and to increase the physical volume of exports of other goods. It is important to note that the European integration processes provide for the harmonisation of Ukrainian legislation with European standards related to logistics services. This encompasses measures pertaining to cargo transportation safety, environmental standards, certification of logistics processes, and the supervision of employees' rights in the logistics sector.

3. Problems of Logistics Services in the Context of European Integration Processes

Ukraine is currently engaged in efforts to align its regulatory framework with the environmental safety requirements of the European Union. This process encompasses the transition to modes of transportation that are both more energy-efficient and less harmful to the environment. For instance, the road transport sector is implementing regulations to reduce CO2 emissions, encouraging logistics companies to utilise environmentally friendly vehicles, such as electric vehicles and vehicles powered by alternative energy sources. In addition, in order to optimise the functioning of inland waterway transport, investment in infrastructure development is necessary, including the modernisation of port facilities and the creation of new cargo and passenger terminals. The enhancement of navigation systems constitutes a pivotal component in the augmentation of transportation efficiency.

The issue of sunken property on inland waterways necessitates a systematic approach, encompassing the formulation of explicit procedures for the detection, recovery, and disposal of sunken property. This will have a favourable impact on navigation safety and the environmental condition of water resources. A fundamental component of the legislative framework pertains to the delineation of the liability of shipowners in the event of violations pertaining to the regulations that govern inland waterway transport. This encompasses both administrative and criminal sanctions, the purpose of which is to encourage compliance with the law.

In the context of the ongoing conflict, Ukrainian logistics has adapted to the new realities and continues to operate effectively under martial law. The industry is demonstrating signs of recovery and is becoming integrated into the European and global transport and logistics network. European integration processes engender significant opportunities and considerable challenges for logistics companies in Ukraine. The entry of a company into the European logistics services market can be expected to engender a number of key benefits, including the acquisition of new customers, the geographical expansion of its operations, and the utilisation of European logistics centres and ports. Nevertheless, competition with European companies that offer high-quality services and reliable logistics networks is a significant obstacle.

The growth of e-commerce in Ukraine is driving demand for third-party logistics providers (3PLs), particularly those offering fulfilment centre services such as warehousing, order picking and packing, delivery, and reverse logistics. Small and medium-sized businesses are actively outsourcing their logistics operations in order to reduce costs and focus on their core business. However, DB Schenker experts state that some companies must still handle customs clearance in-house, limiting outsourcing to warehousing and delivery.

Until 2022, fulfilment services were in stable demand among the customers of logistics companies. However, the outbreak of a full-scale war in Ukraine caused significant difficulties for fulfilment services. The first to refuse these services were customers who could not effectively control the circulation of goods. According to Meest China, fulfilment began to recover in mid-2023, and there has since been an increase in the volume of this business, giving reason to hope for a return to pre-war levels. Experts note that fulfilment is gaining popularity again, enabling suppliers to reduce delivery times and enhance convenience for end users.

In response to restrictions on the western borders, businesses are trying to maintain stock levels in warehouses to avoid delivery delays. Customers are now seeking to store goods in locations from which it is easier to organise deliveries, emphasising the need to deploy warehouses in the central, southern, eastern and western regions of Ukraine. The integration of automation and digitalisation within the logistics sector has been demonstrated to engender substantial enhancements in the efficiency of supply chains, whilst concomitantly reducing transportation expenditures and expediting order fulfilment times. The implementation of warehouse management systems (WMS), transportation management systems (TMS), and supply chain management systems (SCM) has been demonstrated to enhance coordination and reduce the time required to process requests. The utilisation of Global Positioning System (GPS) tracking systems facilitates the monitoring of goods in transit, while the integration of artificial intelligence (AI) enables real-time oversight, thereby enhancing the transparency and efficiency of logistics management processes. This underscores the pivotal role of innovative technologies in propelling industry forward.

