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RISK ANALYSIS IN INTERNATIONAL LOGISTICS: METHODS OF MINIMISING THEM

АНАЛІЗ РИЗИКІВ У МІЖНАРОДНІЙ ЛОГІСТИЦІ: МЕТОДИ ЇХ МІНІМІЗАЦІЇ

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Summary. *The article explores the current challenges and risks arising in international logistics, as well as the key strategies for their management and minimisation. An analytical review of the main risk factors, including economic, political, social, technological, environmental and legal aspects that affect the stability of supply chains in the global environment, is carried out. Particular attention is paid to risk assessment methods, including qualitative and quantitative approaches, and practical recommendations for minimising risks are proposed based on a survey of project managers. The article identifies problematic aspects of logistics processes, such as delivery delays, insufficient technical support and high cost of transport services. Based on the results obtained, recommendations are formulated to improve communication, increase technological support and more efficient inventory management in the context of international activities.*

Keywords: *international logistics, risk management, risk assessment, supply chains, risk minimisation strategies, globalisation.*

Problem statement. In the context of globalisation and dynamic development of international economic relations, logistics processes are becoming more and more complex and interdependent. Today's supply chains face numerous challenges and threats that can significantly affect the efficiency of business operations and lead to significant financial losses. The events of recent years, in particular the global pandemic, political conflicts and economic crises, have demonstrated the vulnerability of international logistics systems and the need to develop effective risk management mechanisms.

Despite a significant amount of research in the field of risk management, the issue of integrated risk management in international logistics remains understudied. The need to systematise approaches to the identification, assessment and minimisation of logistical risks in the conditions of growing uncertainty of the global business environment becomes especially relevant. It is also important to understand the relationship between different types of risks and their complex impact on the efficiency of international logistics operations.

The presentation of the main material. Risks in international logistics are one of the key challenges that require systematic analysis and management. The globalisation of the economy, the increase in the number of international trade relations

and the development of technologies have significantly expanded business opportunities. At the same time, these factors have led to an increase in the number of risks that threaten the stability and efficiency of global supply chains. A variety of research and scholarly works devoted to risk management issues emphasise different aspects of this problem, offering different approaches and strategies to minimise threats.

The concept of risk in logistics can be defined as the probability of events that negatively affect logistics processes, causing losses in the form of delays, increased costs or damage to goods. This concept covers a wide range of threats, which are both internal, related to the operational activities of the company, and external, such as political instability or natural disasters, which are beyond the company's control. In an international environment, risks become more complex due to factors of political instability, cultural differences, different economic conditions and unpredictable changes in global markets.

In determining risk in international logistics, scientists use different approaches, given the complexity and multifaceted nature of this phenomenon. For example, Christopher Martin, in his book Logistics and Supply Chain Management (2016), defines risk in logistics as uncertainty in supply systems that can upset the balance between supply and demand, leading to instability, additional costs and losses for business.[1] Christopher emphasises the importance of flexibility in supply chains, emphasising that logistical risks are often caused by the complex nature of relationships between different participants, as well as the need to use innovative technologies to reduce them.

In their work, Juttner, Peck, and Christopher (2003) note that risk in logistics is a set of factors that affect the stability of supply [2]. They emphasise that risk is not only the possibility of negative events, but also the unpredictability of consequences for the supply chain. The authors describe risk as a multi-level phenomenon that depends on economic, political, social and technological factors. According to their model, risk management should include both the strategic level — analysis of market conditions and political risks, and the operational level — assessment of daily logistics processes.

Tang (2006) considers risk in international logistics through the prism of management strategies, offering a clear framework for analysis. He divides risks into types such as operational, financial and strategic, and notes that each of them requires different approaches. For Tang, risk in international logistics is an integral aspect of the global economy that requires a combination of different management practises, from supplier diversification to insurance strategies [3].

Due to globalisation and the expansion of markets, the volume and complexity of logistics processes have increased significantly, which has led to increased vulnerability of supply chains to various risks.

The main factors that create risks in international logistics are divided into several key groups [9]: economic, political, social, technological, environmental.

According to studies by other authors, technical and force majeure risks should be added to the list [10].

