

# The Problems of Ensuring the Efficiency and Competitiveness of the Ukrainian Transport Industry to Meet the Modern Challenges and Threats

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## Abstract

In Ukraine, the challenges and threats to the efficient functioning of the transportation industry are intensifying during the war and infrastructure destruction. The need for emergency repairs of the ruined infrastructure hinders the reform of the Ukrainian transportation industry. Furthermore, developing an integrated EU-oriented multimodal transportation system within the "Eastern Partnership" regional network becomes more complicated. This article aims to identify the problems of efficiency and competitiveness of the Ukrainian transportation industry in the context of integration into the Trans-European Transport Network (TEN-T) and the construction of a multimodal transportation system. The research employs a systemic analysis methodology to assess the structural indicators of Ukraine's transportation system development. The structure of Ukrainian freight transportation by mode is compared with that in EU countries to reflect differences in a modal split in the context of Ukraine's accession to TEN-T. The results demonstrate a range of problems related to the competitiveness of the Ukrainian transportation industry, which act as barriers to its integration with TEN-T. Institutional, political, and managerial-administrative problems are identified as the leading issues associated with inefficient data collection and processing, management and control functions, decision-making, communication, and interaction among governing bodies. A separate group of issues in Ukraine's transportation industry is linked to the material-technical condition of various types of transportation infrastructure, which affects service quality. Consequently, other problems arise, including the low level of development of intermodal and multimodal transport, transportation logistics, decreased efficiency in capacity utilization, insufficient level of competition in the market for transportation services, and non-compliance with European requirements for access to the transportation services market.

**Keywords:** intelligent control systems, transport sector, transport systems globalization, energy-efficient transport, multimodal transportation.

## Introduction

The state of the transportation industry is a significant determinant of modern progressive changes in the socio-economic life of the country, its integration into the global transport system, and its capacity to carry out import-export operations. In the conditions of Ukraine's European integration, the destruction of infrastructure and the logistics system due to war exacerbate the existing problems of efficiency and competitiveness in the transportation industry.

The globalization of transportation systems, European integration, and the need to ensure competitiveness and create a resource-efficient multimodal transport system determine the strategic directions for developing Ukraine's transport sector. The National Economic Strategy of Ukraine until 2030 defines an essential vision for the development of transport and infrastructure: the construction of a logistic and production hub that meets the needs of the economy and allows for the realization of export and transit potential to increase real GDP, attract foreign investments, and export goods and services (Verkhovna Rada of Ukraine, 2023a).

This article aims to identify the problems of efficiency and competitiveness in the transportation industry of Ukraine in the context of integration into the Trans-European Transport Network and the construction of a multimodal transport system.

### **Literature review**

In the context of Ukraine's European integration, the need to ensure competitiveness and create a resource-efficient multimodal transportation system warrants an analysis of key efficiency factors in the transportation industry, as explored in the scientific literature. Among favorable factors for the competitiveness of the transportation industry, the following should be highlighted:

1. Standardization of the functioning of different modes of transport, promoting the interaction, quality, and safety of intermodal transportation, ensuring higher productivity (Gharehgozli, de Vries & Decrauw, 2019), and addressing competitiveness and competition issues across sectors (Bucsky, 2021).
2. Updating supranational regulatory institutions within the EU to improve regulation of the transportation industry in the context of addressing digitalization challenges (Antonowicz & Majewski, 2022) and climate change, addressing the development of an intermodal regulatory framework (Finger, Montero-Pascual & Serafimova, 2019), and the need for decarbonization and energy efficiency (Tzeiranaki et al., 2023). The importance of institutional updates to dynamically regulate the industry in response to challenges and problems (Sys et al., 2020) and develop transport corridors to reduce the costs of import-export operations (Minárik & Čiderová, 2021) should be noted.
3. New concepts of supply chains in the transport sector that facilitate flexibility in utilizing different modes of transport through real-time information exchange technologies. Among these concepts, the "synchronous multimodality" paradigm should be highlighted, incorporating elements such as visibility, integration, multimodal transportation, and flexibility (Acero, Saenz & Luzzini, 2022).
4. The quality and quantity of transport infrastructure (Mańkowska, 2019), capacity deficits/surpluses, expenditure volumes, and prices across different sectors of the industry (Sys et al., 2020), which determine the competitiveness of transport connections and links and influence the development of cross-border cooperation through effective interaction, intermodality, and interconnectivity (Mańkowska, 2019). In the context of capacity control and expenditure, the importance of technological/operational innovations or modernization for different transport industry sectors' environmental and social sustainability should be emphasized (Sys et al., 2020).
5. Involvement of various stakeholders (public and private) in the development of the transportation industry, formulating sustainable and integrated transport solutions based on transnationality and multimodality (Beifert & Prause, 2019; Dunmore, Preti & Routaboul, 2019; Greaves, 2019; Minárik, 2021).

