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LOGISTICS SERVICES MARKET: DEVELOPMENT UNDER THE CONDITIONS OF EUROPEAN INTEGRATION РИНОК ЛОГІСТИЧНИХ ПОСЛУГ: РОЗВИТОК ЗА УМОВ ЄВРОІНТЕГРАЦІЇ

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This study examines the significant influence of World Bank assistance in rejuvenating Ukraine's logistics framework, specifically the railway system. The primary objective is to modernize the infrastructure and consequently bolster the competitiveness of rail transport within the context of European integration. The paper identifies crucial areas for logistics infrastructure upgrades, notably the rehabilitation of railway tracks and the replacement of critical turnouts, with a substantial focus on integrating innovative management practices and cutting-edge technologies. The research also validates the essential role of international investment and European funds in supporting transport initiatives to improve the quality of road and border infrastructure. Furthermore, a comprehensive theoretical analysis is conducted, defining the core nature of 'logistics' and dissecting the structural elements of market-based logistics operations. The article also illustrates how adherence to international educational benchmarks and fostering partnerships with foreign academic institutions can substantially enhance the market standing of Ukrainian universities. It explores the contribution of innovative managerial approaches to delivering high-quality education and facilitating adaptation to contemporary global challenges. Subsequently, the research delineates key areas for the successful adoption of international best practices in the Ukrainian educational sphere, specifically to improve logistics-related activities. Ultimately, the paper outlines the necessary directions for Ukrainian logistics enterprises to adapt to European market requirements, expand their participation in global logistics networks, and enhance safety, environmental sustainability, and operational efficiency by vigorously adopting advanced technological solutions. This integrated approach contributes to an optimistic outlook for the future trajectory of Ukrainian logistics amid ongoing European integration.
Keywords: *logistics services, state regulation, logistics activities, European integration processes, market, war, logistics flows, management.*

У цьому дослідженні розглядається значний вплив допомоги Світового банку на відновлення логістичної системи України, зокрема залізничного сектору. Основною метою є модернізація інфраструктури та, як наслідок, зміцнення конкурентоспроможності залізничного транспорту в контексті європейської інтеграції. У роботі визначено ключові напрями оновлення логістичної інфраструктури, зокрема реконструкцію залізничних колій та заміну критично важливих стрілочних переводів, з особливим акцентом на впровадженні інноваційних практик управління та передових технологій. Дослідження також підтверджує важливу роль міжнародних інвестицій та європейських фондів у підтримці транспортних ініціатив, спрямованих на покращення якості дорожньої та прикордонної інфраструктури. Крім того, проведено комплексний теоретичний аналіз, що визначає сутність поняття «логістика» та розкриває структурні елементи ринкових логістичних операцій. У статті також проілюстровано, як дотримання міжнародних освітніх стандартів та розвиток партнерства з іноземними академічними установами можуть суттєво підвищити ринкові позиції українських університетів. Досліджено внесок інноваційних управлінських підходів у забезпечення високоякісної освіти та сприяння адаптації до сучасних глобальних викликів. На основі цього визначено ключові напрями успішного впровадження найкращих світових практик в українську освітню сферу, спрямовані безпосередньо на вдосконалення діяльності у сфері логістики. Зрештою, у роботі окреслено необхідні стратегії адаптації українських логістичних підприємств до вимог європейського ринку, розширення їхньої участі у глобальних логістичних мережах, а також забезпечення підвищеного рівня безпеки, екологічної стійкості та оперативної ефективності шляхом активного впровадження передових технологічних рішень. Такий комплексний підхід сприяє оптимістичному прогнозу майбутньої траєкторії розвитку української логістики в умовах триваючої європейської інтеграції.
Ключові слова: *логістичні послуги, державне регулювання, логістична діяльність, євроінтеграційні процеси, ринок, війна, логістичні потоки, управління.*

Statement of the problem

The effective growth of the logistics sector depends on modernizing and expanding its infrastructure. This encompasses both the physical renewal of transport networks and the implementation of advanced technologies to guarantee the high speed and reliability of freight transit. Given its geographic location, Ukraine has the potential to serve as a crucial transport corridor linking Europe and Asia. Nonetheless, achieving this role requires substantial investment in the reconstruction and renewal of existing infrastructure to ensure compliance with rigorous European standards.

