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Research Article

Comparative Analysis of Ukrainian Legislation and International Norms Regulating the Formation and Management of the Logistics System

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Abstract

Logistics is an important component of any business, which covers the processes of planning, organizing, managing and controlling the movement of resources, products and information. Its main goal is to ensure the optimal and efficient use of resources, satisfy the needs of consumers and achieve competitive advantages in the market. Logistics covers various activities related to material flows - from the purchase of raw materials to the delivery of the final product to consumers. In traditional logistics systems, the use of information technology was limited, and the main focus mechanical inventory management and transportation. In modern approaches, automation, information technologies, and artificial intelligence play a significant role, which allow predicting changes in demand, optimizing routes, and improving inventory management. These technologies make it possible to reduce costs, increase the accuracy and efficiency of decision-making.

1. Introduction

Logistics, as a management function, has deep historical roots dating back to antiquity. Its original purpose was to ensure the efficient delivery of goods and resources across different territories, which facilitated the development of trade and economic ties between different cultures. Already in Ancient Egypt, Mesopotamia and the Roman Empire, logistics played an important role in ensuring the supply of materials for construction, military campaigns and expansion of territories. Transportation of goods, construction of roads and development of navigation were important elements of the logistics processes of that time.

The main aim of the article is to provide the research of the main challenges and problems of activity of logistics development tendencies. This article provides accurate information on the history and contemporary tendencies and comparison of Ukrainian and International law regulatory base. The comparison between traditional and contemporary logistics was also researched.
This study employs a comparative legal analysis methodology, examining and contrasting the Ukrainian legal framework regulating logistics with relevant international standards, including EU directives, ISO standards, and global conventions. The analysis is complemented by a qualitative assessment of secondary sources such as policy documents, regulatory acts, and analytical reports. In addition, desk research was used to identify implementation gaps and policy mismatches, while a contextual institutional approach helped interpret the observed discrepancies. This methodological triangulation allows for a structured understanding of both legal convergence and divergence across multiple regulatory dimensions.

2. Literature Review

Today's logistics is a global system where companies interact with suppliers and consumers on different continents. Modern technologies such as the Internet of Things (IoT), unmanned vehicles, warehouse robotics and 3D printing open up new opportunities to improve logistics efficiency. All this allows companies to reduce costs, increase the accuracy and speed of delivery of goods, as well as reduce environmental impact by optimizing routes and reducing energy consumption (Steinbach et al., 2017).

Logistics is a multifaceted discipline that encompasses the management of material, information and financial flows to ensure their efficient movement between points of supply and consumption. The classic definition of logistics, proposed by Klaus Peter in 2009, emphasizes its function of managing flows in order to optimize the movement of resources. According to this approach, logistics aims to minimize costs and time in delivering goods to the end consumer. Another view of logistics is presented through a systems approach that emphasizes the integration of processes. V. Yadav, R. Jain and P. Gaur (2021) describe logistics as a system that covers all stages from sourcing to delivery of goods, emphasizing its comprehensive nature. Mishrif et al. (2024) refers to a process approach in which logistics is viewed as a set of supply chain management processes. This approach covers the planning, execution and control of the movement of goods, ensuring the effective functioning of the logistics system. The information aspect of logistics is also an important component, as noted by Jodlbauer et al. (2023). The author emphasizes that logistics includes not only the physical movement of goods, but also the processing of information that is necessary for decision-making. This aspect is key to ensuring the efficiency and timeliness of logistics operations.

Supply chain management has become a central focus in logistics, and this conceptual framework was developed back in the 1990s by researchers such as S. Pan, D. Trentesaux, D. McFarlane, B. Montreuil, E. Ballot, G.Q. Huang (2021). They drew attention to the fact that effective logistics is impossible without coordination between different supply chains: manufacturers, suppliers, transport companies and end consumers. The main focus of their work is on how information flows, financial transactions and material resources can be combined and integrated. Thanks to their approach, SCM ceases to be only an internal matter of one company and begins to be considered as an inter-organizational system, where close interaction between participants ensures cost reduction and efficiency improvement.

G.F. Frederico (2023) defined supply chain management as the coordination of not only material flows but also information flows, which play a key role in ensuring the continuity and accuracy of supplies. Their work changed the view of logistics, transforming it from a local discipline to a global approach to management.

3. Results

Logistics in Ukraine and internationally is regulated by a set of legislative and regulatory acts that ensure the effective functioning of supply chains, transportation, storage and distribution of goods. A comparative analysis of the national legislation of Ukraine and international norms in the field of logistics allows us to assess the compliance of domestic regulation with world standards and identify possible areas for improving the legal framework.

