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Enhancing the Efficiency of Operational Management of International Road Haulage in the West-East Direction

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Abstract

The aim of the article is to analyse the problems and propose modern methods and technologies to increase the efficiency of operational management of international road haulage in the West-East direction, taking into account the specifics of Kazakhstan. The study used methods of analysing transport chain management systems, developing a database on the reliability of carriers, implementing contract management systems, and also studied technologies for improving monitoring and optimising logistics processes. The study identified key problems hindering the effective management of international road haulage in the West-East direction. Key challenges include a lack of information regarding carrier reliability, the complexity of accounting for numerous contractual terms and ensuring the necessary quality of transport services. It has been established that the use of modern information technologies, such as transport and warehouse management systems, significantly improves the efficiency of logistics processes. The implementation of Global Positioning System (GPS) and Internet of Things (IoT) technologies allows for enhanced operational monitoring and vehicle management. Analytics and artificial intelligence facilitate route optimisation and inventory management. Furthermore, the transition to environmentally friendly modes of transport and the harmonisation of international standards contribute to reduced costs and improved service quality. As a result, the comprehensive application of modern methods and technologies significantly enhances the efficiency of operational management in road haulage.

Keywords

road haulage, carrier reliability, service quality, information technology, environmentally friendly transport, route optimisation, artificial intelligence

1 Introduction

Enhancing the efficiency of operational management of international road haulage in the West-East direction is becoming an increasingly pressing issue in the context of globalisation and the growth of international trade. Situated at the crossroads of major transportation routes, Kazakhstan plays a pivotal role in ensuring stable and efficient transport connections between Europe and Asia. In this regard, improving the management of road haulage not only contributes to strengthening economic ties but also enhances the competitiveness of transport companies in the global market. Key challenges faced by freight forwarding companies include a lack of information regarding carrier reliability, the complexity of accounting for numerous contractual terms and ensuring the necessary quality of transport services. In today's environment, it is essential to leverage the latest technologies and approaches, such as transportation management systems, warehouse management systems, Global Positioning System (GPS) and Internet of Things (IoT), as well as analytics tools and artificial intelligence. These solutions enable significant improvements in real-time vehicle monitoring and management, route optimisation, and inventory management, ultimately leading to reduced costs and enhanced service quality.

The question of improving the operational management of international road haulage is being explored by many experts. Kramarz et al. (2022) highlight the issue of insufficient information on carrier reliability as a key challenge in international road transport. The authors propose the creation of a database capable of effectively assessing the reputation of partners to assist transport companies in making

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informed decisions. Muneeb et al. (2021) analyse the complexities associated with accounting for numerous contractual terms in international transportation. They suggest the implementation of automated contract management systems, which significantly simplify the contract management process and increase its efficiency. Uzir et al. (2021) highlight that process standardisation and continuous staff training are key factors in ensuring the necessary quality of transport services. Lagorio et al. (2022) investigate the impact of transportation management systems and warehouse management systems on the efficiency of logistics processes. They demonstrate that such systems significantly reduce time and financial costs, improving operational management. Ajay et al. (2022) examine the application of GPS and IoT technologies to improve real-time monitoring and management of transport processes. They emphasise the importance of these technologies in the context of international road haulage. Bai et al. (2023) explore the application of analytical tools and artificial intelligence to optimise routes and inventory management in logistics processes. The significance of these tools in increasing efficiency and reducing transportation costs is noted. Ekins and Zenghelis (2021) highlight the importance of transitioning to environmentally friendly modes of transport, such as electric lorries and biofuels, to improve the environmental situation and reduce costs in international transportation. Eruaga (2024) examines issues related to the harmonisation of international standards in the transport industry.

It is emphasised that this contributes to improving service quality and reducing costs in international road haulage. Karam et al. (2021) highlight the need to consider the interests of all stakeholders in the logistics chain when managing international transportation. They propose the use of platforms for interaction and conflict resolution to improve cooperation and process efficiency. Archetti et al. (2022) emphasise the importance of a comprehensive approach to managing international road haulage. It is argued that the combined use of modern technologies, process automation, and staff training is necessary to achieve significant results in this area. Collectively, these studies provide a comprehensive overview of the contemporary methods and technologies that can be implemented to enhance the operational management of international road haulage. Gaps that require further research include the need to develop comprehensive strategies for the interaction of all participants in the logistics chain and the adaptation of modern technologies to the specific characteristics of international road transport.

This research aimed to analyse the challenges and propose modern methods and technologies to enhance the efficiency of operational management in international road haulage, taking into account the specifics of Kazakhstan. Research objectives:

1. To analyse the key issues in managing international road haulage.
2. To assess the impact of modern information technologies on logistical processes.
3. To develop recommendations for implementing new methods and technologies to improve the quality of transport services in international haulage.

