

# Legal regulation problems in transport logistics: challenges and prospects

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**Abstract:** *Transport logistics plays a decisive role in supporting global trade and economic development. The effectiveness of logistics systems largely depends on the quality, coherence, and adaptability of their legal regulation. In recent decades, profound changes in supply chains, technological innovation, and sustainability requirements have revealed significant shortcomings in existing legal frameworks governing transport logistics. This article analyzes the key problems of legal regulation in transport logistics, including fragmentation of legal regimes, challenges of multimodal transport, contractual and liability issues, digitalization, environmental regulation, and enforcement mechanisms. Using doctrinal legal analysis and comparative perspectives, the study identifies systemic weaknesses and proposes directions for regulatory improvement. The findings contribute to ongoing academic and policy debates on the modernization and harmonization of transport logistics law.*

**KEY WORDS** TRANSPORT LOGISTICS; LEGAL REGULATION; MULTIMODAL TRANSPORT; LIABILITY DIGITALIZATION; SUSTAINABILITY

## 1. Introduction

Transport logistics constitutes the backbone of modern supply chains, enabling the movement of goods across domestic and international markets. The growing integration of national economies and the expansion of global trade have increased the importance of efficient and predictable logistics systems. Legal regulation is a fundamental element of such systems, as it defines the rights and obligations of logistics actors, allocates risks, and ensures safety, security, and environmental protection [3].

Despite its central role, the legal framework governing transport logistics remains fragmented and, in many respects, outdated. Many regulatory instruments were developed for traditional, mode-specific transport operations and do not adequately address contemporary logistics practices such as multimodal transport, digital platforms, and integrated supply chain management [1]. As a result, legal uncertainty and regulatory inefficiencies persist.

This article aims to examine the principal legal regulation problems in transport logistics and to assess their implications for market participants and public authorities. It further explores potential directions for legal reform and harmonization.

## 2. Methodological and theoretical framework

The study employs a doctrinal legal research methodology, focusing on the analysis of international conventions, national legislation, and academic literature on transport and logistics law. The doctrinal approach is complemented by comparative legal analysis, which allows for the identification of similarities and differences between regulatory frameworks across jurisdictions. This combination makes it possible to assess the coherence, consistency, and practical effectiveness of existing legal regimes, particularly in the context of cross-border and multimodal transport operations.

The theoretical framework of the research is grounded in the principles of legal certainty and economic efficiency. Legal certainty is regarded as a key prerequisite for predictable contractual relations and effective risk allocation in transport logistics, while economic efficiency emphasizes the role of legal regulation in reducing transaction costs and facilitating trade. The theoretical framework is grounded in the concept of legal certainty and economic efficiency, emphasizing the role of law in reducing transaction costs and facilitating trade [6].

## 3. Functions of Legal Regulation in Transport Logistics

Legal regulation in transport logistics fulfills several interconnected functions. First, it establishes market access rules, including licensing and authorization of carriers and logistics

service providers. Second, it governs contractual relations among shippers, carriers, freight forwarders, and intermediaries. Third, it determines liability for loss, damage, or delay of goods, thereby allocating risks among parties [8].

In addition, transport logistics law addresses public interests such as safety, security, environmental protection, and fair competition. Effective regulation should strike a balance between facilitating efficient transport services and safeguarding societal objectives. However, achieving this balance has proven increasingly difficult in the context of globalized logistics networks.

## 4. Fragmentation of legal frameworks

### 4.1 Diversity of National Regulations

One of the most persistent and structurally significant problems in the legal regulation of transport logistics is the diversity of national legal systems. Each state maintains its own set of transport, commercial, labor, tax, and administrative regulations, all of which directly influence the organization and execution of logistics operations. In the context of cross-border transport, this regulatory diversity results in increased compliance costs, legal uncertainty, and administrative complexity for logistics operators, carriers, and freight forwarders [10]. Market participants are often required to navigate multiple legal regimes simultaneously, which complicates planning and risk management.

Differences in technical and operational requirements, such as vehicle standards, cabotage regulations, driver working conditions, licensing systems, and mandatory insurance coverage, further complicate international logistics operations. These disparities create barriers to market access and limit operational flexibility, particularly for small and medium-sized enterprises that lack the resources to adapt to diverse regulatory environments. Moreover, the absence or limited application of mutual recognition mechanisms between states exacerbates regulatory fragmentation, undermining legal predictability and impeding the development of integrated and efficient international logistics networks.

### 4.2 Limitations of International Legal Instruments

International legal regulation of transport logistics is primarily based on mode-specific conventions governing road, rail, air, and maritime transport. These instruments aim to promote legal harmonization by establishing uniform rules on contractual relations, carrier obligations, and liability regimes. However, their practical effectiveness remains limited due to incomplete ratification by states and significant differences in national implementation and interpretation [1]. As a result, the intended uniformity of international transport law is often undermined at the domestic level, leading to inconsistent legal outcomes.

