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RISK MANAGEMENT IN INTERNATIONAL SUPPLY CHAINS: GEOPOLITICAL AND GEOECONOMIC DIMENSIONS

Mariia Hryhorak, Alona Dimitrova. "Risk management in international supply chains: geopolitical and geoeconomic dimensions". *In the current climate of global instability driven by dramatic geopolitical and geoeconomic transformations, international supply chains face numerous risks that significantly impact the continuity and efficiency of logistics processes. Threats such as military conflicts, port blockades, border instability, climate changes, and cyber threats introduce new challenges for companies, particularly Ukrainian ones, which require adaptive strategies to ensure the resilience of their supply chains.*

The purpose of this study is to systematize key geopolitical and geoeconomic risks affecting international supply chains and to identify optimal approaches to managing these risks under conditions of instability, especially for Ukrainian companies facing heightened threats. The study includes an analysis of global risks based on international scientific literature, specific risks in Ukraine and their impact on import, export, and transit chains, and the development of a generalized risk management model tailored to Ukrainian enterprises.

The research identified effective risk management methods such as supply chain diversification, the creation of alternative routes, and the use of insurance mechanisms. A practical case study on risk management in the import of industrial fasteners illustrates the stages of collaboration with forwarders and carriers, partner selection, and response to disruptions, demonstrating approaches that can be used to minimize the impact of risks.

The findings provide practical recommendations for Ukrainian companies, highlighting an adaptive approach to risk management that will help them maintain competitiveness and ensure supply chain resilience in a rapidly changing global environment. Future research should focus on integrating digital technologies, such as blockchain, artificial intelligence, and big data analytics, to strengthen the resilience and flexibility of international supply chains.

Keywords: management of international supply chains, geopolitical and geoeconomic risks, risk management, transparency and sustainability of supply chains

Марія Григорак, Альона Дімітрова. «Управління ризиками в міжнародних ланцюгах постачання: геополітичний та геоекономічний вимір». *У сучасних умовах глобальної нестабільності, спричиненої кардинальними геополітичними та геоекономічними трансформаціями, міжнародні ланцюги постачання стикаються з численними ризиками, що суттєво впливають на безперервність та ефективність логістичних процесів. Такі загрози, як військові конфлікти, блокування портів, нестабільність кордонів, кліматичні зміни та кіберзагрози, створюють нові виклики для компаній, особливо українських, що потребують адаптивних стратегій для забезпечення стійкості своїх ланцюгів постачання.*

Метою дослідження є систематизація ключових геополітичних та геоекономічних ризиків, що впливають на міжнародні ланцюги постачання, та визначення оптимальних підходів до управління цими ризиками в умовах нестабільності, особливо для українських компаній, які стикаються з підвищеними загрозами. Дослідження включає аналіз глобальних ризиків на основі міжнародної наукової літератури, специфічних ризиків в Україні та їхнього впливу на імпортні, експортні та транзитні ланцюги, а також розробку узагальненої моделі управління ризиками для українських підприємств.

У результаті дослідження було визначено ефективні методи управління ризиками, такі як диверсифікація ланцюгів постачання, створення альтернативних маршрутів і застосування страхових механізмів. Представлений практичний кейс управління ризиками при імпорті промислових кріплень, що ілюструє етапи співпраці з експедиторами та перевізниками, вибір партнерів і реагування на збої, демонструє підходи, які можуть бути використані для мінімізації впливу ризиків.

Отримані результати дозволяють сформувати практичні рекомендації для українських компаній щодо адаптивного підходу до управління ризиками, що допоможе зберігати конкурентоспроможність та забезпечувати стійкість ланцюгів постачання в умовах мінливого глобального середовища. Майбутні дослідження доцільно зосередити на інтеграції цифрових технологій, таких як блокчейн, штучний інтелект та аналітика великих даних, для посилення стійкості міжнародних ланцюгів постачання та підвищення їхньої гнучкості.

Ключові слова: управління міжнародними ланцюгами постачання, геополітичні та геоекономічні ризики, управління ризиками, прозорість і стійкість ланцюгів постачання.

Introduction. In today's conditions of globalization and rapid development of the world economy, international supply chains face an ever-increasing level of risks. Geopolitical conflicts, trade wars, economic sanctions and other external factors significantly affect the functioning of global supplies, endangering the stability and reliability of the supply of goods and services to world markets. Events in recent years, including the COVID-19 pandemic and military aggression on the territory of Ukraine, have highlighted the vulnerability of global supply chains and the need for effective risk management.

The issue of geopolitical and geoeconomic risks, which create additional challenges for companies involved in international trade, and also require new approaches to risk analysis and management, is of particular importance. The relevance of this direction of research is due to the need for new practices and tools that will allow businesses to quickly adapt to changes in the external environment, minimizing losses and ensuring the sustainability of their supply chains.