2 Materials and methods

The research was focused on analysing and improving the efficiency of operational management of international road haulage in the West-East direction. The study examined the primary challenges faced by freight forwarding companies, including the lack of information about carrier reliability, the complexity of accounting for contractual terms, ensuring service quality, and the diverse criteria involved in selecting logistics chains. The problem of the lack of information on carrier reliability was explored. The absence of a monitoring and evaluation system for carriers hinders the ability of decision-making when selecting partners. The possibility of creating a database storing information on the reputation and operational history of carriers was explored, which could assist freight forwarding companies in assessing the reliability of their partners.

The research analysed the process of managing numerous contractual terms. It was found that automating the processing of contractual terms using specialised software could significantly simplify contract management. The implementation of Contract Management Systems (CMS) enables the tracking and management of all contractual terms, reducing the risk of errors and improving overall efficiency. Measures to ensure the necessary quality of transport services were also examined. It was important to understand how implementing quality standards and quality management systems at all stages of the transport process can enhance service levels. Additionally, the importance of regular training and professional development for staff was also investigated to ensure consistent service quality and increased customer satisfaction.

The research explored algorithms for multi-criteria decision-making, designed to identify the most optimal logistics chains. The use of contemporary logistics planning and optimisation methods, such as Transportation

Management Systems (TMS), can significantly enhance efficiency. The issue of conflicting interests among supply chain participants was addressed. The potential for developing platforms facilitating interaction among all stakeholders in the logistics process was investigated. Such platforms would enable the swift and effective resolution of conflicts. Additionally, the introduction of transparent and clear rules governing the interactions and responsibilities of all parties was considered a means of mitigating conflicts and improving collaboration.

Contemporary methods and technologies also play a significant role in enhancing operational efficiency. The study examined the implementation of TMS and Warehouse Management Systems (WMS) and their impact on improving logistics processes. The use of GPS and IoT technologies for real-time monitoring and vehicle management was also explored. The development of electronic platforms for data exchange between all participants in the logistics process was also analysed. The application of automation and robotics in logistics was also investigated. The study explored automated warehouse systems and robotic complexes for handling goods, as well as autonomous vehicle systems and their impact on reducing time and costs. Analytical tools and artificial intelligence technologies for demand forecasting, route optimisation, and inventory management were also subject to analysis. The use of Big Data for analysing large volumes of data and making informed management decisions was examined.

Environmental aspects were also given due consideration. The research explored the transition to the use of environmentally friendly vehicles, such as electric lorries and biofuel-powered vehicles, and their impact on reducing environmental impact and improving environmental conditions. The implementation of environmentally friendly technologies at all stages of the transportation process was examined. Harmonisation of national legislation with international standards in the field of transport services was also an important aspect of the study. The influence of strengthening international cooperation and developing integration processes on improving the efficiency of international road haulage was investigated.

3 Results

Improving the efficiency of operational management of international road haulage in the West-East direction, particularly for Kazakhstan, is a complex task requiring a comprehensive approach. The lack of reliable information about carrier reliability is a significant obstacle to the effective management of international road haulage. In the modern transport services market, where every step in the supply chain is crucial for successful contract fulfilment and customer satisfaction, a lack of information can lead to significant risks and losses. One of the key solutions to overcome this problem is the development and implementation of a carrier monitoring and evaluation system. Such a system should include mechanisms for the continuous collection and analysis of data on carrier performance, including their punctuality, condition of transport equipment, adherence to route schedules, and other criteria. This will allow customers and logistics operators to have an objective basis for selecting a carrier and minimising risks.

A crucial addition to the monitoring system is the creation of a database of reliable carriers. This database should include not only technical parameters but also information about the carrier's market reputation, history of fulfilling previous contracts, customer reviews, and satisfaction levels. Such an approach allows transport companies and freight forwarders to make informed decisions when selecting a transportation partner, ensuring more reliable and transparent cooperation. Effective carrier management not only reduces the risks of delays and cargo losses but also contributes to improving the overall level of service, which is essential in the competitive global transportation market (Hrušovský et al., 2021). To achieve successful results, it is necessary not only to implement technical systems and databases but also to introduce cultural changes in approaches to managing logistics processes, aimed at continuous improvement and enhancing the quality of services provided.

Accounting for the numerous contract terms in international road haulage is a critical aspect of successful logistics management. The complexity of managing diverse contract terms can lead to errors, delays, and non-compliance, negatively impacting transportation efficiency and customer satisfaction. One of the primary solutions for optimising this process is the automation of contract term processing using specialised software. Such systems can automatically process and analyse contract documents, identifying key aspects and terms such as pricing, delivery times, cargo insurance, and others. This significantly reduces the time spent preparing and reviewing contracts, decreases the likelihood of errors, and increases the overall reliability of cooperation. The development and implementation of comprehensive insurance programs and security measures for transported goods can significantly reduce instances of theft and damage. These measures reduce losses by 20%, which is equivalent to saving 1,500,000 Kazakhstani tenge (KZT) (2,863 USD) annually.