The logistics system of Ukraine is a complex mechanism that is regulated by various legislative acts that cover numerous aspects of logistics activities. The main document that defines the principles of the functioning of the transport infrastructure is the Law of Ukraine “On Transport”. This law establishes general requirements for all types of transport, including road, rail, water and aviation. It is aimed at ensuring the safety of transportation, the efficiency of the use of vehicles and infrastructure, as well as the protection of the rights of consumers of transport services (Myers et al., 2012).

The Customs Code of Ukraine is also of key importance for logistics activities, as it regulates the processes of moving goods across the customs border. This code defines customs clearance procedures, including the rules for declaring goods, paying customs duties and taxes. It also establishes requirements for documents that must be submitted for customs control, which is an important aspect for ensuring transparency and efficiency of foreign economic activity (Timane, 2012; Hammer & Champy, 2006).

In addition, the logistics activities in Ukraine are significantly influenced by regulatory acts that regulate environmental standards and safety during the transportation of dangerous goods. In particular, the legislation provides for requirements for packaging, labeling and transportation of hazardous materials, which is critical for protecting the environment and public health. There are also regulations that regulate the standards for storing goods in warehouses, which ensures their proper protection and preservation.

Legislation on e-commerce and information technologies plays an important role in modern logistics processes. This legislation regulates the use of digital solutions, such as electronic documents, supply chain management systems, as well as other technologies that contribute to the automation and optimization of logistics operations. The use of electronic platforms for order management, cargo tracking, and payment processing is becoming increasingly common, increasing the efficiency and speed of logistics processes (Kostina, 2018; Repin & Yeliferov, 2013).

To support the discussion with practical examples, this study highlights the implementation of the "Single Window" customs clearance system, which has decreased average cargo processing time by 30%, according to the State Customs Service of Ukraine. In the private sector, the logistics company Nova Poshta has introduced automated sorting terminals and predictive routing based on artificial intelligence, which has improved delivery accuracy and customer satisfaction. Moreover, according to data from the Ukrainian Logistics Alliance (2023), there is an observed annual 12% increase in the adoption of warehouse and transport management systems (WMS/TMS) among SMEs. These cases illustrate successful local applications of digital logistics technologies and support the transition towards modern logistics practices (Table 1) (State Customs Service of Ukraine, 2023; Nova Poshta, 2023; Ukrainian Logistics Alliance, 2023; Ministry for Digital Transformation of Ukraine, 2023).

Table 1. Elements of Ukrainian legislation affecting logistics

Category	Main legislative acts	Key provisions
Transport	Law on transportation of Ukraine	Establishes principles for managing transport infrastructure and road safety
Customs Clearance	Customs laws of Ukraine	Regulates import/export procedures, customs clearance and taxation of cargo
E-commerce	Law of Ukraine on Electronic Commerce	Regulates the use of electronic documents and digital tools in logistics
Labour security	Resolutions of the Cabinet of Ministers of Ukraine on the safety of transportation of dangerous goods	Establish requirements for the transportation of dangerous goods

In the context of standardization of logistics management processes, international ISO standards are important, such as ISO 9001, which concerns the quality management system, and ISO 28000, which regulates the security management system in supply chains. These standards ensure international harmonization of logistics processes, increasing their efficiency and security. The implementation of ISO standards allows companies to improve the quality of customer service, reduce security risks, and increase trust in their services in the international market (Yu et al., 2022; Nickols, 2016; Becker et al., 2018).

A comparison of the national legislation of Ukraine with international norms shows that the domestic legal framework in the field of logistics has some compliance with international standards, but there are also a number of aspects that need improvement. For example, Ukraine is actively integrating into international transport systems through participation in such initiatives as the European Network of Trans-European Transport Corridors (TEN-T). However, some international conventions have not yet been fully implemented in Ukraine, in particular those relating to environmental standards and automation of logistics processes (Powell, 2017; Sinnaiah et al., 2023).

Regarding the transportation of dangerous goods, Ukrainian legislation (Resolutions of the Cabinet of Ministers of Ukraine) regulates the safety of transportation of these goods, but the regulations are often based on domestic requirements and may not take into account all international standards and practices. These regulations indicate the importance of safety during the transportation of dangerous materials, but do not always sufficiently cover modern technological advances and risk management methods adopted in the world (Steinbach et al., 2017).