Literature Review. In today's climate of global uncertainty, comprehensive risk management in international supply chains is a critically important task. This is why the scientific literature reflects various aspects of risk management in international supply chains, including the identification and classification of risks, as well as approaches and tools for managing and mitigating those risks. Nearly 20 years ago, renowned scholars Kleindorfer & Saad wrote about the necessity of developing proactive risk management strategies within supply chains and described the consequences of potential disruptions [1]. The need for coordination and collaboration among supply chain partners to prevent possible disruptions and mitigate potential impacts has been substantiated in numerous later publications, such as those by Manuj & Mentzer [2], Christopher M. et al. [3], and others. Several publications, including [4-6], provide critical literature reviews on risk management challenges within supply chains.

A new wave of interest in risk management for international supply chains emerged following the start of the global COVID-19 pandemic. Some authors have described this phase as an era of global uncertainty and vulnerability. One of the first attempts to assess the pandemic's impact on global supply chains is presented in work [7]. Madzík P. et al. [8] drew attention to the issue of supply chain resilience, which has since been explored in greater depth in studies [9-11].

Among the latest publications focused on risk management in international supply chains, significant attention is given to the use of digital technologies to reduce vulnerabilities and enhance resilience. Studies [12-13] examine a variety of risks that modern supply chains face, from natural disasters and geopolitical tensions to cyber threats and disruptions in global trade. Researchers have studied how technological innovations such as blockchain, the Internet of Things (IoT), artificial intelligence (AI), and predictive analytics are transforming traditional risk management approaches, enabling real-time visibility, data-driven insights, and proactive mitigation strategies. Authors [14] have shown that big data analytics can increase transparency, improve operational efficiency, and allow the detection of hidden risks that traditional methods cannot identify.

It is also worth noting that Ukrainian scholars, such as Makarenko M. and Kovalenko I. [15], Kharsul L. and Kovalenko Y. [16], and others, have contributed to research on risk management in supply chains. T. Anufrieva's work [17] investigates the unique challenges of managing supply chains for perishable goods in the context of Ukrainian business practices, while article [18] emphasizes risk reduction in cold chain logistics. Publications [19-21] focus on identifying geopolitical and geo-economic factors affecting supply chain management. Studies [22, 23] address opportunities for increasing transparency and resilience in supply chains through the use of modern information and communication technologies and digital tools.

To conclude this literature review on risk management in international supply chains, it can be stated that the process is multifaceted and complex. The factors that comprise and intensify risks are constantly evolving under the influence of geopolitical and geo-economic factors. This necessitates a coordinated approach among supply chain partners, the development of new structures and risk management models, and the search for effective tools for mitigating or offsetting the effects of potential risks. Thus, it can be inferred that current supply chain risk analysis cannot fully address all related risks, which, in turn, are gaining influence and creating a cascading negative effect. In other words, with the rapid changes in the market, it is essential to continuously update information and study the issue of risks and their impact on business activities.

The aim of the research is to systematize key geopolitical and geoeconomic risks impacting international supply chains and to

identify optimal approaches to managing these risks under conditions of instability, particularly for Ukrainian companies facing elevated threats due to current political and economic challenges.

To achieve this objective, the following tasks were set:

- summarize global geopolitical and geoeconomic risks based on international research, identifying their main characteristics and impact on international supply chains;
- analyze specific risks in Ukraine, including military actions, blocked ports, and borders, with a focus on their impact on import, export, and transit supply chains;
- develop a generalized risk management framework for Ukrainian companies, considering all types of potential threats, and evaluate the effectiveness of proposed methods in reducing supply chain vulnerability;
- present a practical case study of risk management for the supply of imported fasteners, illustrating stages of collaboration with forwarders and carriers, partner selection, and response to disruptions, and demonstrate approaches that can be used to minimize risk impacts.

These tasks provide a comprehensive approach to studying risks in international supply chains and formulating recommendations aimed at enhancing business resilience amid global and local challenges.

Research Methodology. The following research methods were employed in preparing the article analyzing geopolitical and geoeconomic risks and their impact on international and Ukrainian supply chains:

Critical Literature Analysis Method. This involved analyzing and systematizing scientific sources, including international studies on geopolitical, geoeconomic, climate, and technological risks. Various perspectives on these risks were compared, allowing for the identification of common patterns and gaps in the existing research.

Data Generalization and Systematization Method. Data from various sources (international and Ukrainian studies) were structured to form a generalized framework of risks and their impact on logistics processes. Using the generalization method enabled the presentation of key risk types encountered by Ukrainian companies and the proposal of corresponding risk management strategies.

Comparative Analysis Method. This method compared the impact of risks in Ukraine with similar international risks, highlighting the unique characteristics of local risks and their interaction with global threats.

Case Study Method. The case study method was applied to examine specific examples of risk management in supply chains by Ukrainian companies. This helped to practically illustrate the impact of both international and local risks on logistics and company operations, as well as methods for mitigating these risks.

Graphic Analysis Method. A risk framework was created for a visual representation of the interconnections between risks and management strategies for Ukrainian companies. The graphic method helped to clearly structure the data and demonstrate the summarized results.