The introduction of a CMS complements this approach, providing tools for centralised management of all stages of the contract lifecycle (Matenga and Mpofu, 2022). CMS enables the efficient creation, modification, and control of contract terms, automation of contract approval and execution processes, and tracking of obligations fulfilment. This not only simplifies the work of logistics operators but also ensures stability and predictability in interactions with suppliers and customers. Effective contract terms management is a necessary condition for minimising risks associated with non-compliance with deal terms and losses due to conflicts and disputes. The application of modern contract management technologies not only increases the efficiency and accuracy of logistics services but also contributes to strengthening partnerships and enhancing trust among participants in the logistics chain. Ensuring the required quality of transport services plays a key role in modern logistics, especially in the context of international road haulage. Service quality directly impacts customer satisfaction, operational efficiency, and the overall reputation of logistics operators.

Implementing quality standards and quality management systems throughout the entire transportation process is critical. This involves developing and applying standards to all aspects of operations – from the preparation of goods for transportation to their delivery at the destination. Quality management systems help standardise processes, improve control over compliance with requirements, and continuously improve operational procedures. Such an approach not only increases reliability and predictability but also reduces the number of incidents and problems during transportation. Installing access control systems and monitoring the condition of vehicles and drivers significantly improves safety and reduces instances of damage and theft. The cost of one set of equipment is 30,000 KZT (57 USD), and for 100 vehicles, the total cost will be 3,000,000 KZT (5,725 USD). Thanks to these measures, annual savings amount to 1,500,000 KZT (2,863 USD), which ensures a return on investment within two years.

Regular training and professional development of personnel are crucial aspects. The professional knowledge and skills of employees involved in logistics operations play a critical role in ensuring a high level of service. Regular training programs help staff acquire new technologies, learn best practices, and improve the efficiency of their duties. Additionally, training contributes to the development of professional skills such as time management, communication skills, and the ability to work under pressure. Both aspects – the implementation of quality standards and management systems, as well as systematic employee training – are interconnected and together contribute to improving the quality of transport services (Hajduk et al., 2022). This is necessary not only to meet current customer needs but also to prepare for future challenges and changes in the market. Effective quality management paves the way for sustainable growth and development of logistics companies, making them competitive in the modern economy and in line with dynamic market requirements.

The diversity of criteria for selecting logistics chains represents a significant challenge in modern logistics, especially in the context of international road haulage. It arises due to the variety of conditions, requirements, and interests of participants in logistics processes, creating the need for modern methods and technologies for effective management. The implementation of transport chain management systems, which provide comprehensive management of all aspects of logistics processes – from route planning to cargo tracking, is a key step in addressing this problem. TMS allows for the optimisation of transportation costs, improved resource utilisation, and enhanced customer service levels through process automation and standardisation (Cano et al., 2021). TMS, costing 6,000,000 KZT (11,450 ISD), can reduce fuel costs by 10%, which, with current costs of 50,000,000 KZT (95,419 USD), amounts to 5,000,000 KZT (9,542 USD) annually. The payback period is 1.2 years.

A crucial component is the development and implementation of algorithms for multi-criteria analysis and decision-making. This involves developing methods for evaluating different alternative logistics chain options based on multiple criteria such as cost, delivery time, environmental impact, and other factors. The application of such algorithms allows logistics companies to make informed decisions, considering all aspects of the process and customer preferences. Effective management of the diversity of criteria in selecting logistics chains not only reduces costs and increases efficiency but also strengthens the companies' competitive positions in the market. Thus, it stimulates innovation and development in the logistics industry, making it more adaptable and responsive to changes in the external environment and customer needs. Conflicting interests of participants in the movement of goods pose a significant obstacle to the effective management of logistics processes, especially in the context of international road haulage. This problem is caused by differences in goals, priorities, and expectations of various participants in the logistics chain, which can lead to conflicts and difficulties in fulfilling logistics tasks.