Furthermore, the coexistence of multiple international conventions with distinct scopes, liability standards, limitation amounts, and defenses creates substantial legal complexity, particularly in cases involving multimodal or combined transport operations. When a single logistics chain involves several transport modes, determining the applicable legal regime becomes problematic, especially if the location of loss or damage cannot be clearly identified. This fragmented legal landscape, often described as a "legal patchwork," undermines predictability, increases the risk of disputes, and weakens legal certainty for transport and logistics actors, ultimately limiting the efficiency and reliability of international logistics systems.

## **5. Multimodal Transport and Regulatory Gaps**

### **5.1 Absence of a Comprehensive Legal Regime**

Multimodal transport has become a central component of modern logistics systems, allowing the coordinated use of different transport modes under a single contractual framework and contributing to greater efficiency, flexibility, and reliability in global supply chains. Through the integration of various modes of transport, logistics operators are able to optimize routes, reduce costs, and respond more effectively to operational and market demands.

Despite its growing importance, multimodal transport remains inadequately regulated at the international level, as there is no universally accepted and binding legal regime governing such operations [7]. Most legal systems continue to rely on mode-specific rules derived from existing international conventions, which creates legal uncertainty when determining the applicable liability regime, particularly in cases where the location of loss, damage, or delay cannot be clearly identified. This regulatory gap complicates claims handling and dispute resolution, increases transaction costs, and undermines legal certainty for logistics actors, thereby limiting the full potential of multimodal transport solutions.

### **5.2 Liability Allocation Issues**

A central legal challenge in multimodal transport concerns the allocation of liability among carriers, freight forwarders, and other logistics service providers involved in a single transport operation. When loss, damage, or delay occurs, identifying the responsible party and determining the applicable legal rules is often complex, particularly in situations where the exact location or stage of transport at which the damage occurred cannot be clearly established [8].

The absence of clear and uniform liability standards across different transport modes leads to legal uncertainty and inconsistent outcomes in claims handling and dispute resolution. This uncertainty increases transactional risks and costs for market participants and weakens effective risk allocation. As a result, the lack of harmonized liability rules discourages the wider adoption of multimodal transport solutions, despite their potential economic and operational advantages.

## **6. Contractual Regulation and Liability**

### **6.1 Standard Form Contracts and Inequality of Bargaining Power**

Transport logistics contracts frequently rely on standard terms and conditions developed by carriers or large logistics service providers. Such standardization plays an important role in enhancing efficiency, reducing transaction costs, and facilitating the rapid conclusion of contracts in complex logistics operations. However, the widespread use of standard form contracts may also reinforce structural imbalances of bargaining power between contractual parties, particularly where smaller shippers or subcontractors are involved [1].

In practice, shippers and subcontractors often have limited opportunities to negotiate key contractual terms, including liability

limitations, exclusions of responsibility, choice of law, and jurisdiction clauses. These standardized provisions are typically imposed on a "take-it-or-leave-it" basis, which may lead to unequal risk distribution. Legal systems differ significantly in their willingness to intervene in such contractual arrangements, with some jurisdictions offering stronger protective mechanisms than others. This divergence results in uneven levels of legal protection and contributes to further fragmentation of contractual regulation in transport logistics.

### **6.2 Adequacy of Liability Regimes**

Existing liability regimes in transport logistics differ considerably with regard to liability limits, available defenses, and the allocation of the burden of proof. These differences stem from the mode-specific nature of international conventions and their varied implementation at the national level. In many cases, the established liability limits are outdated and no longer correspond to the value of modern, high-value cargo or to the significant economic losses that may result from delay or disruption in contemporary supply chains [7].

This misalignment between legal liability standards and the economic realities of transport logistics undermines effective risk allocation and weakens the protective function of liability regimes. As a consequence, market participants may face inadequate compensation for losses, which can reduce trust in transport services and discourage investment in efficient and innovative logistics solutions.

## **7. Digitalization and Legal Challenges**

### **7.1 Electronic Transport Documents**

Digitalization has significantly transformed transport logistics through the increasing use of electronic contracts, electronic bills of lading, and real-time tracking and information systems. These technologies enhance transparency, speed, and efficiency within logistics operations and contribute to better coordination across supply chains. However, despite technological progress, many legal frameworks continue to prioritize or formally require paper-based transport documentation, which limits the full realization of digital benefits [9].

The lack of uniform legal recognition and acceptance of electronic transport documents creates barriers to interoperability and legal certainty, particularly in cross-border logistics operations involving multiple jurisdictions. Divergent national approaches to electronic documentation result in inconsistent legal treatment, increased administrative burdens, and reduced efficiency gains. This regulatory uncertainty discourages wider adoption of digital solutions and highlights the need for harmonized legal standards that recognize electronic transport documents as functionally equivalent to their paper counterparts.

### **7.2 Data Protection and Cybersecurity**

Logistics operations increasingly depend on extensive data exchange involving both commercial and personal information, including shipment data, customer details, contractual records, and real-time tracking information. This growing reliance on digital technologies exposes logistics actors to significant legal, financial, and operational risks, particularly in the context of inconsistent data protection frameworks and insufficiently developed cybersecurity regulation across jurisdictions [5].