These methods collectively enabled an in-depth exploration of the issue of risks in international supply chains and provided practical recommendations for their management.

Presentation of the main results. In the modern international trade system, supply chains face heightened risks associated with geopolitical and geoeconomic factors. The integration of national economies and reliance on global supplies increase their vulnerability to political and economic conflicts. Geopolitical risks, particularly military conflicts and political instability, such as the war between russia and Ukraine, disrupt the supply of energy resources, food, and raw materials [21].

Geoeconomic risks, including economic sanctions and trade restrictions, also reshape supply chain structures, as seen during the trade war between the United States and

China. For Ukrainian companies, these risks are intensified by export restrictions, currency fluctuations, and new EU trade quotas. In response, companies must adapt their strategies to increase resilience and reduce dependence on unstable external markets [25].

Analysis of global supply chains indicates a growing impact of geopolitical and geoeconomic risks on the stability of the global economy and the continuity of trade relations. Foreign studies highlight the complex nature of these risks, encompassing both traditional geopolitical conflicts and new economic restrictions and challenges arising from global changes in foreign economic policies. According to research by Heckmann et al. [27], military actions can cause supply disruptions, block strategic trade routes, and negatively impact the entire supply chain. For example, conflicts in the Middle East and the war in Ukraine have significantly reduced the availability of oil and gas, which are critical for many industries. These conflicts have also led to logistical delays, increased insurance costs, and disrupted transport routes.

Geoeconomic risks are reflected in changes to countries' trade policies, an increase in economic sanctions, and the implementation of protectionist measures aimed at safeguarding national markets. The trade war between the U.S. and China has become one of the most prominent examples of these risks, leading to widespread reevaluation of existing supply chains. This results in increased customs processing costs, product quotas, and restrictions on the export of high-tech products, which complicate international trade and restrict access to strategically important resources.

In addition, currency fluctuations significantly impact global companies, especially when planning long-term contracts. Exchange rate instability can cause price volatility, affecting companies' competitiveness in external markets. Lastly, the COVID-19 pandemic and the subsequent post-pandemic crisis have greatly exacerbated logistical risks. Due to port shutdowns and route blockages, many companies were forced to redirect supplies or even localize production to reduce logistics costs.

According to recent studies and statistical data from international organizations, short-term critical economic and geopolitical risks for the global economy include inflation, economic recession, interstate armed conflicts, and geoeconomic confrontation. However, in the long term, the primary risks shift toward climate and technological threats, such as extreme weather events, critical changes in ecosystems, resource scarcity, and the adverse effects of technological advancements, particularly artificial intelligence and cybersecurity (see Fig. 1). This shift is associated with trends in globalization, technological progress, and growing dependence on natural resources, which lead to changes in the global risk landscape.

This research illustrates the key risks that may impact international supply chains and global operations in the short term (2 years) and the long term (10 years). The difference between short- and long-term risks lies in the fact that, in the short term, sudden threats dominate, such as disinformation, cybersecurity issues, and economic fluctuations, which quickly affect supply chains. In contrast, long-term risks reflect cumulative effects, including climate change and resource scarcity, which are structural in nature and require strategic preparation to ensure resilience in the future.

Short term (2 years)	
1st	Misinformation and disinformation
2nd	Extreme weather events
3rd	Societal polarization
4th	Cyber insecurity
5th	Interstate armed conflict
6th	Lack of economic opportunity
7th	Inflation
8th	Involuntary migration
9th	Economic downturn
10th	Polution
11th	Critical change to Earth systems
12th	Technological power concentration
13th	Natural resource shortages
14th	Geoeconomic confrontation
15th	Erosion of human rights

Long term (10 years)	
1st	Extreme weather events
2nd	Critical change to Earth systems
3rd	Biodiversity loss and ecosystem colapse
4th	Natural resource shortages
5th	Misinformation and disinformation
6th	Adverse outcomes of AI technologies
7th	Involuntary migration
8th	Cyber insecurity
9th	Societal polarization
10th	Polution
11th	Lack of economic opportunity
12th	Technological power concentration
13th	Concentration of strategic resource
14th	Censorship and surveillance
15th	Interstate armed conflict

Figure 1 – Global Risks Ranked by Probable Impact (Severity) over 2-Year and 10-Year Periods
Source: [25]

The impact of geopolitical and geoeconomic risks on international supply chains (SC) is among the most significant and unpredictable, as these risks directly influence the stability and availability of supply channels and resources in the global economy. In the context of globalization, international SCs are particularly vulnerable to geopolitical crises, armed conflicts, trade sanctions, and other forms of geoeconomic confrontation (Table 1). Geopolitical and geoeconomic risks, as indicated in the previous figure, are important factors influencing international supply chains in both the short and long term. Short-term risks, such as armed conflicts and economic sanctions, create sudden supply disruptions, reducing the reliability of supply chains. Meanwhile, in the long term, factors like resource depletion and increasing protectionism gradually undermine the stability of global supply chains, necessitating diversification and adaptation to new conditions.