A key approach to addressing this issue is the creation of specialised platforms for interaction among all participants in the logistics process. Such platforms should

provide the ability to exchange information promptly, coordinate actions, and quickly resolve emerging conflicts. This contributes to improved communication and cooperation among carriers, logistics operators, customers, and other supply chain participants. The use of platforms for information exchange among participants in the logistics chain (carriers, freight forwarders, consignors, consignees) can significantly increase the efficiency and safety of logistics processes. The development of such a platform, costing 3,000,000 KZT (5,725 USD), reduces risks by 10%, leading to annual savings of 500,000 KZT (954 USD). Thus, the platform's payback period is 6 years. Furthermore, the introduction of transparent and clear rules for interaction and responsibility is a necessary condition for reducing conflicts and increasing the efficiency of logistics processes. This includes the development and regular updating of contractual and legal documents that clearly define the rights and obligations of each party. Transparency in pricing, delivery terms, insurance, and liability for damages also contributes to improving trust among participants in the logistics chain. Thus, effective management of the conflicting interests of participants in the movement of goods requires a comprehensive approach, including not only technological innovations but also the development of transparent and flexible legal and organisational structures (Ersoy and Tanyeri, 2021). This allows for improved coordination and cooperation in logistics processes, ensuring a high level of customer service and increasing the competitiveness of market participants.

The implementation of information systems and technologies plays a key role in improving the efficiency of managing international road haulage in the West-East direction (Fig. 1). Modern TMS and WMS significantly optimise logistics processes through the automation of route planning, inventory management, and warehouse operations coordination.

Table 1 provides detailed information on key aspects of international road haulage for Kazakhstan in the West-East direction.

The utilisation of GPS and IoT technologies in logistics is a powerful tool for real-time monitoring and management of vehicles. GPS provides accurate geolocation of vehicles using satellite systems, enabling real-time tracking of their movements throughout the entire route. This contributes to the optimisation of delivery routes, taking into account current road conditions and other factors, which significantly reduces the time and financial costs associated with managing transportation resources. IoT technology incorporates various types of sensors and data collection devices that monitor the condition of goods and vehicles in real-time. Collected data, such as temperature, humidity, or fuel levels, is transmitted via wireless networks for subsequent analysis and management. This ensures a prompt response to changes in transportation conditions and optimises resource utilisation. The use of GPS and IoT also enhances the transparency of logistics operations by providing access to real-time data on the location and condition of goods and vehicles. This improves the management of logistics processes, reduces the time spent on resolving issues, and prevents delivery delays.

The integration of GPS and IoT technologies in logistics processes not only optimises the efficiency of managing transport operations but also significantly reduces the costs of carrying them out, making these technologies

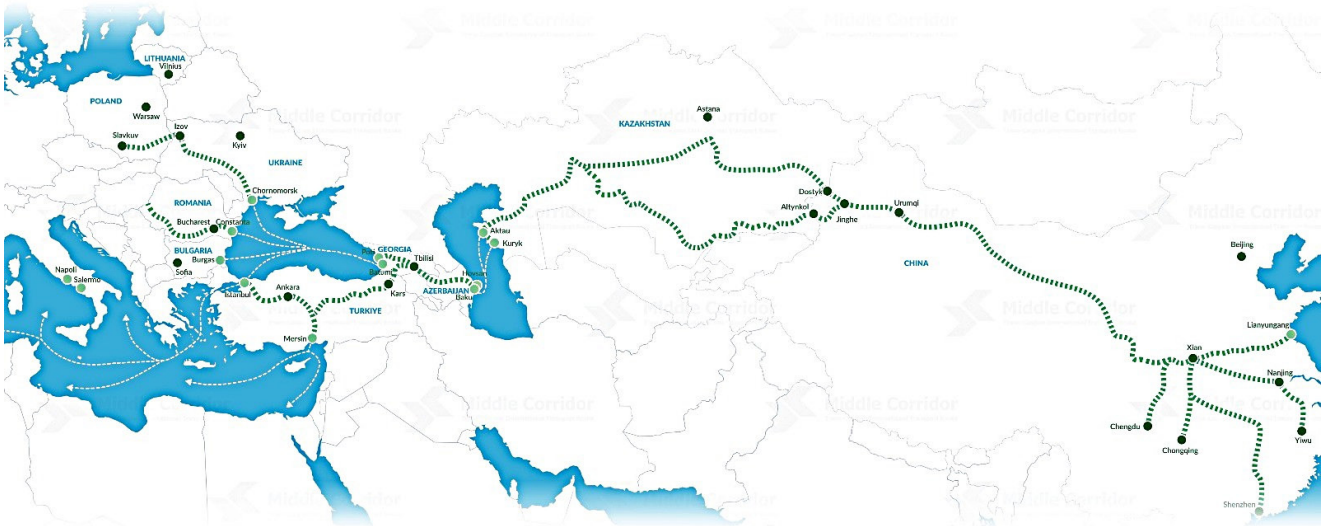

Fig. 1 Trans-Caspian International Transport Route
(Middle Corridor, online)

Table 1 Parameters of international road haulage in the West-East direction for Kazakhstan