This process necessitates making prudent financial and economic decisions alongside establishing an adequate regulatory framework. Such a framework must enable the industry to successfully adapt to European norms and maintain effective competitiveness on the international stage. Consequently, Ukraine faces a mix of significant challenges and opportunities, demanding a holistic approach to reforming its logistics operations to facilitate full integration into the European economic area.

The essence of the concept of "logistics" and its activities has been considered in several scientific works. O. Tridid [1] interprets logistics as organizing a continuous flow of materials and information from the supplier to the end user in a single process. According to O. Yastremska et al. [2], logistics is the science of planning, organizing, managing, controlling, and regulating material and information flows in space and time from the initial source to the final consumer. T. Dudar and R. Voloshyn [3] define the term "logistics" as 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 [4] identifies three critical approaches to managing logistics activities in the organization's management system.

In the works of L. Hrynash [5], S. Schultz [6], N. Popadynets [6], K. Pavlov [7-9, 15], O Pavlova [7-9, 12], H. Pruntseva [10], L. Akimova [11], O. Novosad [13], A. Yakymchuk [14, 16, 17] 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 scientists: N. Konishcheva, N. Trushkina [18] and T. Skrypko [19] as the movement and storage of commodity flow in the process of their transportation through various stages within the supply chain, O. Sumets [20] as a system of integrated management of logistics flows, which includes organizational 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; N. Tyurina, I. Goy, I. Babiy [21] as the implementation of operational management of logistics processes and operations to ensure the efficient movement of material resources and products. M. Oklander [22] defines logistics activities as an organizational 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 because the coordinated work of various services allows to ensure the smooth movement of goods, minimize delays and increase the overall efficiency of the supply chain, which, in turn, positively affects the competitiveness of the enterprise in the market. D. Chechel [23] considers logistics activities as an adaptive logistics system with feedback, which performs various logistics functions and operations, consists of several integrated subsystems, and has complex interactions with external factors. A. Zaverbnyi and Y. Lomaga [24] argue that the conditions of European integration impose new challenges on an enterprise's logistics processes, especially when expanding its production capacity and entering international markets. A. Hukaliuk argues that the modern consumer requires the most efficient and high-quality provision of goods and services, which imposes high demands on the organization of transport routes [25]. American researchers J. Stock and D. Lambert [26] note that, within the logistics management framework, there is planning, implementation, and control of the movement of goods, their stocks, services, and related information from the place of formation to the place of consumption to meet customer needs. D. Waters [27] interprets logistics flow as the movement of material resources, including the organization's incoming, internal, and outgoing flows.

According to E. Krykavsky [28], logistics is the study of an integrated system of material, information, and financial flows within an enterprise. Thus, the essence of logistics activities is central to scientific work, as it is the main factor that allows us to analyze the overall market system.

The purpose of the research

The article's purpose is to analyze the logistics services market and identify the main patterns of its development in the context of European integration.

Presentation of the primary research material

Support from the World Bank is crucial to helping Ukrainian railways repair damaged infrastructure and maintain the uninterrupted operation of both freight and passenger services. With the season for track renewal underway, modernization efforts are concentrated on high-traffic rail sections deemed critical areas. The company has set ambitious goals for the end of 2024, planning to renew over 1,195 km of railway tracks and replace 1,073 sets of switches (turnouts). To facilitate these large-scale works, the railroad has already received its initial delivery of 25,000 tons of rails from the Japan International Cooperation Agency (JICA) [29].

Ukraine's integration into the European market presents logistics companies with new opportunities to attract foreign capital, though it also requires substantial financial investment in modernizing their systems. Active participation in European integration programs, notably the TEN-T Transport Network initiative, enables Ukraine to secure European grants and loans specifically for upgrading its transport infrastructure.

It is crucial to recognize that European integration inherently fosters a competitive environment, compelling Ukrainian firms to compete directly with well-established, powerful European logistics operators. This situation requires enterprises to prioritize reducing operating costs and significantly boosting productivity. In this demanding setting, the immediate focus must be on optimizing logistics processes, encompassing improved inventory management, selection of optimal routes, and the vigorous introduction of automation and digital technologies.