Cyber threats have become one of the key challenges to business security due to their potential to cause strategic-level damage. Vulnerability to cyberattacks from hostile states or organizations can disrupt company operations, lead to the leakage of critical data, and even pose a threat to national security. Addressing this risk is essential for maintaining operational stability and safeguarding reputation, as the damage from cyber incidents can have long-term effects, impacting financial performance and customer trust.

Today, cyber threats have gained particular importance due to the increasing digitalization and dependence on global supply chains. The growing number of connected devices and systems, including critical infrastructure, creates additional opportunities for cyberattacks, which can have a cascading effect. Disruption in the operations of even a single company can trigger chain reactions affecting other businesses and government structures.

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Table 1 – Impact of Geopolitical and Geoeconomic Risks on International Supply Chains

Risk Category	Risk Impact Description	Risk Management Methods	Recovery Speed
1. Geopolitical	Interstate conflicts, territorial disputes, military actions: cause logistical delays, loss of goods, increased transportation costs, and instability.	Diversification of routes and suppliers, geopolitical monitoring and forecasting, contingency supply plans.	From several months to a year, depending on the scale of the crisis and the company's emergency preparedness.
1.1. Sanctions Policy	Embargoes, trade sanctions: limit access to certain markets, restrict trade of strategic goods, and force companies to adjust routes and supply sources.	Market and supply source diversification, adaptation of supply chains to new conditions, search for alternative markets.	Recovery speed depends on the business's ability to shift to new markets and the availability of alternatives.
2. Geoeconomic	Changes in economic policy (trade wars, currency manipulation, tariff adjustments): complicate trade conditions, affect the cost and availability of goods.	Reducing dependence on specific markets, adapting to currency fluctuations, seeking alternative sources of raw materials and markets.	From several months to several years in case of significant changes in global markets.
2.1. Investment Risks	Decreased investment appeal, trade barriers: reduce economic growth and foreign investment flows.	Development of strategies to attract investment in stable sectors, focus on localization of production.	Depends on the presence of long-term investment programs, potentially lasting a year or more.
2.2. Infrastructure Risks	Military conflicts in transportation hubs (ports, corridors): complicate or completely halt logistics processes due to infrastructure damage.	Localizing warehouses, creating backup routes, and alternative supply chains.	Depending on infrastructure damage, recovery may take from several months to years.
2.3. Cyber Threats	Use of foreign equipment and software in corporate networks can provide hostile countries with access to confidential data, posing threats to both commercial and national security.	Reducing dependence on foreign-made components and software from potentially threatening countries is recommended. Cybersecurity measures such as network and software audits, multi-factor authentication, mandatory data encryption, and regular threat monitoring are crucial.	Recovery depends on business continuity plans and the effectiveness of measures like data backups, well-defined incident response protocols, and access to reliable tools for operational recovery.

This makes cybersecurity not only a matter of technological resilience but also a crucial condition for economic and national stability.

Preventing this risk requires implementing comprehensive cybersecurity measures. These include using nationally certified technologies, multi-level authentication, regular threat monitoring, and planning backup strategies for rapid operational recovery following incidents. Government initiatives and international

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standards also play an essential role, enhancing business security and data protection at a global level.

Thus, geopolitical and geoeconomic risks are among the most serious for international supply chains, and their impact necessitates complex strategies, including supplier diversification, production localization, and global market monitoring.

Let us examine in more detail the characteristics of risks to international supply chains in Ukraine, summarized in Figure 2.