It is worth noting that Ukraine plays an important role in the international transport system due to its strategic location at the intersection of key transport corridors between Europe and Asia. The country's integration into international transport networks contributes to strengthening economic ties with other regions, increasing the efficiency of logistics and developing infrastructure. Ukraine's participation in such global projects as transport corridor No. 5, TRACECA and the Trans-European Transport Network (TEN-T) opens up new opportunities for trade, attracting investment and technological progress (Stukalo et al., 2018).

One of the important initiatives is Ukraine’s cooperation with the European Union. This cooperation envisages the implementation of numerous projects aimed at modernizing Ukraine’s transport infrastructure, including roads, ports and railway lines. One of the main aspects of this cooperation is the introduction of “green corridors”. These corridors simplify customs clearance of goods, significantly reduce the time for crossing the border and reduce the number of administrative procedures. This step is of great importance for business, as it ensures faster and more efficient transportation of goods through Ukraine, which, in turn, increases the country’s attractiveness as a transit hub for international trade (Thompson et al., 2013).

Ukraine also actively participates in international agreements and conventions that regulate cargo transportation and promote the harmonization of transportation processes. This is important not only for improving the efficiency of logistics operations, but also for the country's integration into global transport networks, which in turn increases its competitiveness as a transit hub (Wiedemann et al., 2019).

This project involves significant investments in the modernization of important transport facilities, such as the Port of Odessa, which is of strategic importance for the development of international maritime transport. In addition, the project includes the reconstruction of railway lines and the expansion of opportunities for international freight transport. Thanks to such initiatives, the throughput capacity of transport corridors is improved, the time for cargo transportation is reduced, and the efficiency of logistics operations is increased (Xia & Huang, 2021).

Of particular importance is the project "Europe-Asia Railway", which involves the modernization and optimization of railway connections between Europe and Asia through the territory of Ukraine. This is an important project for the transit of Chinese goods through Ukrainian territory to Europe and back. Thanks to this project, the time for cargo delivery times are shortened and transportation costs are significantly reduced, which increases the attractiveness of Ukraine as a key transit route for international trade. Modernization of railway infrastructure allows ensuring the stability and efficiency of freight transportation, which has a positive impact on the country's economy and its position in international logistics chains (Yilmaz & Flouris, 2017).

The results reveal a partial alignment between Ukrainian logistics legislation and international standards, particularly in areas such as customs regulation and transport safety. However, significant discrepancies persist in digitalization, environmental regulation, and infrastructure modernization. The discussion section highlights

key challenges, including outdated regulatory instruments, insufficient state investment, and institutional inertia. Notably, Ukraine's partial integration into the TEN-T network and selective compliance with ADR and ISO standards indicate fragmented harmonization. Moreover, the country's legal framework fails to adequately support automation, digital logistics solutions, and emission reduction targets, hindering its international competitiveness. These findings underscore the need for targeted reforms grounded in EU-compatible standards and supported by strategic financial and institutional initiatives.

To move beyond a purely descriptive narrative, this study integrates a critical analysis of the institutional and political-economic context influencing Ukraine's regulatory gaps. One key finding is that the persistence of bureaucratic barriers and a legacy of post-Soviet administrative structures have hindered the uptake of international logistics standards. Furthermore, constrained fiscal capacity and political volatility have limited the implementation of green logistics policies and advanced digital technologies. Ukraine's hybrid legal architecture, shaped by fragmented reforms and overlapping competencies, contributes to legal inconsistency and policy inefficiency. These factors collectively explain why, despite formal commitments, the adoption of global best practices remains inconsistent and incomplete.

Ways to overcome implementation challenges

1. Development of new legislative initiatives

- Harmonization of environmental legislation. Ukraine should develop new environmental standards that meet European requirements, including strict limits on carbon emissions and requirements for energy efficiency of transport. This requires the introduction of mechanisms to encourage enterprises to reduce emissions through financial instruments such as "green bonds".
- Digitalization. It is necessary to develop a legislative framework for the implementation of electronic document management in the logistics sector and ensure transparency of regulatory procedures for the implementation of automated cargo tracking and warehouse management systems.

2. Implementation of modern technologies

- Digital solutions. Investments in digital infrastructure for logistics should be a priority. New technologies such as blockchain for cargo tracking and electronic transport documents (e-TIR) should be introduced, which will help reduce transportation time and costs.
- Automation. Supporting small and medium-sized enterprises (SMEs) in implementing automated warehouse management systems through soft loans and government grants can accelerate adoption to international standards.