Political instability and legislative changes such as sanctions, tariffs, and restrictions on imports and exports have the potential to complicate logistics

operations. The full-scale war in Ukraine led to the loss of assets and territories, significantly complicated supply chains and the logistics system. Regular bombing of infrastructure facilities causes force majeure risks in logistics and interfere with transportation or can lead to the loss of goods and vehicles. Customs policy regulations in individual European countries periodically create barriers at borders, due to the introduction of additional customs inspections or changes in the rules for the certification of goods.

Economic factors are one of the most important factors affecting the stability of the logistics process. For Ukrainian companies, this risk is quite significant, since the economic crisis is accompanied by a negative tendency to change the exchange rates of the hryvnia, a high rate of inflation, fluctuations in prices for fuel and other resources. In this regard, many enterprises had to face negative receivables, which led to a reduction in budgets and expenses. Some companies even had to stop their activities. These and other factors led to negative trends in transportation volumes (Fig. 1).

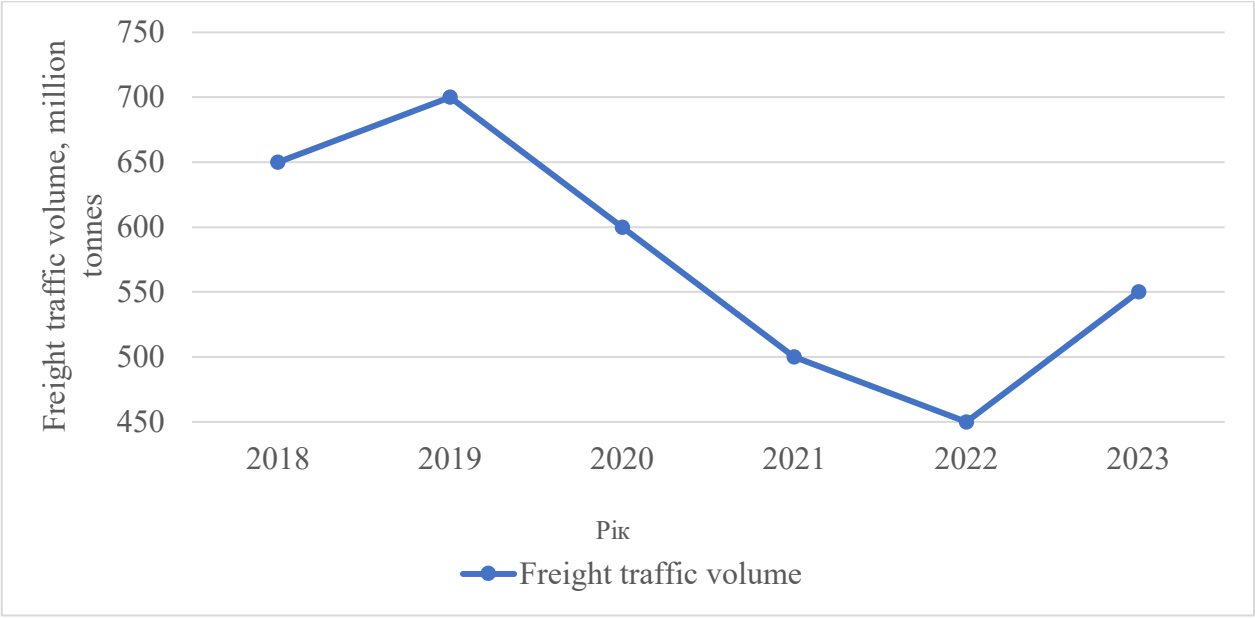

Fig. 1 Dynamics of cargo transportation volumes in Ukraine in the period 2016-2023.

Formed by the authors based on the analysis of the source [11]

The above graph shows that the volume of freight traffic in 2018 - 2019 was stable at the level of 650 - 670 million tons due to sustainable economic growth and infrastructure development. In 2020, the outbreak of the COVID-19 pandemic led to a reduction in the volume of transportation to 6 billion tons, as well as a reduction in international trade and domestic economic activity. The situation in the period 2021 - 2022 was the most difficult: the full-scale war in Ukraine caused a reduction in cargo flows to 45,000 million tons, as the destroyed infrastructure and the blockade of ports significantly limited the possibilities of domestic logistics.