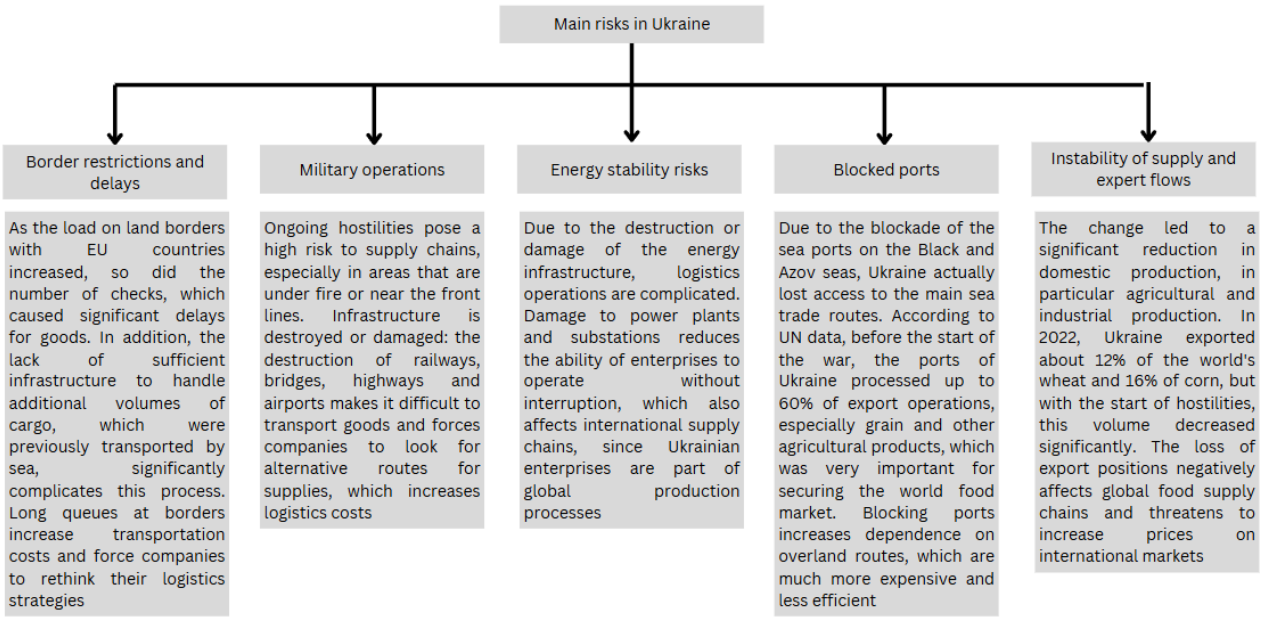

Figure 2 – Classification of Major Risks in Ukraine
Source: (summarized by [20; 25-26])

The military actions in Ukraine constitute one of the largest conflicts since World War II. Unlike global geopolitical risks, which often involve general economic confrontation or trade restrictions, the situation in Ukraine is unique due to active combat on the country's territory. For instance, in other regions facing trade or geopolitical confrontations, infrastructure usually remains intact, allowing for relatively stable logistics. In Ukraine, however, physical risks have a more pronounced and lasting impact due to widespread destruction of infrastructure, closed airspace, blockades of seaports, and restrictions at border crossings.

Military actions and associated risks in Ukraine have drastically altered the geography of import, export, and transit supply chains (see Table 2). Port blockades, instability of transport routes, difficulties in accessing traditional logistical corridors, and the need for new logistical strategies have significantly impacted international trade and transport infrastructure.

The risks associated with the armed conflict in Ukraine are more concentrated and have a direct impact on the country's logistical infrastructure. Unlike international risks, which generally manifest as trade restrictions or currency fluctuations, the risks in Ukraine involve physical destruction of transport and energy infrastructure, leading to a more prolonged and profound impact on supply chains. International risks are mostly tied to sanctions and trade barriers, while Ukraine's challenges include port blockades, damage to rail and road networks, making the impact immediate and more difficult to overcome.

Table 2 – Impact of Risks in Ukraine on the Geography of Import, Export, and Transit Supply Chains

Category	Impact Description	Main Routes and Changes	Key Issues and Consequences
Geography of Import Chains	Changes in sources of energy supplies, medical products, and raw materials.	Key energy suppliers are now EU countries (Poland, Germany, Lithuania); reorientation to land corridors via Ukraine's western border.	Increased dependence on European suppliers, rising logistics costs.
Geography of Export Chains	Restrictions on maritime exports due to port blockades, especially affecting grain, a major Ukrainian export.	Shift to land export routes (rail and road) through the western border. Primary transit countries are Poland, Romania, and Hungary.	High transport costs, delays due to limited capacity.
Transit Supply Chains	Ukraine lost its role as a key transit corridor between Europe and Asia due to port blockades and armed conflict.	Alternative routes now run through Poland, Turkey, and the Trans-Caspian corridor (Kazakhstan, Azerbaijan, Turkey).	Decline in Ukraine's transit potential, need for investment in alternative routes, high costs of new routes.

Source: (summarized by [19-22])

Changes in the geography of import, export, and transit routes pose a significant challenge for supply chains. In Ukraine, it is essential to develop infrastructure on the western border, strengthen rail and road connections, and explore new logistics strategies. International companies and governments involved in supply processes must also adapt to these new realities, investing in the development of transport infrastructure and the search for secure routes, particularly through Central Asia and the Middle East.

Consider the generalized framework (Figure 3), which outlines the primary risks faced by Ukrainian companies in international supply chains and the corresponding risk management strategies.

This framework enables Ukrainian companies to respond effectively to a wide range of risks related to international supply chains and to minimize their impact on operational activities.