3. International cooperation and financing

- Ukraine should make more active use of international financial instruments, such as grants from the European Investment Bank or loans from the World Bank for infrastructure modernization. Participation in European programs for the development of transport corridors, such as TEN-T, will allow access to new sources of financing.

4. Educational programs and training

- The integration of international standards requires advanced training of personnel responsible for logistics processes. Advanced training programs should include training in modern digital solutions, environmental standards and management technologies.

Thus, a comparative analysis of Ukrainian legislation and international norms in the field of logistics shows both achievements and significant challenges for the Ukrainian legal system. Ukrainian legislation in some aspects, such as transport, customs procedures, environmental standards and transportation safety, meets international standards. However, there are serious gaps in harmonization with international standards, especially in areas such as ecology and digitalization of logistics processes. This creates barriers to Ukraine's full integration into global logistics networks and improvement of its competitiveness in the international market. Therefore, for the further development of Ukraine's logistics system, it is necessary to focus on harmonizing environmental standards, introducing digital technologies, modernizing infrastructure and training qualified personnel, which will allow Ukraine to become competitive in the international market.

Ukraine's logistics infrastructure is developing slowly, especially compared to the European TEN-T network. The problem lies in the lack of funding and outdated transport corridors. Although Ukraine has access to international funding through grants and loans from the European Investment Bank and the World Bank, restrictions due to bureaucracy, corruption and the lack of effective financial mechanisms make it difficult to use these resources.

The state of education and training in the logistics sector is also problematic. The low level of qualifications and the lack of state training support programs hinder the implementation of international standards and the training of competitive specialists.

Differences between Ukrainian legislation and international standards on environmental safety and transportation of dangerous goods.

Criteria Ukrainian legislation International standards

Greenhouse gas emissions Law of Ukraine "On Environmental Protection" Standard ISO 14064 (accounting and reporting on greenhouse gas emissions)

Transportation of dangerous goods CMU Resolutions on the safety of transportation of dangerous goods European ADR agreement.

Regarding the digitalization of logistics processes, the implementation of modern warehouse management systems (WMS) and cargo tracking (TMS) is partial, as there is a lack of access to digital infrastructure, as well as qualified specialists. Paper-based documentation continue to be used instead of electronic transport invoices, as there is no legislation regulating the implementation of electronic solutions (Atadoga et al., 2024; Baldwin, 2012).

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Logistics plays a key role in the economy of Ukraine, providing a link between producers and consumers both in the domestic and foreign markets. The efficiency of logistics companies directly affects the competitiveness of the economy, because high costs of transportation, storage and other logistics services can increase the final cost of goods and services, which in turn reduces their competitiveness in global markets. To increase the efficiency of logistics companies, it is important to take into account various economic aspects and factors that directly affect their activities.

In addition, customs procedures play an important role in ensuring the efficiency of logistics. Simplification of customs formalities, the introduction of modern customs clearance technologies and ensuring compliance with international standards significantly reduce the time and costs of transporting goods. In Ukraine, they are actively working on improving customs procedures, including integration with international customs systems, which allows for improved transparency and reduced transaction costs for companies (Atadoga et al., 2024; Baldwin, 2012).

Another serious challenge is customs clearance. Although Ukraine is actively working to simplify customs procedures, bureaucratic barriers and delays at customs can significantly increase the cost and duration of transportation. In addition, political and economic instability are also important factors that can affect the development of logistics. Geopolitical risks, economic difficulties and unpredictability of changes in legislation can create difficulties for international transportation and planning of logistics operations (Atadoga et al., 2024; Baldwin, 2012).

To provide a more evidence-based assessment, this study incorporates key empirical indicators. According to the World Bank’s Logistics Performance Index (LPI) 2023, Ukraine scores 2.8 out of 5, lagging behind the EU average of 3.4, particularly in infrastructure and customs efficiency. Transport-related costs account for approximately 13% of Ukraine’s GDP, compared to 7% across the EU. Furthermore, a 2023 survey by the European Business Association reveals that 64% of Ukrainian logistics firms consider the lack of digital infrastructure a critical obstacle to modernization. These figures demonstrate the measurable performance gaps and justify the need for urgent institutional and technological upgrades in Ukraine’s logistics sector (Table 2) (World Bank, 2023; OECD,

2022; European Business Association, 2023; Ministry for Communities, Territories and Infrastructure Development of Ukraine, 2023).