The text also highlights contemporary market performance, noting that global logistics giant Kuehne + Nagel recorded a revenue of CHF 5.5 billion during the first three months of 2024. This figure represents an 18% decrease compared to the CHF 6.7 billion achieved in the same period of 2023. Correspondingly, the Swiss group's net profit for the first quarter of 2024 fell 40% year on year to 270 million francs [30].

The organization has recently experienced a sustained downturn in financial performance over the past few quarters, primarily attributable to weak performance in the maritime logistics division. This decline stems from the stabilization of sea freight rates, which, following their peak during the 2021-2022 period, had normalized to pre-pandemic levels by 2023.

Consequently, the revenues generated by the maritime logistics division fell 27.8% year on year in the first quarter of 2024, settling at CHF 1.926 billion. The aviation segment also registered a significant revenue decline, though its rate of decline was slightly less severe than that observed in sea freight. Revenue from air transportation totalled CHF 1.583 billion, a 15% decrease from the previous year.

The road transportation segment demonstrated greater resilience, with its revenue decline being less pronounced than in the maritime and air divisions, falling by 10% year-on-year to CHF 860 million. Nevertheless, the Earnings Before Interest and Taxes (EBIT) for this segment decreased by over 42% compared to the same period in 2023, to 30 million francs [30].

The contract logistics segment demonstrated relative resilience, a characteristic of logistics operators in the last few quarters. Revenues in this area decreased by 9.8% and amounted to 1,139 million francs compared to the previous year.

The financial performance of the Danish logistics operator DSV also shows a similar trend. In the first quarter of 2024, the company's revenues reached 38.34 billion kroner, 5% less than in 2023 [30].

The most unprofitable division remains the sea and air transportation segment, which recorded revenues of 22.7 billion kroons in the first quarter of 2024, which is 11.5% lower than last year. Profit before tax in this segment decreased by 16%, and EBIT decreased by 26%, indicating a larger decline than the group's overall results [30]. This shows a continuing decline in efficiency in the sea and air transportation segments compared to previous years.

The results from the first quarter of 2024 collectively affirmed a continued downtrend in the logistics sector's financial performance. The revenue decline was particularly pronounced in the maritime and aviation divisions, primarily due to falling transportation tariffs. This notably affected the financial outcomes reported by key players such as Kuehne + Nagel and DSV. In contrast, contract logistics emerged as the most stable segment, with fewer revenue fluctuations.

Turning to global investment trends, 68 countries increased infrastructure investment in 2023. Analysis by the World Bank indicates that the volume of private participation in infrastructure (PPI) investment reached $86 billion during that year, surpassing the average annual figure for the previous five years by $0.5 billion. The global number of infrastructure projects is showing consistent growth, rising from 260 in 2022 to 322 in 2023. Specifically, the infrastructure portfolio across Europe and Central Asia doubled, reaching 35 projects annually. While renewable energy still accounts for the bulk of global PPI investment, spending on port infrastructure development also increased by twofold in 2023.

Despite the ongoing hostilities, representatives of the Ukrainian transport and logistics sector maintain an optimistic outlook. The results of the Infrastructure Index 2023 survey, conducted by the European Business Association (EBA) in collaboration with Arzinger and Sayenko Kharenko, show that 84% of companies are prepared to resume shipping immediately upon the unblocking of Ukrainian ports, with most respondents planning the fastest possible restart. Furthermore, 66% of industry representatives prioritize investments in developing highways connecting Ukraine with the European Union, while 70% deem it essential to build a network of strategic transport hubs in western Ukraine. Significantly, 85% of Ukrainian companies in this sector have either sustained operations or completed thorough restoration efforts.

The full-scale war has had a destructive effect, shattering traditional supply chains and severely worsening Ukraine's foreign trade position. The blockade of Black Sea routes, the destruction of manufacturing facilities, and targeted attacks on energy and port infrastructure resulted in a sharp reduction in goods exports.

In response to these critical challenges, efforts to expand and modernize existing logistics routes began almost instantly. Specifically, transportation through the previously secondary Danube ports intensified. In 2023, significant steps were taken to boost their capacity, including the opening of 23 new terminals, dredging operations, expansion of pilotage services, and refinements to operational and dispatching processes. As a direct result, according to the USPA, the volume of traffic through the Danube ports soared to 29 million tons in 2023, marking a twofold increase over 2022 and nearly a sixfold increase over 2021.