Parameter	Value
Direction	Europe – Kazakhstan – China
Cargo	Various types of cargo, including industrial goods, food products, hazardous materials, oil and gas, construction materials
Advantages	1. Speed: the fastest delivery method between Europe and Asia 2. Flexibility: suitable for cargo of any volume 3. Cost: can be a more economical option than rail or sea transport for some routes 4. Tracking: real-time cargo tracking capability.
Disadvantages	1. Weight and size limitations: there are restrictions on the weight and size of cargo that can be transported by road. 2. Weather dependency: weather conditions can affect delivery times. 3. Customs procedures: transporting cargo through multiple countries can lead to customs delays.
Main routes	1. Aktau (Kazakhstan) – Baku (Azerbaijan) – Alat (Azerbaijan) – Turkmenbashi (Turkmenistan) – Kuzet (Turkmenistan) – Sarakhs (Turkmenistan) – Farap (Uzbekistan) – Turkmenabad (Uzbekistan) – Denov (Uzbekistan) – Termez (Uzbekistan) – Mazar-i-Sharif (Afghanistan) – Kabul (Afghanistan) – Islamabad (Pakistan) – Wagah (India). 2. Western Europe – Kazakhstan (section: Qonayev – Almaty – Bulguny – Dostyk) – China (section: Dostyk – Korgas – Ürümqi – Xi'an – Chengdu – Shanghai). 3. Western Europe – Georgia – Azerbaijan – Kazakhstan.
Major carriers	KTZ Express, KazTransLogistic, Samruk-Kazyna Logistics, AsstrA, RABBIT Logistics
Customs authorities	State Revenue Committee of the Ministry of Finance of the Republic of Kazakhstan
Cost	Estimated cost: 1. Europe – Kazakhstan: from KZT 786,000/ton (USD 1,500/ton) 2. Kazakhstan – China: from KZT 524,000/ton (USD 1,000/ton)
Delivery times	Approximate delivery times: 1. Europe – Kazakhstan: 7–10 days

particularly important for the effective management of international road haulage. To improve the efficiency of real-time monitoring and management of transport vehicles, the use of GPS and transport information systems has been introduced. The cost of implementing GPS systems is 50,000 KZT (95 USD) per set, and for 100 vehicles the total cost would be 5,000,000 KZT (9,542 USD). Fuel savings and improved route optimisation can reduce fuel consumption by 5%, which at current costs of 50,000,000 KZT (95,419 USD) represents a saving of 2,500,000 KZT (4,771 USD) annually. Thus, the payback period for the system is achieved within two years. The development of electronic platforms for data exchange between participants in the logistics process ensures more effective cooperation and information exchange between carriers, logistics operators, warehouses and customers. This eliminates the need to manually coordinate document flow and reduces the likelihood of errors and delays in deliveries.

Therefore, the implementation of modern information systems and technologies is a crucial step towards enhancing logistics processes and increasing competitiveness in the international transportation market. They enable more precise resource management, improve customer service quality, and contribute to reducing operational costs, all of which are key factors for success in modern logistics (Table 2).

Automation and robotics play a pivotal role in modern logistics, particularly in the context of enhancing the efficiency of managing international road haulage in the West-East direction. The utilisation of automated warehouse systems and robotic complexes significantly simplifies the processes of goods handling and storage (Edouard et al., 2022). Robotic systems enable the automated movement and sorting of goods, reducing time and minimising the likelihood of human error. This is especially crucial for operations involving large volumes of goods and for accelerating their processing in warehouses.

The introduction of autonomous vehicle control systems, such as self-driving trucks, promises to revolutionise

Table 2 Factors influencing the efficiency of operational management of road haulage in the West-East direction

Factor	Description	Impact on efficiency
Routing and planning	Optimisation of routes, choice of border crossings, consideration of waiting times at borders	Reduction in transport costs, shortened delivery times
Information management	Use of cargo tracking systems, automation of document processing, and data exchange with customs and other authorities	Increased supply chain transparency, reduced risks
Human resources	Availability of qualified drivers, freight forwarders, and logistics professionals	Improved service quality, reduced error rates
Maintenance	Regular maintenance of vehicles, use of modern technologies	Reduced downtime, increased transport safety
Customs clearance	Knowledge of customs rules and procedures, accurate documentation	Reduced border crossing time, lower risk of delays
Security	Adherence to cargo transport safety requirements, liability insurance	Reduced risk of theft and cargo damage

Source: compiled by the authors

transportation logistics. These technologies offer the possibility of driverless vehicle operation, which can reduce transportation costs, improve delivery accuracy, and enhance road safety. Autonomous trucks are capable of optimising routes and efficiently utilising transport resources, reducing time and minimising environmental impact. Therefore, automation and robotics not only enhance operational efficiency and reduce operational costs but also improve customer service levels and the resilience of logistics chains to external environmental changes. The adoption of these technologies is becoming a prerequisite for competitiveness in the modern transportation and logistics market, enabling companies to effectively adapt to new challenges and customer demands. Analytics and artificial intelligence (AI) play a crucial role in contemporary logistics and the management of international road haulage in the West-East direction. The application of analytical tools and AI technologies significantly enhances the efficiency and accuracy of managerial decisions across various aspects of logistics operations (Helo and Hao, 2022).