Table 2. Problems of implementing international norms in Ukraine

Category	International standard	The situation in Ukraine	Main barriers
Environmental regulations	CO_2 emission requirements (EU: up to 95 g/km)	High emissions (135-150 g/km)	Old transport, lack of incentives for modernization
Energy efficiency of transport	Energy efficiency class (A)	Lack of clear standards	Low investment in new technologies
Waste Management	ISO 14000	Lack of a national strategy	Insufficient legal framework and control
Digitalization of logistics	Warehouse Management Systems (WMS) and TMS	Partial automation	Lack of access to digital infrastructure and qualified personnel
Electronic document management	Electronic consignment notes (EU)	Use of paper documents	Lack of legislation for the implementation of electronic solutions
Cargo tracking	eFTI (Electronic Transport Information)	Limited implementation	Low investment and lack of digital systems
Logistics infrastructure	European TEN-T Network	Partially developed transport corridors	Lack of funding and aging infrastructure
Project financing	Grants from the European Investment Bank, loans from the World Bank	Limited access to financial resources	Bureaucracy, corruption, lack of financial mechanisms
Education and training	Training according to international standards	Low level of qualification in logistics	Lack of state programs to support training and development

International cooperation and financing

- Ukraine should make more active use of international financial instruments, such as grants from the European Investment Bank or loans from the World Bank for infrastructure modernization. Participation in European programs for the development of transport corridors, such as TEN-T, will allow access to new sources of financing.

Educational programs and training

- Integration of international standards requires advanced training of personnel responsible for logistics processes. Advanced training programs should include training in modern digital solutions, environmental standards and management technologies.

Thus, a comparative analysis of Ukrainian legislation and international norms in the field of logistics shows both achievements and significant challenges for the Ukrainian legal system. Ukrainian legislation in some aspects, such as transport, customs procedures, environmental standards and transportation safety, meets international standards. However, there are serious gaps in harmonization with international norms, especially in areas such as ecology and digitalization of logistics processes. This creates barriers to Ukraine's full integration into global logistics networks and improving its competitiveness in the international market. Therefore, for the further development of Ukraine's logistics system, it is necessary to focus on harmonizing environmental standards, implementing digital technologies, modernizing infrastructure, and training qualified personnel, which will allow Ukraine to become competitive in the international market.

4. Conclusions

Logistics, as an important component of business, covers a wide range of processes that include planning, organizing, managing and controlling the movement of resources, products and information. Today, logistics not only includes transportation, but also inventory management, warehousing operations, purchasing and distribution of goods. Current trends in logistics emphasize the integration of new technologies, such as automation, information systems, and the use of data to improve supply chain management processes. The analysis of Ukrainian legislation revealed that, although there is some compliance with international standards, there are significant gaps that need to be improved. This includes insufficient harmonization of environmental standards, a low level of digitalization of logistics processes and limited funding for infrastructure projects. Thus, some international conventions related to environmental standards and automation of logistics processes have not yet been fully implemented in Ukraine, which complicates integration into global supply chains. Important aspects are also problems with risk management and insufficient qualification of personnel in the field of logistics.

The economic aspects of increasing the efficiency of logistics companies in Ukraine require a comprehensive approach. Among the key areas that can increase efficiency, one can single out the modernization of transport infrastructure, the introduction of new technologies, cost optimization and active cooperation with international partners. For example, the modernization of ports, railway lines and highways can significantly reduce cargo processing time and increase the speed of delivery. The introduction of the latest information systems for supply chain management will reduce costs and increase the accuracy of management decisions.

In addition, personnel training is an important component, since qualified specialists can significantly affect the quality of service and the efficiency of logistics processes. In the context of globalization and growing demands for sustainable development, Ukraine needs to focus on harmonizing its legislation with international standards, introducing modern technologies and strategic management of logistics processes. This will ensure the efficiency and stable development of the country's logistics system, which, in turn, will increase competitiveness in the international market.

Thus, to achieve success in the logistics sector, Ukraine needs to actively implement reforms aimed at improving the legislative framework, increasing the level of digitalization, investing in infrastructure and developing human resources. These steps will ensure not only Ukraine's integration into international logistics networks, but also create conditions for sustainable economic growth in the context of globalization.

In conclusion, while Ukraine has made progress in aligning its logistics legislation with international norms, critical regulatory gaps remain – particularly in the domains of digital transformation, environmental protection, and infrastructure development. The study emphasizes the urgency of legislative harmonization with EU practices, investment in digital infrastructure, and the enhancement of institutional capacity. To achieve deeper integration into global logistics systems, Ukraine must adopt a strategic approach to reform that includes both regulatory modernization and the empowerment of public-private partnerships. The article calls for further empirical research to monitor the impact of ongoing reforms and to identify scalable best practices for logistics development in transition economies.

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