Table 1: Comparative dynamics of exports and imports of goods by mode of transport in 2021 and in the period 03.2022-07.2023 (USD billion)

Type of transportation	Export of goods		Import of goods	
	2021	03.2022-07.2023	2021	03.2022-07.2023
Automotive	22,6	40,3	45,4	67,6
Railway	12,2	22,4	14,3	10,2
Marine	62,4	35,6	20,5	7,5
Other	2,9	1,7	19,8	14,7

Source: [32].

Simultaneously, initiatives to enhance railway crossing capacity drove growth in rail exports. Between March and December 2023, the total volume of rail transportation grew by 23%, with export transportation increasing by 14% compared to the same period in the prior year. The structure of rail exports was dominated by grain (40.6%), ores (35.2%), and ferrous metals (8.1%). On average, rail carried 12.6 million tons of cargo per month, of which 4.7 million were exports. A record volume of 14.1 million tons was transported in November 2023, a surge likely attributable to the rerouting of freight flows due to the simultaneous blockade of road crossings on the border with Poland. Nevertheless, the rail network still faces capacity limitations stemming from differences in track gauges between Ukraine and the EU, high depreciation of rolling stock and fixed assets at rail stations, and overly complex bureaucratic procedures.

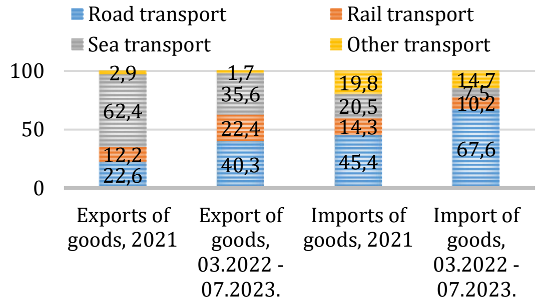

Fig. 1. Transportation of foreign trade flows, billion dollars. USD. *Source: [32].*

The introduction of the maritime "grain corridor" in July 2022 expanded opportunities for agricultural exports. In the most productive months of operation, this route accounted for about a third of total exports [31]. Eventually, Russia's withdrawal from the agreement in July 2023 led to the termination of the grain corridor (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).

As early as August 2023, Ukraine successfully launched a new sea route across the Black Sea, targeting specific destinations, thanks to substantial support from both Ukraine's defence forces and international partners. Since the corridor's activation, maritime traffic volumes have demonstrated consistent monthly growth. Specifically, cargo volume, which stood at 250 thousand tons in September, surged to nearly 7 million tons by December, thereby surpassing the productivity levels recorded during the most successful months of the prior grain corridor operation.

Table 2. Changes in average monthly exports of goods by transport

Type of transportation	Cereal crops	Oil and oilseeds	Rudy	Ferrous metals	Other products
Automotive	3,7	15,9	-0,1	-0,8	-6,2
Railway	13,7	12,7	-3,8	-6,9	-4,9
Marine	-48,6	-34,0	-63,4	-71,0	-20,0
Other	0,0	0,0	0,0	0,0	-5,1

Source: [31-32].

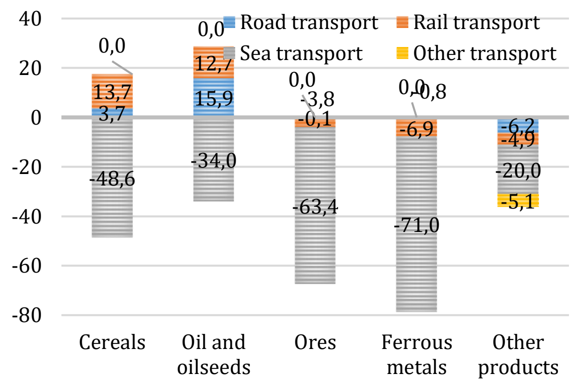

Fig. 2. Contributions to the change in the average monthly export of goods by transport routes during 03.2022 - 07.2023 compared to 2021.
Source: [31-32].