### **Methodology**

The study employed a methodology of systemic analysis to assess the structural indicators of Ukraine's transportation system development, aiming to identify problems in ensuring efficiency and competitiveness in the industry. The structure of freight transportation by modes of transport in

Ukraine is compared with the freight transportation system in EU countries to reflect differences in the modal split in the context of Ukraine's integration into the TEN-T.

The following indicators were used to assess the competitiveness of Ukraine's transportation system:

1. Shipping connectivity index.
2. Logistics efficiency index in Ukraine to assess the efficiency of transportation and logistics systems.
3. Dynamics of production and sales volumes in Ukraine's transportation sector.
4. Share of the transportation industry in Ukraine's GDP.
5. Employment figures in the sector, including the dynamics and structure of employment based on enterprise scale (large, medium, small).
6. Dynamics of capital investments in the transportation sector and warehouse management in Ukraine, disaggregated by assets.
7. Labor productivity in the transportation sector and warehouse management in Ukraine.

The State Statistics Service of Ukraine and Eurostat databases were used to assess the dynamics and structure of the transportation industry and freight transportation.

## **Results and Discussion**

The increasing competition on a global scale due to the dynamic development of transportation markets in developing countries intensifies the challenges faced by the transportation sector in European countries, including Ukraine, which needs to consider long-term global trends in this industry. Ukraine participates in the EU initiative within the White Paper and the Eastern Partnership framework, aiming to deepen cooperation between Eastern European and South Caucasus countries and the EU and update the contractual and legal basis of relations. EU countries aim to integrate the transport systems of Eastern and Western Europe and reduce greenhouse gas emissions from transport by 20% by 2030, mainly through using new technologies as a key tool for environmental sustainability.

In 2013, Regulation (EU) 1315/2013 of the European Parliament and of the Council of December 11, 2013, on Union guidelines for developing the Trans-European Transport Network was adopted. Furthermore, on October 9, 2013, a joint declaration, "Future Cooperation in the Field of Transport within the Eastern Partnership," was adopted in Luxembourg, approving the maps of the regional transport network of the Eastern Partnership (hereinafter referred to as EaP) that demonstrate the connectivity between EaP countries and EU member states. Furthermore, since January 2014, updated guidelines for the Trans-European Transport Network (TEN-T) have been approved, which specify that the "core" network will be developed based on the identified 9 multimodal corridors (Ministry of Infrastructure of Ukraine, 2023).

Among the main priorities of cooperation within the Eastern Partnership are:

1. The development of integrated transport corridors.
2. Addressing bottlenecks in the transport network to optimize the connection with the TEN-T network.
3. Preparation of infrastructure projects in the transportation sector.
4. The integration of Ukraine's transport routes into the regional TEN-T network.