In the contemporary context, digitalisation has emerged as a pivotal element in enhancing the efficiency of logistics processes. In the context of European integration, Ukrainian companies are implementing digital solutions with a view to automating warehouse operations, optimising routes, managing inventory and tracking cargo. This encompasses the utilisation of blockchain technologies for the purpose of tracking supply chains, the application of big data for the forecasting of demand, and the employment of artificial intelligence for the analysis of transportation routes. The development of the Internet of Things (IoT) is a positive occurrence. It facilitates the automation of accounting for goods and the tracking of their movement in real time. This development has the potential to enhance transparency and reliability in logistics processes, which is a pivotal requirement in the European market. It is also important to note that digitalisation helps to reduce costs and increase the speed of service, which allows companies to remain competitive in the context of European integration.

In the context of the development of Ukrainian logistics, it is essential to consider global trends that are actively shaping the modern transportation and logistics services industry. The present study explores the potential of blockchain technology in the context of cargo transportation, a field that has recently become the focus of experimental research. In particular, IBM, in collaboration with Maersk and other partners, has been engaged in the testing of a logistics order monitoring system for a number of years. The system, which employs blockchain technology, has the potential to enhance transparency, accelerate processes, and fortify the security of information exchange.

4. Conclusions

Consequently, the development of the logistics services market within the context of European integration processes in Ukraine is a multifaceted and complex task requiring significant efforts at all levels. The future of this sector will be determined by a number of key factors, including improvements to infrastructure capacity, financial investments, adaptation to European standards, and the introduction of digital technologies. The adaptation of Ukrainian logistics companies to these new conditions will not only result in the expansion of their operations within the European market, but will also serve to enhance their competitiveness on a global scale. During the years of full-scale war, Ukrainian logistics demonstrated notable resilience in the face of significant challenges, including the suspension of sea and air transportation. In the contemporary era, the national logistics sector is undergoing a complex integration process with European transport networks. However, the nation is currently facing a number of challenges, including a shortage of labour and incidents along its borders with neighbouring countries, which are complicating interactions with these states. The integration of advanced technologies on a global scale is set to facilitate the acceleration of order fulfilment and enhance the flexibility of logistics companies in their collaborative efforts with international partners. The integration of innovative technologies, such as 3D printing, has the potential to transform the current structure of cargo transportation. This transformation could lead to a reduction in the volume of physical transportation, thereby creating opportunities to optimise transport infrastructure and reduce logistics costs. These cost reductions are essential for ensuring the stable provision of export and import operations in the future.

References:

Tridid, O. M. (2008). Logistics: monograph. Kyiv: Znannia, 566 p.

Yastremska, O. M. (2015). Logistics. Kharkiv: Simon Kuznets Kharkiv National University of Economics, 271 p.

Dudar, T. H., & Voloshyn, R. V. (2012). Logistics fundamentals. Kyiv: Centre for Educational Literature, 176 p.

Smirnova, N. V. (2018). The essence and importance of logistics activities in the management system of organisations. *Scientific Bulletin of Uzhhorod National University*. Issue 20, Part 3, =p. 54–59.

Kramarenko, I., Irtyshcheva, I., Stehnei, M., Boiko, Y., Nadtochii, I., Pavlenko, O., Rakipov, V., Hryshyna, N., Sirenko, I., Ishchenko, O. (2022). Socio-economic development in conditions of digital transformations: regional features, strategic analysis, and prospects *2022 7TH International conference on mathematics and computers in sciences and industry*, MCSI, 175–182. DOI: https://doi.org/10.1109/MCSI55933.2022.00035

Hrynash, L., Skvorzov, I., Popadynets, N., Nakonechna, K., Gorbova, Kh., Artemenko, L., Svatiuk, O., Rybchuk, A., & Shchurov, I. (2022). Issues of Concern in Managing the Corporate Innovative Development. *WSEAS Transactions on Business and Economics*, Vol. 19, p. 1990–1999. DOI: https://doi.org/10.37394/23207.2022.19.178

Schultz, S., Popadynets, N., Teslya, D., Bilyk, I., Kosar, N., Karpii, O., & Kubrak, N. (2021). Factor determinants of the consumer market development. *Accounting*, Vol. 7(3), p. 563–572. DOI: https://doi.org/10.5267/j.ac.2021.1.002