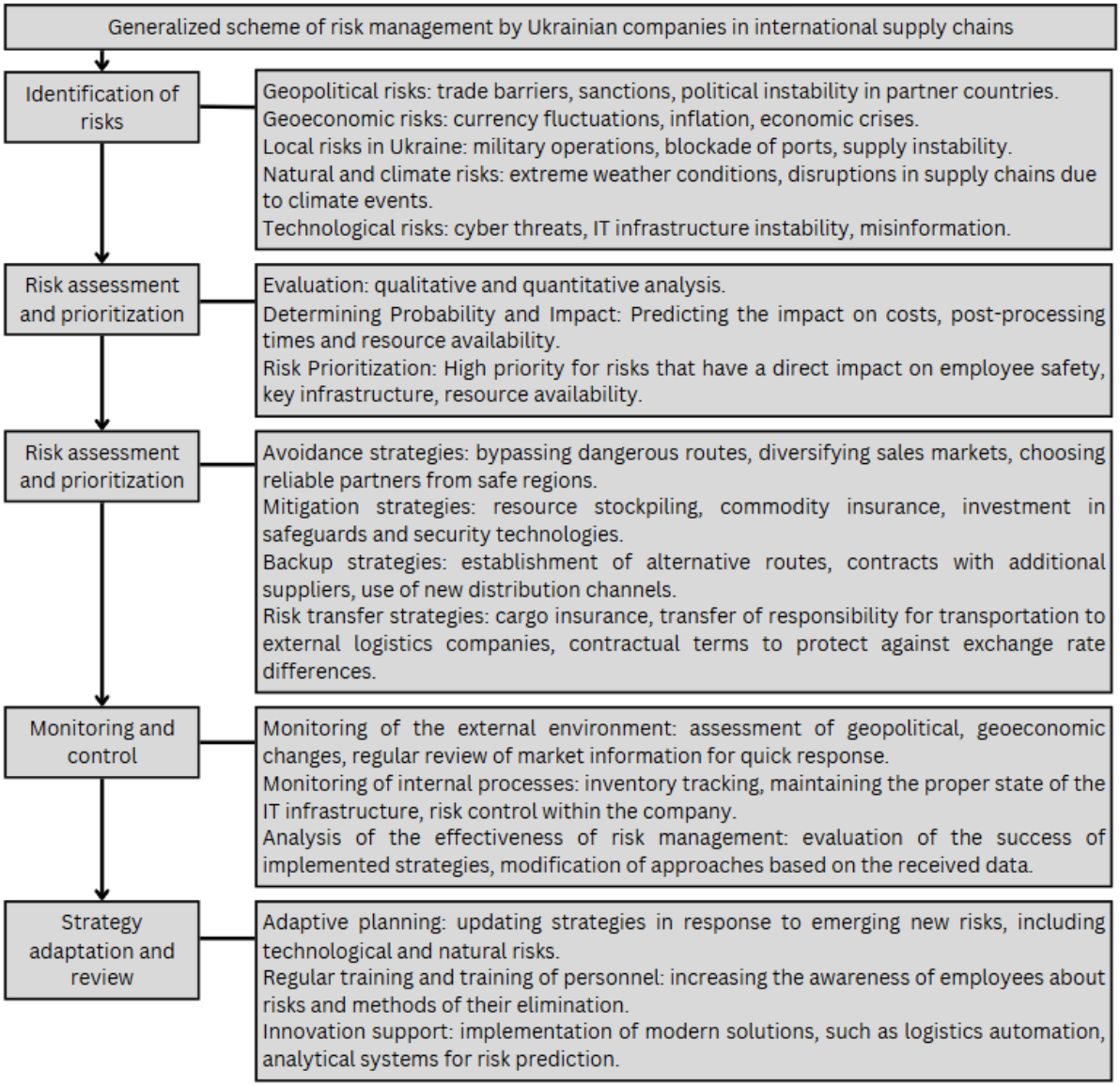

Figure 3 – Generalized Risk Management Framework for Ukrainian Companies in International Supply Chains

Case Study. Let's examine the improvement of risk management systems using the example of "Soldi & Co." This company is a production and commercial enterprise specializing in the supply of fasteners, construction chemicals of its own production, and products from well-known global manufacturers, making it one of the largest importers of fasteners. Since the company's activities are directly tied to the need for transporting goods from Asia and Europe, it faces supply chain risks.

Through analyzing "Soldi & Co." operations, we identified that the main supply chain risks for fasteners include: military actions in Ukraine (prolonged conflict creates instability in the business environment, affecting legislation and business conditions), border delays (queues at customs checkpoints, changes in customs procedures, and closures of certain crossing points), and increased supply costs (border blockades, fuel shortages, and military actions lead to higher transportation costs). Many of these risks can be mitigated through proper planning of

transportation. Therefore, considering the number of risks involved in planning and executing product transportation, particularly from Europe, we will look at optimizing the tender procedure for selecting freight forwarders.

The first and crucial step in optimizing the tender procedure for selecting forwarders is defining the key criteria (see Fig. 4) on which the selection is based. The main criteria to be considered are price, reliability, speed, and reputation. These indicators are essential in ensuring the efficiency of logistical operations, minimizing risks, and guaranteeing the stability of supplies.

Selecting forwarders based on these criteria is critical to optimizing the company's entire logistics network. Balancing price, reliability, speed, and reputation not only helps reduce costs but also enhances operational efficiency, minimizes supply disruption risks, and improves end-customer satisfaction.

The process of selecting reliable freight forwarding companies is vital to the effective organization of logistics in any business, particularly for "Soldi & Co." Developing this process should consider a range of factors, including both finding new potential partners and assessing the risks of working with them. Since many forwarders actively market their services through advertising and other channels, it is important to ensure a systematic approach to their selection and verification. It's also worth considering collaboration with companies with whom logistics projects have previously been successful, while continually assessing risks to ensure consistent quality and reliability.