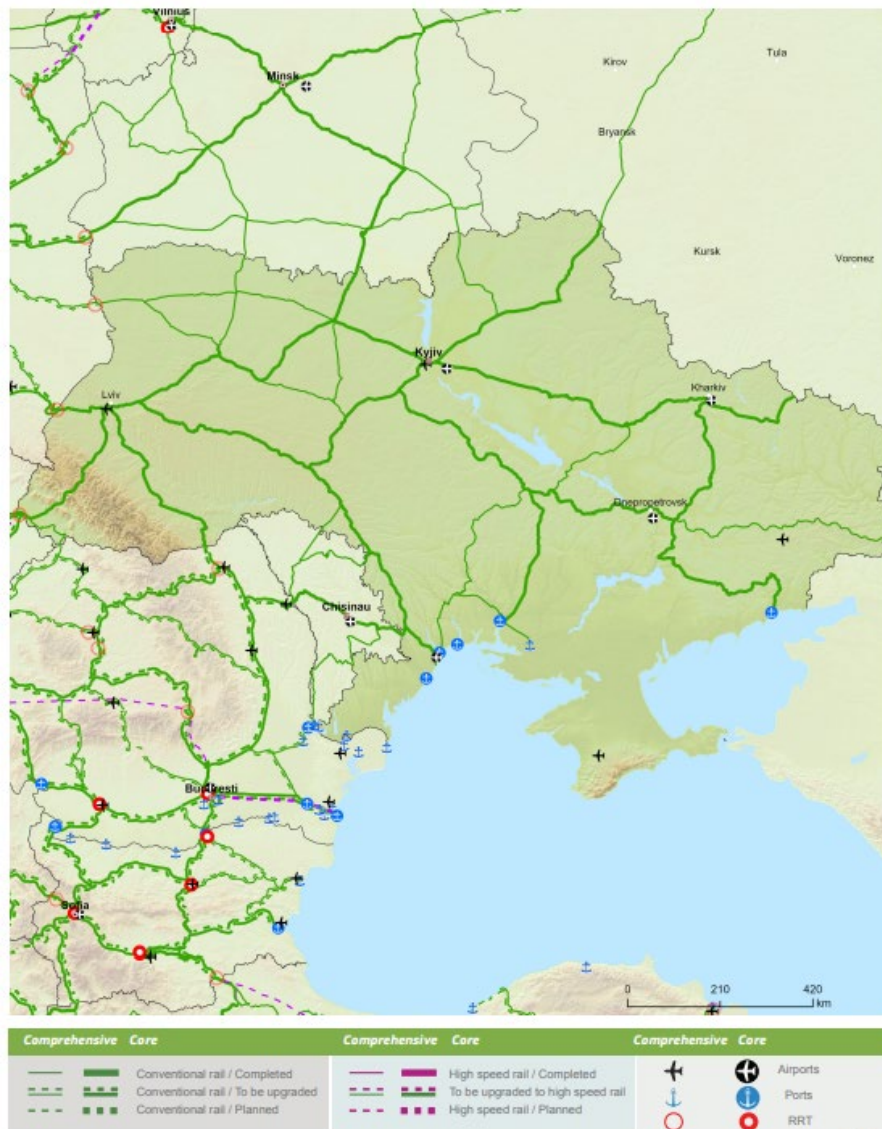
The Ministry of Development of Communities, Territories and Infrastructure of Ukraine (Ministry of Infrastructure) is the central body of the executive power, whose activities are directed and coordinated by the Cabinet of Ministers of Ukraine. The strategic goal of the Ministry is the implementation of key reforms to ensure the availability and quality of transport services, development of transport infrastructure, improvement of the investment climate, improvement of safety, environmental friendliness and energy efficiency of transport. In fact, the Ministry of Infrastructure is responsible for the sustainable development of transport. In addition, the Ministry implements a state policy in the field of restoration of regions, territories and infrastructure affected by the armed aggression of the Russian Federation against Ukraine, as the main threat to the integration of the transport system into the EU.

In 2022, the European Union included Ukrainian logistic routes in the TEN-T, which became a strategic decision in Ukraine's integration with the Union. This inclusion will facilitate the implementation of the "Path of Solidarity" initiative for exporting Ukrainian agricultural products and delivering humanitarian aid to Ukraine amidst the war. The EU extended the North Baltic Corridor through Lviv and Kyiv to Mariupol (Figure 1, 2, 3). The Baltic-Black Sea-Aegean Corridor was extended through Lviv, Chernivtsi (Romania, Moldova), to Odesa. The corridors Baltic Sea-Adriatic Sea and Rhine-Danube will pass through Lviv. The inclusion of logistic routes in the TEN-T network allows for the elimination of existing obstacles during logistic operations, attracting European investments for the modernization of transportation infrastructure, accessing EU assistance tools for the development of the Ukrainian part of the TEN-T network, developing multimodal transportation, reducing logistic costs, and improving the quality of services during cargo transportation. Furthermore, the European Commission excluded Russian and Belarusian routes from the TEN-T network and downgraded the status of routes within the EU at the borders with aggressor countries.



**Figure 1.** Indicative maps of the core network in Ukraine, Inland Waterways (Comprehensive & Core Networks: Inland waterways and ports. Eastern Partnership Transport Network: Ukraine)

Source: European Commission, 2022.



**Figure 2.** Indicative maps of the core network in Ukraine, railways (Comprehensive Network: Railways, ports, rail-road-terminals and airports. Core Network: Railways, ports, rail-road-terminals and airports. Eastern Partnership Transport Network: Ukraine)

Source: European Commission, 2022.



**Figure 3.** Indicative maps of the core network in Ukraine, roads (Comprehensive & Core Networks: Roads, ports, rail-road terminals and airports. Eastern Partnership Transport Network: Ukraine

Source: European Commission, 2022.

In December 2019, the EU (European Commission, 2019) defined a strategy for shifting from road transport to rail and inland waterway transport, which includes measures to develop a modal split, promoting the growth of the inland waterway sector in relative terms (Eurostat, 2020; European Environment Agency (EEA), 2011), and cost optimization measures. It is projected that these measures will enhance the competitiveness of the inland waterway sector compared to other modes of transport, in addition to increasing absolute volumes and market share. However, statistical data indicate the absence of significant structural shifts in favor of water transport (Figure 4), particularly the percentage of inland waterway freight transport in the EU-27 decreased to 1,8% in 2021, while road freight transport increased to 24,6% in 2021 (Eurostat, 2023).