The new route allows the transportation of mining metals and chemical products, in addition to food products, enabling some Ukrainian goods, such as ore and metals, to partially return to traditional markets (Table 2, Figure 2). In addition, trial imports of goods were conducted along this route (Table 3, Figure 3). In general, the table illustrates the challenges Ukrainian exports face in the current period, especially in maritime transportation. Problems with exports of grain, oil, ores, and ferrous metals point to the need to find new markets and optimize logistics routes. The noticeable increase in exports facilitated by road and rail transport suggests that companies are actively adapting to the latest operational environment. However, the sector's overall performance warrants further in-depth analysis and the formulation of a strategic plan to improve its current state.

Furthermore, examining fluctuations in goods imports constitutes a vital component of economic analysis, as it allows for an assessment of the national economy's health and helps determine the influence of both internal and external factors on the market (as detailed in Table 3).

An examination of the table, which details the contribution of various transport modes to the change in average monthly goods imports between March 2022 and July 2023 relative to the 2021 baseline, reveals significant instability in the import structure and highlights the differential impact of transport types on incoming flows.

Overall, road transport proved the most efficient mode for imports during the analyzed period, consistently delivering positive results, while both rail and sea transport sustained substantial losses (as illustrated in Figure 3). The most susceptible import categories were energy, chemicals, and industrial products. This vulnerability underscores an urgent need to refine existing logistics strategies and develop robust alternative transportation corridors. The vigorous establishment of alternative transportation routes has significantly contributed to the resurgence of food exports. Specifically, the utilization of road and rail transport provided positive momentum for food exports during the full-scale conflict. However, the most profound shifts in agri-food exports were achieved through the development and restoration of sea routes. Between July 2022 and June 2023, approximately 75% of agri-food products were exported via the Danube ports and the "grain corridor," resulting in less severe losses for agricultural exports than in sectors like mining and metals.

The growth in road transportation was also instrumental in export recovery, simultaneously maintaining high import levels in 2022 and facilitating an increase in 2023. Road transport played a critical role in delivering essential fuels, such as gasoline and diesel, in 2022, especially following the destruction of production facilities and oil product warehouses. Its importance also grew in the import of industrial and food products.

The lack of diversification in import transportation routes led to a significant reduction in imports when Western borders were blocked. Given that, according to the eChain system, over half of international road transportation crosses the border with Poland, the cargo flow blockade on the Polish side (from November 6, 2023, to January 16, 2024) heavily impacted foreign trade. During this period, the average daily number of trucks crossing the Polish border dropped by 45% compared to October 2023, resulting in a 28% decrease in total truck traffic. Attempts to reroute traffic were hampered by high congestion at alternative crossings, increased logistics costs, and the involvement of carriers from other nations in the blockade. Consequently, the high reliance on road transport for imports led to greater losses for the import sector than for exports. However, the National Bank of Ukraine projects that existing logistics capacities, thanks to the new sea corridor, will be sufficient to export the 2023–2024 harvest and increase the physical volume of other goods exports.

Table 3. Changes in the average monthly imports of goods by transport

Type of transportation	Food products	Energy carriers	Chemical products	Mechanical engineering	Industrial products
Automotive	7,4	18,8	-1,0	0,2	11,2
Railway	-1,1	-20,7	-8,4	-0,3	-3,2
Marine	-22,2	3,9	-13,5	-17,7	-26,8
Other	-4,9	-36,0	-11,2	-11,1	-0,9

European integration processes require harmonizing Ukrainian legislation with EU standards governing logistics services. This includes establishing measures for cargo transportation safety, environmental compliance, process certification, and the protection of employees' rights within the logistics sector. Ukraine is actively working to align its regulations with EU ecological safety requirements, promoting the transition to more energy-efficient and less polluting transport modes. For instance, the road transport sector is vigorously implementing regulations to reduce CO_2 emissions and encourage the use of electric and alternative-energy vehicles. To optimize inland waterway transport, infrastructure investment is crucial, including modernizing port facilities, building new cargo and passenger terminals, and improving navigation systems to boost efficiency. Addressing the issue of sunken property on inland waterways requires a systematic framework for its detection, recovery, and disposal to enhance navigation safety and water resource health. Defining shipowners' liability for violations, through administrative and criminal sanctions, is a key legislative element to ensure compliance.