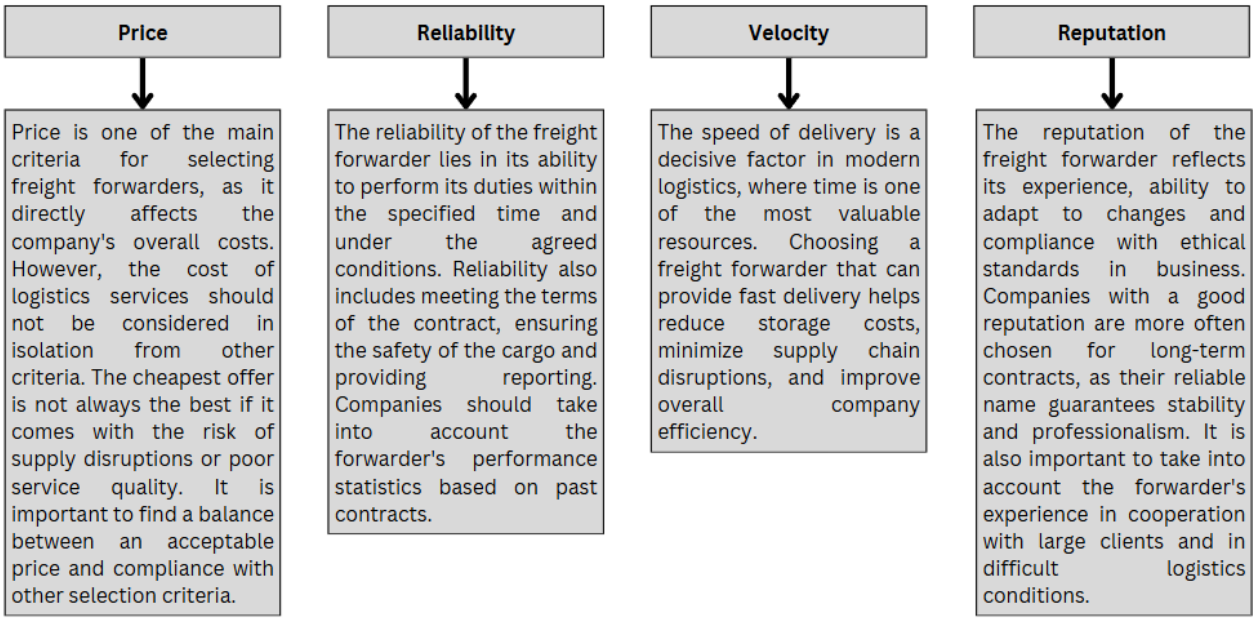

Figure 4 – Key Criteria for Selecting Freight Forwarders for Transportation Planning by "Soldi & Co."

Finding Potential Forwarders. The process of searching for new forwarders relies on multiple channels and tools. First, significant attention should be given to recommendations from partners and other companies with whom there are established business relations. This allows for initial evaluations of forwarders' service quality based on real feedback. Additionally, companies can utilize promotional offers from freight forwarding firms received through various channels (email, phone calls, online advertising). However, these sources require thorough preliminary vetting.

Another important step in finding potential forwarders is market research

through tenders. Conducting open tenders allows new participants to be involved and increases competition among forwarders, which positively influences the selection of the best cooperation terms.

Risk Assessment in Collaboration. Assessing risks when working with new or existing forwarders is a key step to minimizing potential losses and ensuring the continuity of logistics operations. One of the initial steps in risk assessment is verifying the legal status of forwarding companies. The legal department of "Soldi & Co." conducts integrity checks, including an analysis of court cases, financial reporting reviews, and verification of compliance with applicable laws. This process should also cover examining the presence of necessary licenses and certifications that confirm the right to carry out forwarding activities.

In addition to legal verification, the company should consider past collaboration performance. It is important to analyze whether forwarders met their obligations in the past and if there were any delays in delivery or cargo damages. Assessing a company's financial stability is also essential to minimize risks of contract non-fulfillment due to bankruptcy or other financial issues.

Additional Measures to Reduce Collaboration Risks. Beyond legal checks, the company can apply additional mechanisms to minimize logistics-related risks. One such tool is cargo insurance, which provides financial protection against cargo damage or loss during transportation. Insurance also mitigates risks in the event of unforeseen circumstances, such as delays due to weather conditions or force majeure.

An important aspect of risk management is monitoring contract performance during collaboration. The company should implement systems for ongoing oversight of the forwarder's fulfillment of obligations, enabling early detection and resolution of potential issues.

Effective logistics management requires not only careful selection of forwarders but also continuous monitoring of service quality. Implementing a quality control system is a key step in ensuring the stable and reliable operation of forwarding companies in long-term partnerships. This requires using a system of Key Performance Indicators (KPIs) and regularly assessing service compliance with established standards.