The share of inland waterway transport in freight transportation is high in Belgium (7%), Luxembourg (7,8%), Bulgaria (11,7%), the Netherlands (12,5%), and Romania (19,8%) (Eurostat, 2023). According to Sys et al. (2020), inland navigation remains a sustainable mode of transport in EU countries, playing a significant role in the European transport market. However, due to market structure, the sector needs more competitiveness, particularly in terms of market share and volume



Absolute values, thsd. Tones								
Railway	432,90	343,43	339,55	322,34	312,94	305,48	314,30	-2,72%
Sea	4,07	3,03	2,25	1,89	2,12	1,81	1,85	-6,02%
River	6,99	3,64	3,64	3,70	3,99	3,79	3,48	-4,93%
Motor vehicles	1168,22	1085,66	1121,67	1205,53	1147,05	1232,39	1800,30	4,88%
Air	0,09	0,07	0,08	0,10	0,09	0,09	0,10	2,37%
Pipeline	153,44	106,73	114,81	109,42	112,66	97,46	77,60	-5,42%
Total, thsd. Tones	1765,70	1542,57	1582,01	1642,98	1578,85	1641,03	2197,63	2,58%
Cargo density, %								
Railway	24,517%	22,264%	21,463%	19,619%	19,821%	18,615%	14,302%	21,82%
Sea	0,230%	0,197%	0,142%	0,115%	0,134%	0,110%	0,084%	0,17%
River	0,396%	0,236%	0,230%	0,225%	0,253%	0,231%	0,158%	0,24%
Motor vehicles	66,162%	70,380%	70,902%	73,375%	72,651%	75,099%	81,920%	71,03%
Air	0,005%	0,005%	0,005%	0,006%	0,006%	0,005%	0,005%	0,01%
Pipeline	8,690%	6,919%	7,257%	6,660%	7,135%	5,939%	3,531%	6,74%

Source: calculated by authors based on data from the State Statistics Service of Ukraine (2023g; 2023j; 2023k; 2023l).

In Ukraine, the development of multimodal transportation is primarily ensured through legislative changes, specifically the adoption of the "Law on Multimodal Transportation" (Verkhovna Rada of Ukraine, 2023b), which defines mechanisms for state support, including:

1. Encouraging competition and creating equal opportunities in multimodal transportation for economic entities.
2. Developing an attractive investment environment to attract investment resources for developing multimodal terminals and the multimodal transportation market.
3. Enhancing international cooperation in this field and adapting regulatory acts to meet global requirements.
4. Promoting the development of transportation and logistics infrastructure, including multimodal transportation, through the approval of state programs.
5. Providing state assistance for the construction and modernization of multimodal transportation terminals, as well as the provision of services related to such transportation, under the Law of Ukraine "On State Aid to Economic Entities" (Verkhovna Rada of Ukraine, 2023c) (in the form of resource transfer from the state or local resources to individual economic entities, subsidies, grants, subsidies, tax benefits, guarantees, preferential loans, etc.).
6. Creating conditions for developing public-private partnerships, increasing transit transportation, and attracting additional freight flows.
7. Improving mechanisms for state control of multimodal transportation at the Ukrainian state border crossings.
8. Creating equal conditions in the multimodal transportation market and preventing discrimination against market participants.
9. Implementing other measures to provide state support for combined transportation in the manner and scope prescribed by Ukrainian legislation.

In addition, the Law "On Multimodal Transportation" envisages the development of a state aid program aimed at supporting small and medium-sized businesses, the development of multimodal transportation, and transport-logistics infrastructure to ensure regional development, following the Law of Ukraine "On State Aid to Undertakings." The latter document allows for the permissibility of state aid and the direction for such assistance "to compensate undertakings for the costs of implementing investment projects (establishing a new undertaking, expanding production capacity, diversifying the range of goods, works, and services, changing the production process)" (Verkhovna Rada of Ukraine, 2023c). The maximum amount of state aid for regional development, including



support for investments and job creation resulting from the implementation of an investment project, is as follows:

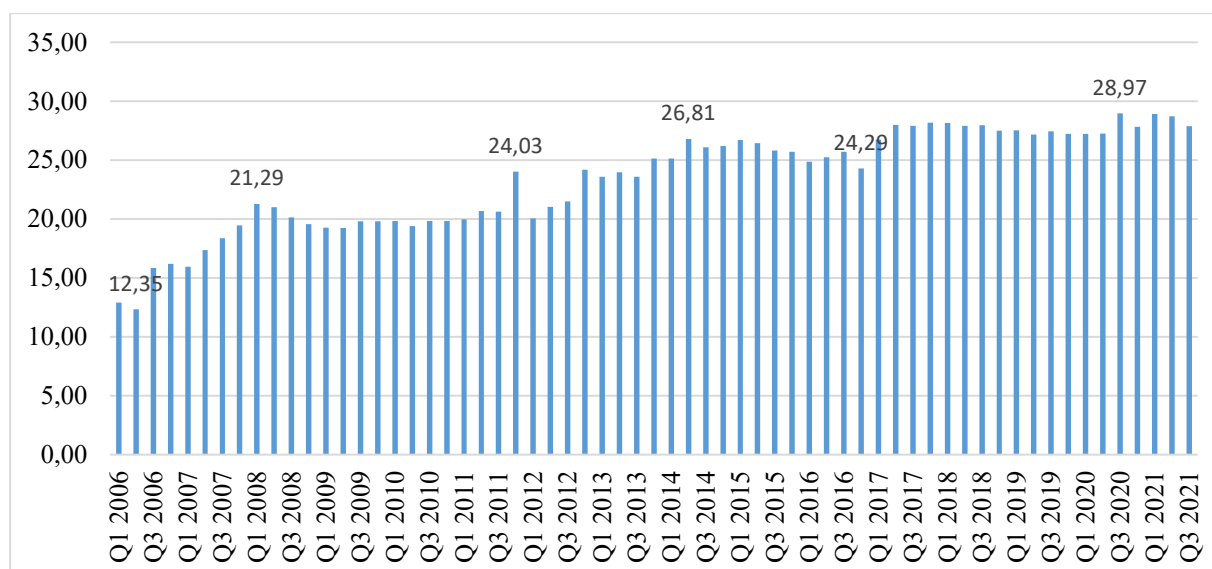
1. for large enterprises - up to 50 percent of the total amount of expenses intended for regional development;
2. for medium-sized enterprises - up to 60 percent of such expenses;
3. for small enterprises - up to 70 percent of such costs (Verkhovna Rada of Ukraine, 2023d).

Establishing a logistic transport system based on logistic centers involving maritime and river ports is one of the main tasks in the reform of transportation in Ukraine within the framework of European integration and the establishment of external logistic connections. Today, maritime and river ports serve not only as transshipment points for goods between water and other modes of transport and vice versa but also as strategic centers in organizing domestic trade, as one of the main links in the integrated transport chain, and as centers of economic development for specific regions.

The transport system of Ukraine has a low level of development of transport and logistics technologies and multimodal transport facilities, which reduces its competitiveness and limits the access of Ukrainian products to the global transport market. For example, the share of goods transported by road in international transportation accounted for only 5,09% of the total transport volume in 2021 (State Statistics Service of Ukraine, 2023j). In the structure of goods transported by road, the largest share is occupied by agricultural, hunting, and forestry products - 12%, products of the extractive industry - 39%, and food products and beverages - 10%. In addition, high transportation costs account for about 40% of the total production cost (State Statistics Service of Ukraine, 2023j).

Unfortunately, none of the Ukrainian commercial ports are among the top 100 largest ports in the world in terms of the number of handled containers. Multimodal and intermodal transportation of goods accounts for no more than 0,5% of the transport market in Ukraine, and in this indicator, Ukraine lags behind EU member states and other developed countries by 20-30 times. The transport system of Ukraine is included in the TEN-T, but currently, there is a low level of interoperability and a general technological lag behind the TEN-T.

Therefore, the Liner Shipping Connectivity Index (LSCI) captures the level of a country's integration into global maritime transport networks (Figure 5). It is calculated by the United Nations Conference on Trade and Development (UNCTAD) based on five components of the marine transport sector: the number of vessels, their container-carrying capacity, the maximum vessel size, the number of services, and the number of companies using container ships in the country's ports. For each component, the country's index value is divided by the maximum value of each component in 2004. The five component scores are averaged for each country, and the average is divided by the maximum average value in 2004 and multiplied by 100. The index generates values from 1 to 100 for the country with the highest average score in 2004. The primary data is sourced from Containerization International Online (2023). From 2006 to 2021, Ukraine achieved modest progress in integrating into global maritime transport networks, with the index rising from 12,35 to 28,97 in 2021, experiencing significant fluctuations throughout the study period.



**Figure 5.** Dynamics and structure of freight volumes transported by transport modes in Ukraine in 2010-2021

Source: calculated by authors based on data from Eurostat (2023).

It is reflected in the transportation industry's reduced transit shipments through Ukraine, the decrease in vessel calls to ports, and the inability to provide quality transport services during export shipments. It, in turn, negatively impacts the competitiveness and efficiency of the national economy.

The Logistics Performance Index, the dynamics of which are presented in Table 2, reflects the average level of efficiency of Ukraine's transport and logistics systems based on key components evaluated on a scale of 1 to 5 points:

1. Low efficiency of customs clearance processes (speed, simplicity, predictability of procedures) by customs authorities.
2. Average quality level of trade and transport infrastructure, including port quality and information technologies.
3. Insufficient ease of organizing supplies at competitive prices.
4. Average level of personnel competence and quality of logistics services in the country.
5. Issues with cargo tracking capabilities.
6. Problems with timely cargo delivery to the planned destination points (World Bank, 2023).