Divergent national approaches to data protection and cybersecurity compliance create uncertainty for cross-border logistics operations and increase vulnerability to data breaches, cyberattacks, and unauthorized access to sensitive information. Ensuring robust data security while simultaneously enabling efficient information sharing and interoperability between logistics stakeholders remains a key regulatory challenge, requiring coordinated legal standards and effective enforcement mechanisms.

## 8. Environmental Regulation and Sustainability

Transport logistics is a significant contributor to greenhouse gas emissions, air pollution, and other forms of environmental degradation, making it a key focus of contemporary environmental policy. In response to these challenges, states and regional organizations have introduced increasingly strict environmental regulations, including emission standards, carbon reduction targets, and requirements aimed at promoting energy efficiency and the use of cleaner transport technologies [4].

While such regulatory measures are essential for achieving sustainable development goals, divergent national and regional approaches create substantial compliance challenges and legal uncertainty for logistics operators, particularly those engaged in cross-border transport. Differences in environmental standards, reporting obligations, and enforcement practices may distort competition and increase operational costs. Moreover, the absence of harmonized environmental regulations can hinder long-term investment in green technologies and sustainable logistics solutions, underscoring the need for greater coordination and legal convergence in environmental regulation within the transport logistics sector.

## 9. Safety, Security, and Customs Regulation

Safety and security constitute core objectives of transport regulation, aimed at protecting human life, property, and the integrity of supply chains. However, significant differences in safety standards, control procedures, and enforcement practices across jurisdictions reduce the overall effectiveness of regulatory frameworks. In the context of international logistics, the duplication of inspections, security checks, and administrative procedures often leads to increased delays, higher operational costs, and reduced reliability of transport services [10].

Customs regulation remains a critical bottleneck in global supply chains, particularly in cross-border transport operations. Despite international initiatives to promote trade facilitation and streamline customs procedures, many customs regimes continue to rely on outdated legal frameworks and paper-based processes. Limited coordination and information sharing among customs authorities further exacerbate inefficiencies, impeding the smooth flow of goods and undermining the effectiveness of modern transport logistics systems.

## 10. Dispute Resolution and Enforcement

Disputes arising in transport logistics frequently involve multiple jurisdictions, diverse contractual arrangements, and the application of different national and international legal regimes. Such complexity is particularly evident in cross-border and multimodal transport operations, where conflicting laws and divergent procedural rules may apply simultaneously. Differences in judicial procedures, evidentiary standards, and enforcement mechanisms significantly complicate dispute resolution and undermine legal certainty for logistics actors [2].

Arbitration and other alternative dispute resolution mechanisms are often regarded as effective tools for resolving transport logistics disputes, due to their flexibility, expertise, and international enforceability. However, the effectiveness of these mechanisms largely depends on their consistent legal recognition and enforcement at the national level. Variations in domestic arbitration laws, court practices, and enforcement standards may limit the practical benefits of alternative dispute resolution, highlighting the importance of harmonized legal frameworks and effective international cooperation in this area.

## 11. Directions for Legal Reform

Addressing the identified problems requires a coordinated and forward-looking approach. Key reform directions include:

- Harmonization of international transport and logistics law

- Development of a comprehensive legal framework for multimodal transport
- Modernization of liability regimes
- Legal recognition of electronic documents and platforms
- Greater coordination of environmental and safety regulations

Such reforms require cooperation between states, international organizations, and industry stakeholders.

## 12. Conclusions

The legal regulation of transport logistics faces significant challenges arising from fragmentation, technological change, and sustainability pressures. Existing legal frameworks often fail to provide sufficient certainty, efficiency, and adaptability.

Modernizing and harmonizing transport logistics law is essential to support global trade, promote sustainable development, and ensure fair and efficient logistics markets. Continued academic research and international cooperation will play a crucial role in achieving these objectives.

## 13. References

- [1] Baughen, S. (2015). *Shipping Law* (6th ed.). London: Routledge.
- [2] Born, G. B. (2021). *International Commercial Arbitration* (3rd ed.). Alphen aan den Rijn: Kluwer Law International.
- [3] Branch, A. E. (2009). *Global Supply Chain Management and International Logistics*. London: Routledge.
- [4] European Commission. (2020). *Sustainable and Smart Mobility Strategy*. Brussels.
- [5] OECD. (2020). *Enhancing Cybersecurity in the Transport Sector*. Paris: OECD Publishing.
- [6] Posner, R. A. (2014). *Economic Analysis of Law* (9th ed.). New York: Wolters Kluwer.
- [7] Ramberg, J. (2011). *ICC Guide to Incoterms 2010*. Paris: ICC Publishing.
- [8] Tetley, W. (2008). *Marine Cargo Claims* (4th ed.). Montreal: International Shipping Publications.
- [9] UNCITRAL. (2017). *Model Law on Electronic Transferable Records*. New York: United Nations.
- [10] UNCTAD. (2021). *Review of Maritime Transport*. Geneva: United Nations.