In 2023, thanks to the adaptation of the industry to new conditions, the development of the Danube port and railway export routes, the volume of transportation increased by 22% (55,000 tons). Investments in Ukraine's railway

infrastructure ensured the growth of cross-border transportation of goods to the EU.

Social factors, language barriers and consumer preferences can also pose risks to the international logistics process. For example, cultural differences can affect business relationships between partners in different countries, harmonisation of delivery terms, delivery times, and other aspects of cooperation. It is also important to take into account the social disproportions that arose in Ukraine with the outbreak of the war. The migration of more than 8 million people of the working population and mobilisation to the Armed Forces of Ukraine caused an increase in the shortage of specialists for logistics activities.

In international logistics, technological factors play an important role, as the development of technology allows to automate processes and improve supply chain management. However, the use of state-of-the-art technologies, such as cargo tracking systems and inventory management software, can also be associated with risks. For example, a technical system failure or cyberattack can lead to a stoppage of the process or data loss. In addition, the constant modernisation of technology may require companies to invest more in order to remain competitive in the market.

Environmental factors include climate change, natural disasters, environmental standards and regulations. Natural disasters such as hurricanes, floods, and earthquakes can disrupt logistics chains, cause delays, and destroy goods during transportation. On the other hand, environmental regulations aimed at reducing emissions and protecting the environment can increase transportation costs and force companies to adapt to new environmental standards, such as the use of environmentally friendly materials and electric vehicles.

Legal factors are related to regulatory requirements, which vary from country to country. For logistics companies, violation of the requirements of the legislation of the country through whose territory the supply chain passes can lead to fines, confiscation of cargo or delays, which generally complicates the work of companies and increases the risk of disruption of logistics operations.

Adaptive assessment of external and internal risks is an important component of the crisis management strategy for logistics companies in difficult martial law. Monitoring the compliance of the management system of companies allows you to identify critical problems and make adjustments to the implementation of the corporate strategy.

The authors of the article conducted a study by CCS TRADE LLC in order to evaluate the logistics strategy and identify ways to improve it. The selected company belongs to the medium-scale cargo transportation, carries out domestic and external transportation for construction in Ukraine and abroad. The company has its own fleet and uses various forms of cooperation with partners in logistics activities behind the effective implementation of construction projects.

Research method – questionnaire and expert evaluation. The questionnaire consists of 15 questions, with the help of which various aspects of the logistics strategy and the work of the logistics department were analysed and evaluated from the point of view of the managers of the specified company.

The methodology of questionnaire analysis is a comprehensive approach to the processing and interpretation of survey results. The authors of the article identified

questions with the highest and lowest ratings, which helped to identify key strengths and problem areas. The following expert results were obtained by the method of surveying the project managers of the construction company.

Table 1 – Results of the focus group survey

№ p/p	Topic of the question	Average score
1	Overall efficiency of the logistics strategy	2,6
2	Frequency of delivery delays	2,1
3	Quality of communication with the logistics department	2,3
4	Effective response to urgent requests	2,2
5	Frequency of receiving incorrect or damaged materials	2,7
6	Satisfaction with the delivery tracking process	2,0
7	Inventory management efficiency	2,4
8	Frequency of problems with surplus or lack of materials	2,2
9	Flexibility of the logistics department	2,3
10	Satisfaction with the speed of problem solving	2,1
11	Frequency of project delays due to logistical problems	2,0
12	Cost optimisation efficiency 2	2,5
13	Quality of documentation and reporting	2,6
14	Satisfaction with technological support	2,2
15	Frequency of updates on delivery status	2,1

**Formed by the authors on the basis of the questionnaire*

The expert survey revealed a number of important aspects of the company's activities that can be interpreted as potential risks in international logistics.

One of the most important risks is the delay in deliveries, which can seriously complicate the effective implementation of international projects. Delays caused by internal and external factors can lead to increased operating costs and disruption of order fulfilment deadlines, especially when the cargo passes through customs borders and requires complex documentary support.