There are disparities between the volumes of transportation carried out by different modes of transport. For example, due to low demand, insufficient liberalization, and competition, aviation transport carries passengers nearly 245 times less than road transport, while rail transport carries approximately 800 times more passengers than a river and maritime transport.

**Table 2.** Dynamics of the Logistics Performance Index of Ukraine in 2007-2020

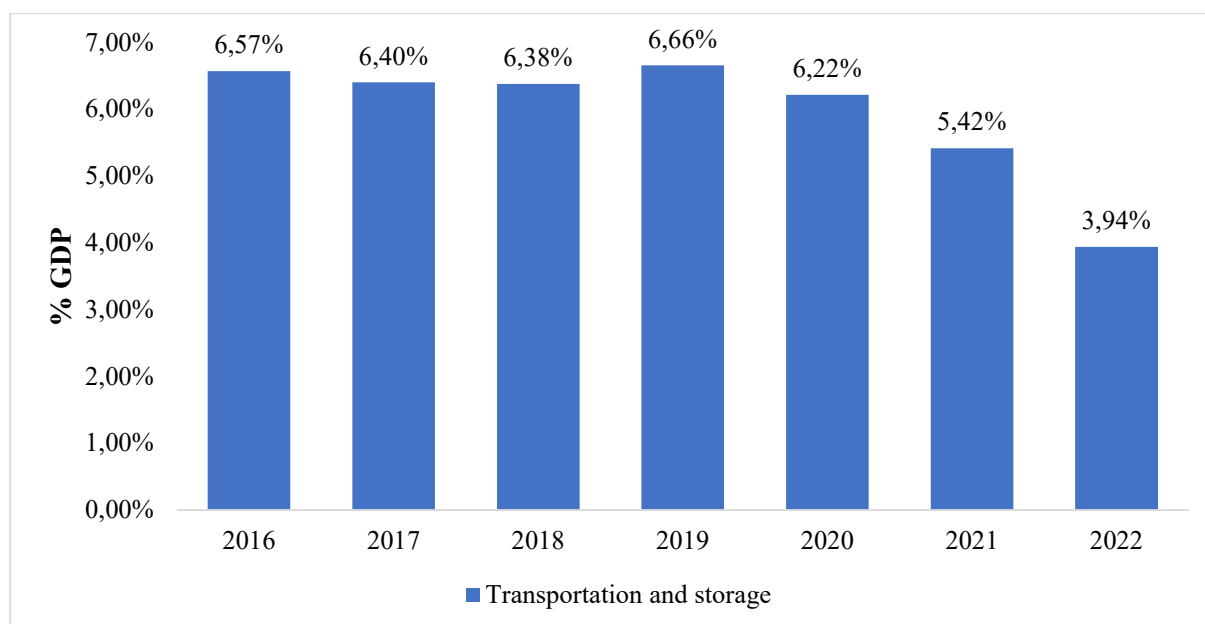
Year	Total LPI	LPI cargo tracking capability	LPI competence and quality of logistics services	LPI ease of organizing supplies at competitive prices	LPI quality of trade and transportation infrastructure	LPI - the efficiency of customs inspection	LPI timely delivery
2007	2,55	2,53	2,41	2,53	2,35	2,22	3,31

2008	2,56	2,51	2,50	2,66	2,40	2,12	3,19
2009	2,64	2,67	2,61	2,71	2,48	2,17	3,19
2010	2,57	2,49	2,59	2,79	2,44	2,02	3,06
2011	2,71	2,82	2,72	2,76	2,57	2,22	3,19
2012	2,85	3,15	2,85	2,72	2,69	2,41	3,31
2013	2,91	3,17	2,85	2,83	2,67	2,55	3,41
2014	2,98	3,20	2,84	2,95	2,65	2,69	3,51
2015	2,86	3,08	2,69	2,77	2,57	2,50	3,51
2016	2,74	2,96	2,55	2,59	2,49	2,30	3,51
2017	2,78	3,04	2,69	2,71	2,36	2,40	3,47
2018	2,83	3,11	2,84	2,83	2,22	2,49	3,42
2019	2,81	3,07	2,77	2,77	2,29	2,44	3,44
2020	2,82	3,09	2,80	2,80	2,25	2,47	3,43

Source: World Bank (2023).