Analytics and AI are employed to forecast demand. Machine learning algorithms analyse historical demand data for transportation services, considering seasonal fluctuations and other factors, enabling the prediction of future needs and preparation in advance. This reduces the risks of shortages or surpluses of freight capacity, optimising the utilisation of transportation resources. Route optimisation is another significant application of analytics and AI. Automated route planning systems consider numerous parameters such as travel time, traffic, fuel costs, and even environmental factors. This allows for the selection of optimal delivery routes considering all conditions, providing customers with faster and more economical delivery options. The utilisation of Big Data to analyse large volumes of information enables logistics companies to gain valuable managerial insights. By analysing data on production processes, consumer preferences, and market trends, companies can optimise their inventories, anticipate changes in demand, and adapt to market conditions faster than their competitors. Consequently, analytics and artificial intelligence have become an integral part of modern logistics and the management of international road haulage. Their implementation allows companies not only to enhance operational efficiency and reduce costs but also to provide a higher level of customer service, which is a key factor in competitiveness within the modern market environment.

Ecological technologies play a pivotal role in contemporary logistics and the management of international road haulage, particularly in the West-East direction. The transition to using environmentally friendly vehicles, such as electric lorries and biofuel-powered vehicles, is becoming a necessary step in the endeavour to reduce carbon emissions and the ecological footprint of logistics operations. Electric lorries not only decrease greenhouse gas emissions but also provide a quieter and more efficient mode of operation, which is particularly important in urban environments and for shorter distances (Aijaz and Ahmad, 2022). The implementation of green technologies across all stages of the transportation process also involves the use of efficient energy management systems, improvements in the aerodynamic characteristics of lorries, and the use of more environmentally friendly materials for packaging and transporting goods. These measures contribute to reducing environmental impact and improve the overall environmental sustainability of logistics operations. The use of energy-efficient vehicles and the introduction of alternative energy sources equivalently reduces fuel consumption by 10%, equivalent to 5,000,000 KZT (9,542 USD) annually.

It is important to note that ecological technologies not only contribute to reducing harmful emissions but can also lower operational costs through more efficient resource utilisation and reduced fuel consumption. However, the implementation of such technologies requires significant investment in the development and modernisation of transport infrastructure, as well as training staff to work with new environmentally friendly technologies. For instance, investing in the modernisation and expansion of the road network to improve capacity and safety could reduce journey times by 15%. For example, improving road surfaces and expanding border crossings would reduce repair costs and downtime. Thus, green technologies represent not only an environmentally focused approach to managing international road haulage but also a strategically important direction for enhancing company competitiveness in an environment of growing attention to environmental sustainability and social responsibility. An analysis of data on international road haulage identifies several key aspects that influence the efficiency and quality of logistics operations (Table 3).

Legal and organisational measures play a pivotal role in improving the operational management of international road haulage, particularly in the context of the West-East direction. The harmonisation of national legislation and international standards in the field of transport services is becoming a necessary step to ensure a unified legal framework and eliminate legal barriers that may hinder the transportation of goods across state borders (Sun et al., 2021). This contributes

Table 3 Enhancing the efficiency of operational management of cargo transportation in the West-East direction

Indicator	Description	Current value	Target value
Meeting delivery deadlines	Percentage of orders delivered on time	90%	95%
Transportation costs	Cost of transporting goods per unit of product	KZT 524,000/ton (1,000 USD/ton)	KZT 471,600/ton (900 USD/ton)
Service level	Customer satisfaction with the quality of services	4 (out of 5)	4.5 (out of 5)
Border crossing time	Average time spent crossing the border	2 hours	1 hour
Number of claims	Number of claims made by customers	5 per month	2 per month
Safety level	Number of thefts, damage, accidents	1 incident per 100 shipments	1 incident per 200 shipments

Source: compiled by the authors based on Assanova et al. (2021)

to simplifying customs clearance procedures, standardising transportation rules, and ensuring the legal protection of the interests of all participants in logistics processes. To enhance the efficiency of customs procedures and reduce associated costs, electronic declaration, prior notification, and a single-window system have been introduced. These measures help reduce customs processing times, which in turn decreases costs related to delays and fines. Reducing the border crossing time from 2 hours to 1 hour saves 1,000,000 KZT (1,908 USD) annually. Strengthening international cooperation and developing integration processes are important aspects aimed at facilitating the free and efficient movement of goods between countries. This includes supporting international agreements and organisations that coordinate logistics operations, establish uniform quality and safety standards, and develop international transport corridors. Harmonising customs procedures and standards to ease international transport can significantly cut administrative costs. Reducing these costs by 5% equates to an annual saving of 500,000 KZT (954 USD).