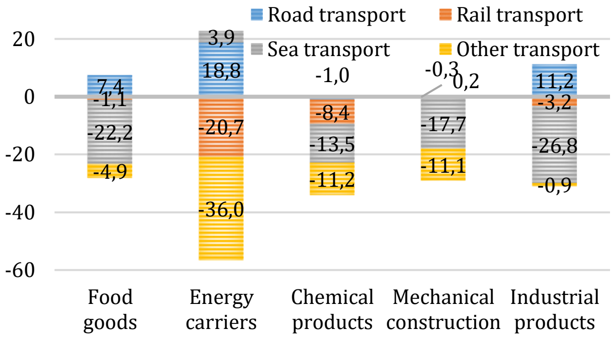

Fig. 3. Contributions to the change in the average monthly imports of selected goods by transport routes during 03.22 - 07.23 compared to 2021. *Source: [31-32].*

Ukrainian logistics has adapted to new realities and continues to operate successfully under martial law, demonstrating recovery and progressive integration into European and global transport networks. While European integration offers significant opportunities – such as access to new customers, expanded operational geography, and the use of European logistics centres and ports – it also presents severe challenges, primarily intense competition with European companies offering established, high-quality services.

The rise of e-commerce is currently driving demand for third-party logistics (3PLs) in Ukraine, particularly for fulfilment centres providing warehousing, picking, packaging, delivery, and reverse logistics. SMEs are increasingly outsourcing logistics to cut costs and focus on core activities. Nevertheless, DB Schenker experts note that some companies restrict outsourcing to just warehousing and delivery, retaining customs clearance internally. While fulfilment services enjoyed stable demand pre-2022, the full-scale invasion caused significant disruption, with customers losing effective control over goods circulation being the first to discontinue these services. Recovery began mid-2023, and Meest China experts observe a growing volume of fulfilment business, suggesting a potential return to pre-war levels, driven by the service's ability to reduce delivery times and increase end-user convenience. Given western border restrictions, businesses are attempting to hold larger warehouse inventories to mitigate delivery delays. Customers are now seeking storage locations that facilitate easier distribution, highlighting the need to expand warehouse networks beyond central regions into the southern, eastern, and western parts of Ukraine. The integration of automation and digitalization—through Warehouse Management Systems (WMS), Transportation Management Systems (TMS), and Supply Chain Management Systems (SCM)—is vital for enhancing supply chain efficiency, reducing costs, and accelerating order fulfillment. Technologies such as GPS tracking and Artificial Intelligence (AI) enable real-time monitoring and analysis, increasing transparency and operational efficiency, underscoring the critical importance of innovation for industry advancement.

Digitalization is currently the key factor for improving logistics process efficiency. In the context of European integration, Ukrainian companies are implementing digital solutions to automate warehouse operations, optimize routes, manage inventory, and track cargo. This involves using blockchain for supply chain tracking, big data for demand forecasting, and AI for route analysis. The development of the Internet of Things (IoT) is on the rise, enabling automated inventory accounting and real-time tracking of movements, thereby significantly increasing the transparency and reliability demanded by the European market. Digitalization is essential for reducing costs and improving service speed, which is necessary for maintaining competitiveness within the European context. Considering global trends, the introduction of blockchain technology, currently being tested in cargo transport (e.g., IBM and Maersk's logistics order monitoring system), is a critical area for Ukrainian logistics development, promising enhanced transparency, speed, and security in information exchange.

Conclusions and prospects for further research

The development of the logistics services market within Ukraine's ongoing European integration processes is a complex, multifaceted undertaking that demands substantial effort at all levels. Key strategic areas will shape the future of this sector: enhancing infrastructure capacity, securing financial investments, achieving full compliance with European standards, and implementing digital technologies. Successful adaptation by Ukrainian logistics companies to these new conditions will not only broaden their access to the European market but also solidify their global competitiveness. Despite enduring numerous challenges, including the suspension of sea and air transport during the years of full-scale war, the national logistics sector is actively integrating into European transport networks. However, it now faces new hurdles, including labour shortages and border incidents that complicate relations with neighbouring countries. Leveraging global trends and integrating advanced technologies will be critical for boosting order fulfilment speed and increasing the operational flexibility of logistics firms collaborating with international partners. Furthermore, the adoption of innovative technologies like 3D printing could transform the structure of cargo transport, reducing the volume of physical movement, optimizing transport infrastructure, and decreasing logistics costs—all essential for the stable future provision of both export and import operations.

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