The production volumes in the transportation sector of Ukraine gradually increased from 2016 to 2021. The share of employed workers averaged 11% from 2010 to 2021 (UAH 264,689 million in 2019, UAH 262,453 million in 2020, and UAH 295,300 million in 2022). However, with the onset of war and significant infrastructure destruction in 2022, the industry's volumes decreased to UAH 204,547 million (State Statistics Service of Ukraine, 2023f). As a result, the industry's share in Ukraine's GDP decreased to 3,94% (Figure 6). According to the KSE Institute (2023), as of February 2023, the total damage inflicted on Ukraine's infrastructure through full-scale invasion amounts to USD 143,8 billion (at replacement cost), including infrastructure damage worth USD 36,2 billion and transportation vehicles worth USD 3,1 billion. Throughout 2022, over 25,000 kilometers of national and local roads and 344 bridges and overpasses were destroyed or damaged. According to the Ministry of Communities and Infrastructure Development, in 2022, 78 bridges were restored on roads of national importance. Most restorations took place in Kyiv region (20 out of 24 objects) and Chernihiv region (20 out of 27 objects). In 2023, the passage was restored through 2 bridge crossings in Mykolaiv and Kharkiv regions.

In large enterprises in the transportation and warehousing sector of Ukraine, an average of 48,9% of employees were employed from 2010 to 2021, while the share of employment in medium-sized enterprises averaged 25,1% and in small enterprises averaged 26,1% (State Statistics Service of Ukraine, 2023e).



**Figure 6.** *Transportation and storage in Ukraine, % from GDP*

Source: calculated by the author based on the data from the State Statistics Service of Ukraine (2023a; 2023b).

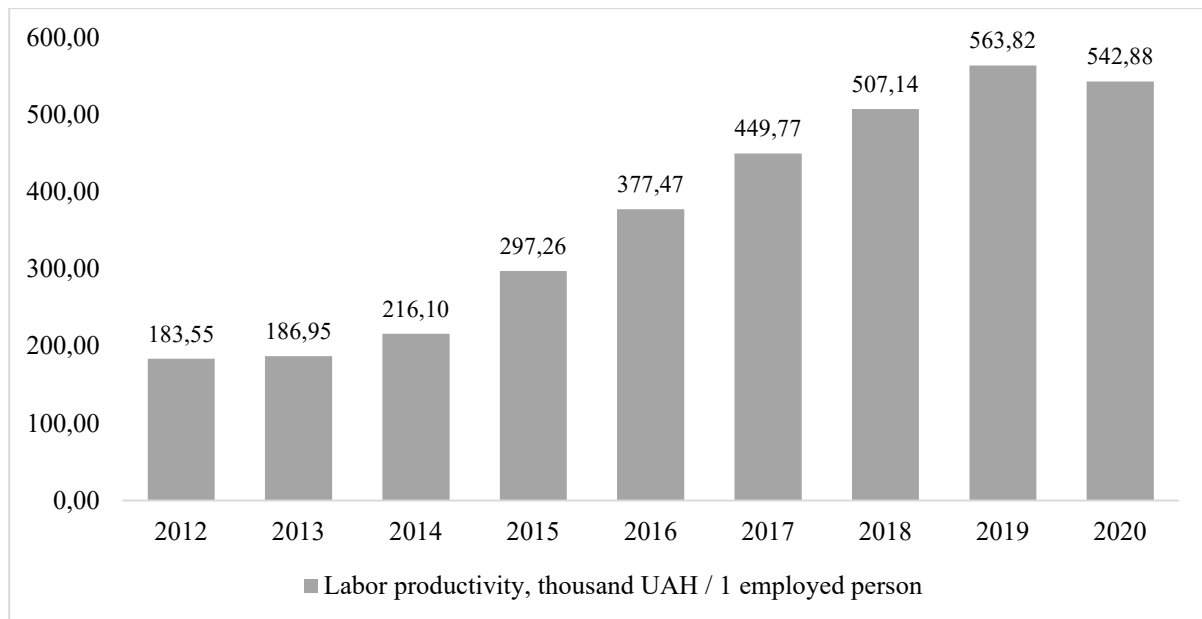
As a result, the transportation sector and warehousing sales volume in Ukraine accounted for 4,45% in 2010, 5,8% in 2015, and 4,37% in 2021 of the total sales volume of all economic activities. Large enterprises in the sector accounted for an average of 49,2% of the production (goods, works, and services) from 2010 to 2021, with a decrease in their share from 54,7% in 2010 to 41,9% in 2021. On the other hand, medium-sized enterprises in the sector accounted for an average of 28,2% of the production (goods, works, services) from 2010 to 2021, with an increase in their share to 29,3% in 2021 (State Statistics Service of Ukraine, 2023g).