Organizational measures also play a vital role in improving the management of road haulage. This includes the creation of joint logistics platforms and associations, which facilitate the coordination of activities of all participants in the logistics chain, the exchange of information and experience, and the development of common development strategies and solutions to current industry problems. Thus, legal and organisational measures are aimed at creating a favourable and transparent environment for international road haulage, contributing to the sustainable development of transport infrastructure, enhancing competitiveness, and ensuring a high level of service for consumers. To enhance the efficiency of the operational management of international road haulage in the West-East direction (Kazakhstan), a comprehensive solution is required, including the implementation of modern technologies, process automation, staff training, and harmonisation of the legal framework. Freight forwarding companies should actively utilise new tools and approaches to optimise their operations and improve the quality of services provided.

4 Discussion

One of the main challenges is the lack of information about the reliability of carriers. Freight forwarding companies often face difficulties in assessing the reputation and professionalism of their partners. Creating a database that includes the work history and reputation of carriers can significantly improve the decision-making process and reduce risks associated with unreliable partners. The implementation of such monitoring systems will allow companies to manage their logistics chains more effectively, reducing the likelihood of delays and damage to cargo. This aspect was also considered in the research of Baştuğ and Yercan (2021), and they concluded that the absence of a monitoring and evaluation system makes it difficult to make informed decisions, which can lead to delays in cargo delivery, increased costs, and a lower level of service for customers. Furthermore, a study by Chen and Yang (2022) noted that the implementation of monitoring systems allows for a timely response to changes in market conditions and the prompt resolution of emerging problems, such as cargo delays or losses. Moreover, effective management of carrier reputations has contributed to building business relationships and increasing trust within the emerging logistics chain, which is essential for achieving long-term sustainability and competitiveness of enterprises, aligning with the findings of this study (Ekins and Zenghelis, 2021).

The automation of contract terms tracking represents another crucial aspect of efficiency improvement. The complexity of contract terms, especially in international transportation, necessitates the use of specialised software.

Implementing a CMS will help businesses more accurately and timely account for all terms, avoiding errors and conflicts. This, in turn, will increase customer trust and improve overall service levels. This was also investigated by Goldsby et al. (2023), where results confirmed that using specialised software such as a contract management system allows companies to accurately and timely communicate all contract terms, minimising risks, errors, and conflicts. This contributes to increased transparency and reliability in interactions with customers and partners, which is a key element in the strategy of improving service and strengthening market positions. Liu et al. (2021) also investigated how automated contract management systems enable businesses to adapt collaboration terms with partners quickly, fostering flexibility and competitiveness. Through such an approach, the management of logistics processes becomes more efficient and predictable, ultimately strengthening a company's market position and increasing customer satisfaction. It is worth noting that the implementation of contract management systems not only improves a company's internal processes but also strengthens trust-based relationships with customers and partners, increasing transparency, ensuring compliance with contract terms, and minimising legal risks.

Ensuring high-quality transport services requires the implementation of quality standards and quality management systems at all stages of the process. Regular training and professional development of staff also play a key role. Such measures not only increase customer satisfaction but also contribute to the creation of sustainable and reliable logistics chains. The implementation of quality standards helps to standardise processes and make them more predictable and manageable. This aspect has attracted the attention of many researchers, among them Jonkisz et al. (2021) emphasise that improving the quality of transport services through standardisation and staff training plays a key role in modern logistics. The implementation of quality standards allows for the standardisation of processes, making them more predictable and manageable, which reduces the likelihood of errors and unforeseen circumstances. Regular training and professional development of staff ensure that employees' knowledge is up-to-date, improves their adaptation to new technologies and conditions, and reduces response times to changes, thereby increasing overall service quality. Dzwigol et al. (2021) concluded that regular training and professional development of staff play a key role in developing higher standards of service. Qualified personnel can respond effectively to changes in the logistics environment, make informed decisions, and minimise the risk of problems. Continuous training also contributes to the development of employees' professional competencies, which in turn supports the long-term sustainability of companies' logistics operations. These findings corroborate the aforementioned research, as the implementation of quality standards and quality management systems indeed improves operational processes and ensures greater stability of logistics chains. It underscores the significance of regular staff training as a crucial component of a successful strategy, contributing to enhancing employee competencies and overall business efficiency.