Pavlova, O., & Pavlov, K. (2021) Strategic Priorities for Socio-economic Development of Ukraine in Comparison with the Republic of Poland. In: Karwowski W., Ahram T., Etinger D., Tanković N., Taiar R. (eds) Human Systems Engineering and Design III. IHSED 2020. Advances in Intelligent Systems and Computing, vol. 1269. Springer, Cham. DOI: https://doi.org/10.1007/978-3-030-58282-1_49

Pavlov, K. (2018). Competitive Features In The Market Structure Of Housing Property With Regard To Regional Definitions. *Baltic Journal of Economic Studies*, Vol. 3(4), p. 191–198. DOI: https://doi.org/10.30525/2256-0742/2017-3-4-191-198

Pavlova, O., Pavlov, K., Matiichuk, L., Kotsan, I., & Perevozova, I. (2024). Imperatives to improve the efficiency of the energy security system of Ukraine. *E3S Web Conf.*, Vol. 567 (2024). pp. 01015. DOI: https://doi.org/10.1051/e3sconf/202456701024

Pruntseva, G., Davymuka, S., Yakubiv, V., Vasyltsiv, T., Anhelko, I., Irtyshcheva, I., Maksymiv, Y., Hryhoruk, I., Bilyk, R., & Popadynets, N. (2021). The analysis of factors affecting the household savings as a part of food security management. *International Journal of Data and Network Science*, Vol. 5(4), p. 769–774. DOI: https://doi.org/10.5267/j.ijdns.2021.7.004

Akimova, L. M., Levytska, S. O., Pavlov, K. V., Kupchak, V. R., & Karpa, M. I. (2019). The role of accounting in providing sustainable development and national safety of Ukraine. *Financial and Credit Activity Problems of Theory and Practice*, Vol. *3*(30), p. 54–61. DOI: https://doi.org/10.18371/fcaptp.v3i30.179501

Wołowiec, T., Pavlov, K., Pavlova, O., & Zaichuk, K. (2022). Tourist Services of the Western Region of Ukraine: Rating and Analysis. *Economics*, Vol. 10(1), p. 183–198. DOI: https://doi.org/10.2478/eoik-2022-0007

Pavlova, O., Pavlov, K., Horal, L., Novosad, O., Korol, S., Perevozova, I., Obelnytska, K., Daliak, N., Protsyshyn, O., & Popadynet, N. (2021). Integral estimation of the competitiveness level of the western Ukrainian gas distribution companies. *Accounting*, Vol. 7(5), p. 1073–1084. Available at: https://www.growingscience.com/ac/Vol7/ac_2021_57.pdf

Yakymchuk, A., Halachenko, O., Irtyshcheva, I., Popyk, M., Bondarenko, V., Kondratska, L., Pavlov, K., Pavlova, O., Ishcheikin, T., Barybina, Y., Hryhoruk, I., & Popadynets, N. (2022). Ways of Improving Management System of a Tourism Industry Development. Applied Human Factors and Ergonomics International. Human Interaction & Emerging Technologies (IHIET-AI 2022). Artificial Intelligence & Future Applications. Available at: https://openaccess.cms-conferences.org/#/publications/book/978-1-7923-8989-4/article/ 978-1-7923-8989-4_12

Siryk, Z., Hrafska, O., Pavlov, K., Samoilenko, B., & Chornyi, R. (2024). Sustainable development trends in the Ukrainian logistics market. *E3S Web Conf.*, vol. 567 (2024) 01024. Volume 567 (2024). DOI: https://doi.org/10.1051/e3sconf/202456701024

Yakymchuk, A., Valyukh, A., Irtyshcheva, I., Yakubiv, V., Popadynets, N., Hryhoruk, I., Pavlov, K., Pavlova, O., Maksymiv, Y., Boiko, Y., Hryshyna, N, & Ishchenko, O. (2021). Economic Diagnostics and Management of Eco-Innovations: Conceptual Model of Taxonomic Analysis. In: Russo D., Ahram T., Karwowski W., Di Bucchianico G., Taiar R. (eds) *Intelligent Human Systems Integration 2021. Advances in Intelligent Systems and Computing*, Vol. 1322. Springer, Cham. DOI: https://doi.org/10.1007/978-3-030-68017-6_84