The share of capital investments in the transportation sector and warehousing of Ukraine averaged 9% of total assets across all economic activities from 2012 to 2021. The average investment volume amounted to UAH 32,116 million, with a tendency to increase from 2016 to 2018, a decrease in 2020, and growth in 2021 to UAH 43,462 million. In the structure of capital investments in the sector, investments in machinery and equipment predominated (the share of investments was 52,9% in 2012 and 61,3% in 2021), followed by investments in construction and building reconstruction (the percentage of investments was 43,5% in 2012 and 32,9% in 2021). Capital investments in intangible assets averaged 1,4% from 2012 to 2021, with a tendency to increase, especially in 2019 (State Statistics Service of Ukraine, 2023d).

For the maximum use of Ukrainian transport potential, in particular, as a transit country, it is necessary to create a customer-oriented transport service system and take measures to ensure the effective organization of the country's transport and road complex and to obtain a synergistic effect from the effective combination of the potential and capabilities of all modes of transport based on partnership and competition in transportation.

The general problems and contradictions requiring resolution at the state level are clearly defined in the National Transport Strategy of Ukraine for the period up to 2030, namely:

1. Lack of an effective system for collecting and processing administrative data in the transport sector, which prevents objective assessment of its current state and development prospects.



**Figure 7.** Labor productivity in the transport and warehousing sector of Ukraine, 2012-2020, thousand UAH / 1 employed person

Source: calculated by the author based on the data from the State Statistics Service of Ukraine (2023e; 2023f).

2. Absence of a systematic approach to coordinating the development and long-term planning of all modes of transport, considering the socio-economic needs of the population, businesses, defense, and Ukraine's geopolitical interests.
3. Incomplete administrative reform, including the process of delineating functions of state regulation and control, including the formation of relevant state management bodies, operational activities, and functions of economic activities of transport enterprises.
4. Lack of effective systems for monitoring the efficiency of managerial decision-making, insufficient transparency of reporting, and activities of government authorities and entities of the state sector of the economy in the transport industry.
5. Absence of an effective communication and feedback system between transportation management authorities, transport enterprises, and users of transport services reduces the efficiency of transport management and the quality of transport and logistics services.
6. Lack of criteria and indicators for assessing the quality of transport services.
7. Low level of development of intermodal and multimodal transportation and transport logistics.
8. Tendency towards reduced utilization efficiency of transport capacity.
9. Insufficient level of competition in the market of transport services and non-compliance with European requirements for market access to transport services.
10. Imperfect tariff policy in the provision of transport services.
11. Slow delivery speed of goods "door to door" and within specified timeframes.
12. Existence of bottlenecks in transport infrastructure.
13. Low economic attractiveness of shipowners using the Ukrainian flag.
14. Inadequate system for preventing and avoiding the deterioration of public roads, including dimension and weight control of vehicles and appropriate levels of accountability for exceeding acceptable parameters and axle loads of vehicles.

It should also be noted that to create an efficiently functioning transport complex in Ukraine and consequently achieve the status of a regional transportation hub, the Strategy takes into account the following global trends inherent to transportation:

1. Utilization of high-tech and ergonomic vehicles, principles of multimodality, satellite navigation, intelligent transportation systems, information technologies, and electronic document circulation.
2. Application of composite materials, reducing weight, improving aerodynamics and safety of vehicles.
3. Using fuel-efficient and environmentally friendly vehicles, adopting alternative fuels, "green" transportation modes, prioritizing protecting the environment, and preserving valuable conservation areas during transport infrastructure development.
4. Extensive containerization of transport and interoperability of transportation systems within supply chains.
5. Acceleration and ensuring timely delivery of passengers and goods through high-speed transport modes and logistics development.
6. Globalization of transcontinental aviation transportation within powerful global alliances.
7. Increasing role of low-cost air transportation for direct interregional connections.
8. Ensuring transport accessibility for the population, high mobility of labor resources, increasing travel distance and reducing travel time for passengers in megacities.
9. Growing motorization in developed countries and further containment of private vehicles in cities through the development of public and non-motorized transportation (Verkhovna Rada of Ukraine, 2023).

## Conclusions

The conducted research reveals several issues related to the competitiveness of the Ukrainian transportation industry, which serve as barriers to its integration with the TEN-T. The leading problems identified include institutional, political, and managerial-administrative issues associated with inefficient data collection and processing processes, management and control functions, decision-making, communication, and interaction among governing bodies. A separate group of problems in the Ukrainian transportation sector is linked to the physical and technical condition of various types of transport infrastructure, which affects service quality. Consequently, other issues arise, such as a low level of development of intermodal and multimodal transport, transportation logistics, decreased efficiency of capacity utilization, imperfect competition in the market for transport services, and non-compliance with European requirements for market access to transport services. In the conditions of war and infrastructure destruction, in addition to the mentioned problems, the transportation industry's implementation volume and its share in the GDP decrease, intensifying the integration challenge with the TEN-T.

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