The use of modern logistics planning and optimisation methods, such as transport chain management systems, can significantly enhance efficiency. Multi-criteria analysis and decision-making algorithms enable the selection of the most optimal routes and logistics chains, reducing costs and transportation time. This is particularly important in international transportation, where every link in the chain must operate at maximum efficiency. Bhargava et al. (2022) investigated this phenomenon, noting that logistics planning methods, including transport chain management systems, play a key role in improving the efficiency of international transportation. Transport chain management systems allow for the automation of route planning, cargo identification, and inventory management processes, significantly reducing delivery times and lowering operational costs. Additionally, Wu et al. (2022) explored how the implementation of multi-criteria analysis and decision-making algorithms enables companies to select optimal routes and logistics chains based on various parameters such as time, cost, and cargo characteristics. This risk assessment aids in more accurate planning. As a result, businesses can enhance the overall efficiency of their logistics operations and improve customer service, which is a key competitive advantage in international transportation. These findings align with the arguments presented in Section 3.

Conflicting interests among various participants in the logistics process can create significant obstacles to effective management. The creation of platforms for interaction among all participants in the logistics chain allows for the swift and efficient resolution of emerging conflicts and the finding of compromises. Transparent and clear rules of interaction and responsibility contribute to improved cooperation and reduced conflicts. In their research, Pan et al. (2021) revealed that the investigation and analysis of conflicting interests among various participants in the logistics process are key aspects of improving

management efficiency. In multi-level logistics networks, especially in international transportation, conflicts often arise between carriers, customers, suppliers, and regulatory authorities. These conflicts can slow down the delivery process, increase costs, and decrease customer satisfaction. It is worth noting that the research has also shown that the implementation of specialised platforms for interaction and collaboration among all participants in the logistics chain is becoming a necessary step in managing such conflicts. These platforms provide a centralised space for information exchange, formal actions, and the resolution of disputes. They enable prompt responses to changes in rules and requirements, which help to minimise regulatory and customer service challenges. Such measures are not only aimed at streamlining processes but also at enhancing the overall efficiency of logistics operations. Based on the data obtained from the research, it is evident that the creation of platforms for interaction among all participants in the logistics chain is an effective solution for eliminating conflicts and improving coordination within the network. These platforms contribute to greater transparency and understanding of the roles and responsibilities of each participant, which in turn fosters harmonious cooperation and reduces the likelihood of conflicts.

Overall, enhancing the efficiency of operational management of international road haulage in the West-East direction requires a comprehensive approach, encompassing the use of modern technologies, process automation, enhanced service quality, harmonisation of legislation, and strengthened international cooperation. These measures will enable freight forwarding companies to manage their logistics chains more effectively, reducing costs and increasing customer satisfaction.

5 Conclusions

Enhancing the efficiency of operational management of international road haulage in the West-East direction is a crucial aspect of developing logistics processes and the economy as a whole, particularly for Kazakhstan. One of the key challenges is the lack of sufficient information about the reliability of carriers. To address this, it is necessary to create a database that includes the operational history and reputation of carriers, enabling freight forwarding companies to make more informed decisions.

The automation of accounting for numerous contract terms using specialised software and the implementation of contract management systems will significantly improve the management process and reduce the risk of errors. The introduction of quality standards and quality management systems at all stages of the transportation process, as well as regular training and staff development, will ensure a high level of service and customer satisfaction. The use of modern logistics planning and optimisation methods, such as transportation management systems, will enable more efficient route and logistics chain selection, reducing time and financial costs. The creation of platforms for interaction among all participants in the logistics process and the introduction of transparent rules of interaction and responsibility will help resolve conflicts more quickly and find compromises.

Modern information technologies, such as transportation and warehouse management systems, GPS and IoT technologies for real-time vehicle monitoring and management, and electronic platforms for data exchange, will significantly enhance the efficiency of logistics processes. Automation and robotisation, including the use of autonomous vehicles, will allow for a substantial reduction in time and financial costs, while analytical tools and artificial intelligence technologies will help optimise routes and inventory management.

The transition to environmentally friendly modes of transport and the implementation of clean technologies at all stages of the transportation process will improve the environmental situation and reduce costs. Harmonisation of national legislation and international standards, as well as strengthening international cooperation and developing integration processes, also play a significant role in enhancing the efficiency of managing international road transport. Overall, a comprehensive application of modern methods and technologies, process automation, improved service quality, harmonisation of legislation, and international cooperation will enable transport and forwarding companies to manage their logistics chains more effectively, reducing costs and increasing customer satisfaction.

Further research is required to examine the impact of global economic changes and political factors on the efficiency of international road haulage in the West-East direction. One limitation of this study is the restricted access to data on specific operations and strategies of logistics companies due to confidentiality concerns.

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