Yakymchuk, A., Valyukh, A., Diugowanets, O., Bilyk, R., Pavlov, K., Pavlova, O., Batkovets, N., Popadynets, N., & Hryhoruk, I. (2020). Public Administration and Economic Aspects of Ukraine's Nature Conservation in Comparison with Poland. In: Kantola J., Nazir S., Salminen V. (eds) *Advances in Human Factors, Business Management and Leadership. Advances in Intelligent Systems and Computing*, Vol. 1209, p. 258–265. Springer, Cham. DOI: https://doi.org/10.1007/978-3-030-50791-6_33

Konishcheva, N. J., & Trushkina, N. V. (2005). Management of logistics activities of industrial enterprises. *Economics of Industry*, Vol. 1, p. 114–123.

Skrypko, T., Popadynets, N., Yakhno, T., Shulla, R., Vlasenko, T., Irtyshcheva, I., & Boiko, Y. (2021). Optimizing the polymer waste supply chains based on circular economy. *Uncertain Supply Chain Management*, Vol. 9(2), p. 343–350. DOI: https://doi.org/10.5267/j.uscm.2021.2.008

Sumets, O.M. (2013). Content analysis of the definition of logistics activity. *Sustainable Development of the Economy*, Vol. 4, p. 290–295.

Tyurina, N., Goy, I., & Babiy, I. (2015). Logistics. Kyiv, 392 p.

Oklander, M. A. (2008). Logistics: Kyiv, 346 p.

Chechel, D. O. The logistics system of the enterprise: theoretical plane. *The XVII All-Ukrainian Practical and Cognitive Internet Conference*. Available at: https://naukam.triada.in.ua/index.php/konferentsiji/47-simnadtsyata-vseukrajinska-praktichno-piznavalna-internet-konferentsiya/368-logistichna-sistema-pidpriemstva-teoretichna-ploshchina

Irtyshcheva, I., Pavlenko O., Boiko Y., Stehnei M., Kramarenko, I., Hryshyna, N., Ishchenko, O. (2022). Evaluation of efficiency of regional public governance in the context of achieving goals of sustainable development. *Management theory and studies for rural business and infrastructure development*. Volume 44, Issue 4, p. 497–505. DOI: https://doi.org/10.15544/mts.2022.49

Zaverbnyi, A., & Lomaga, Y. (2022). Problems and prospects of forming logistics supply chains in wartime in the context of intensified European integration. *Economy and Society*, Vol. 45. DOI: https://doi.org/10.32782/2524-0072/2022-45-23

Hukaliuk, A. F. (2015). Improvement of supply chains in the context of international business trends. *Economic Analysis*, Vol. 21, No. 2, pp. 48–54.

Stock, J., & Lambert, D. (2016). Logistics trend radar. Delivering insight today. Creating value tomorrow! Version 2016. DHL Customer solutions & innovation. Available at: http://www.dhl.com/content/dam/downloads/g0/about_us/logistics_insights/dhl_logistics_trend_radar_2016.pdf

Waters, D. (2018). Global Logistics And Distribution Planning. Strategies for Management. Taylor and Francis.

Krykavsky, E. (2006). Logistics. Basics of theory. Lviv: *Lviv Polytechnic National University*, 456 p.

Industry trends. The state of the logistics industry in Ukraine: trends and features (2024). Available at: https://hub.kyivstar.ua/articles/galuzevi-trendi-stan-logistichnoyi-galuzi-v-ukrayini-trendi-ta-osoblivosti

Trends in the world of logistics (2024). Available at: https://www.tot.com.ua/post/logistics-trends-worldwide

The National Bank of Ukraine (2023). Inflation report. Available at: https://bank.gov.ua/ua/news/all/inflyatsiyniy-zvit-kviten-2023-roku

The State Migration Service of Ukraine. Available at: https://dmsu.gov.ua/pro-dms/zagalna-informacziya.html

Pryshchepa, O., Kardash, O., Yakymchuk, A., et al. (2020). Optimization of multi-channel queuing systems with a single retail attempt: Economic approach. *Decision Science Letters,* Vol. 9(4), p. 559–564.

Received on: 20th of March, 2025
Accepted on: 27th of April, 2025
Published on: 30th of May, 2025