The poor quality of communication with the logistics sector, also mentioned by respondents, creates additional risks for international operations, as time zone differences, cultural barriers and language difficulties can lead to misinterpretation of data, which is crucial for supply chain management.

Insufficient technical support for the logistics processes described in the survey participants' responses poses significant risks for international transportation, so it is important to ensure the visibility and control of goods at all stages to prevent loss or damage to goods. Internationally, this aspect becomes even more important due to the large number of logistics links and the complexity of transportation.

In addition, frequent problems with inventory management point to potential threats in the context of international logistics, as fluctuations in demand, seasonality and regional differences make it difficult to ensure the necessary level of inventory, which can lead to shortages or surpluses of goods.

Finally, dissatisfaction with the optimisation of logistics process costs reflects financial risks. High transportation costs and tariffs can increase the cost of the entire project, and inefficient optimisation of these costs can increase the company's financial risks, especially in the event of exchange rate fluctuations and changes in tariff rates.

Risk management strategies cover key approaches and tools to minimise and control risks in international logistics processes. Risk management is an important element of logistics activities, because it allows you to increase the stability of supply chains, reduce costs and reduce the likelihood of negative consequences for the company.

According to the results of the survey, it is advisable to propose several ways and methods of improving the company's activities to reduce risks in the international logistics strategy, which will also be useful for all domestic companies operating internationally.

Table 2 – Methods of risk reduction in the company's international logistics activities

Risk	Risk description	Recommended measures for improvement	Description of events
Delayed deliveries	Delayed deliveries leading to rising costs and breaking deadlines	Route optimisation and monitoring, backup planning, forecasting of time for customs clearance	Implementation of systems for automation of route selection, reservation of alternative carriers, preparation of time for customs
Low quality of communication	Insufficient level of communication with logistics partners due to time zones and cultural differences	Integrated information systems, cultural training, unified document management system	Installation of platforms for real-time data exchange, adaptation training, standardisation of document flow
Insufficient technical support	Risk of loss or damage to goods due to lack of control	IoT implementation, process automation, quality tracking systems	Use of sensors and IoT to monitor the condition of goods, automation of warehouse and transport processes
Inventory management	The threat of shortage or surplus of goods due to the difficulty of forecasting demand	Demand forecasting, automated inventory management, supply chain optimisation	Use of forecasting software, automated inventory management systems
Cost optimisation	Financial risks due to high transport costs and currency fluctuations	Logistics cost analysis, tariff comparison platforms, currency risk management	Search for optimal tariffs, use of financial instruments to protect against currency risks

**Compiled by the authors*

In international logistics, a combined approach to risk management is effective. An integrated approach allows companies to respond more effectively to external changes, optimise costs and ensure the stability of logistics processes. Taking into account the multiple risk factors and characteristics of specific logistics chains, such strategies become an important tool for creating sustainability in international operations.

Conclusions.

The conducted study allows us to conclude that risks in international logistics are

a significant challenge to the stability and efficiency of global supply chains. The main problems identified on the basis of the survey of project managers of the construction company include delays in deliveries, poor quality of communication, lack of technical support, problems with inventory management and high transportation costs. These aspects can not only increase operating costs, but also have a significant impact on the overall competitiveness of the company.

Despite the crisis situation, the Ukrainian logistics industry has demonstrated stability and adaptability. The development of alternative routes and international cooperation are key factors in the further growth of transportation. However, a stable recovery will require investment in infrastructure and modernisation of railway transport.

To overcome these, companies need to implement automated systems for monitoring the logistics process, which constantly monitor the route, the condition of the cargo and compliance with delivery deadlines. In addition, the implementation of modern IT solutions for the integration of logistics data and the improvement of communication between partners contributes to increasing the efficiency and accuracy of information exchange.

One of the key areas is demand forecasting and optimising inventory management, which reduces the risk of a surplus or shortage of goods. The use of forecasting techniques can help reduce dependence on unpredictable market changes and adapt inventory volumes to current demand.

The prospect of overcoming these problems is to increase the company's adaptability to changes in the external environment and increase investment in technological innovations. This allows us to build a flexible logistics system capable of responding quickly to external challenges.

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