Key Performance Indicators (KPIs) are the main tools for quantifying forwarders' performance. They allow objective measurement of results achieved and comparison with expected standards. Important KPIs for controlling forwarders' service quality include [6]:

- On-time Delivery Rate: this indicator measures the percentage of deliveries completed on time according to agreements and contracts. It is a crucial metric affecting customer satisfaction and the stability of logistics processes.
- Damage Rate: this KPI monitors the frequency of cargo damage during transportation. A high damage rate indicates the need to reassess the collaboration with the forwarder or improve transport conditions.
- Cost per Delivery: an important metric that assesses cost efficiency per delivery by comparing actual costs with planned ones. This helps the company control expenses and adjust financial plans.
- Communication & Reporting Efficiency: this indicator evaluates how promptly and effectively the forwarder provides delivery reports and communicates with the company in cases of delays or issues.
- Contract Compliance: a KPI that measures the forwarder's adherence to contract terms, including timelines, service standards, and contractual transportation volumes.

To ensure long-term quality control, it is necessary to implement regular evaluations of forwarder performance. This assessment should occur quarterly or annually, depending on the intensity of collaboration. Evaluations should be based on data derived from KPI analysis and include qualitative

aspects, such as client feedback and internal audits.

Implementing a quality control system for services is also an essential stage in collaborating with forwarding companies. Various quality control models can be implemented for managing forwarders. Among the most effective systems are the Balanced Scorecard (assesses forwarders based on financial indicators, customer satisfaction, internal processes, and partnership development), Six Sigma (enables systematic improvement of forwarders' service quality by analyzing reasons for delays or cargo damage), and ISO 9001 (certification confirms that quality management processes meet international standards).

A quality control system not only enhances logistics processes but also plays a crucial role in strategic risk management. Continuous monitoring of key indicators enables quick identification and timely response to issues, reducing risks for the company. Moreover, regular evaluations help maintain high forwarder productivity levels and ensure that their services meet the company's requirements. (Table 3)

Table 3 – Use of Various Tools to Improve the Collaboration Process with Freight Forwarding Companies

Type of Tool	Description	Application Example
Insurance Instruments	An effective mechanism for minimizing financial losses in case of cargo damage, delivery delays, or force majeure events. Cargo insurance helps reduce risks associated with logistical issues and guarantees compensation for losses due to unforeseen events.	Cargo Insurance: company can enter agreements with insurance companies to cover risks of cargo damage or loss during transit. This can be a contract condition with freight forwarders who bear responsibility for insurance compliance. Freight Forwarder Liability Insurance: Company may require forwarders to provide proof of professional liability insurance to cover risks in case of contract violations.
Reserve Funds	Created to ensure the company's financial stability during crisis periods. These funds can be used to cover unforeseen costs related to delivery delays or increased logistics costs. Such funds allow "Soldi & Co." to maintain liquidity and support stable operations even amid economic or political instability.	Crisis Expense Fund: The company can establish an internal reserve fund designed to cover unexpected expenses arising from delays or additional costs for alternative routes. For example, in case of unpredictable fuel cost increases or route blockages, the reserve fund can help stabilize financial operations. Compensation Fund: If a forwarder fails to meet obligations, this fund can be used to compensate clients for delays or undelivered goods, minimizing negative reputational impact.
Information Technology	Enables real-time monitoring and prompt response to potential risks. Use of cargo tracking systems, data processing automation, and crisis prediction tools improves logistics management efficiency. IT solutions also enhance communication with forwarders and allow quick plan adjustments in case of unforeseen circumstances.	Logistics Management IT Platforms: Specialized IT solutions automate route planning, risk assessment, and interactions with forwarders. These systems help optimize delivery costs and improve delivery time predictions. Big Data Analysis: Using information technology for collecting and analyzing large data volumes can help predict potential risks such as delays due to weather, economic changes, or other logistics-impacting factors.

Improving the collaboration process with forwarding companies at "Soldi & Co." entails a comprehensive approach to risk management, including the use of insurance tools, reserve funds, and information technologies for crisis management.

Thus, the use of insurance tools, reserve funds, and modern information technologies provides a comprehensive approach to crisis management, enhancing "Soldi & Co." resilience to external risks and supporting the stability of logistics operations.

Conclusions and Further Research Prospects. In the current global landscape marked by instability, this study systematically examines key geopolitical and geoeconomic risks impacting international supply chains, with a focus on defining effective risk management approaches. The research specifically addresses challenges faced by Ukrainian companies, which contend with heightened threats due to ongoing political and economic disruptions.

Determined through a synthesis of international research, the primary geopolitical and geoeconomic risks impacting global supply chains are categorized and assessed for their direct and indirect effects on operational stability. This systematic evaluation allows a clearer understanding of critical vulnerabilities, enabling companies to proactively adapt to fluctuating global conditions and thereby strengthen overall supply chain resilience.

Justified by a targeted analysis, specific risks affecting Ukrainian supply chains—such as military conflicts, port blockades, and border instabilities—are identified as significant disruptors to import, export, and transit processes. Addressing these challenges within the Ukrainian context allows for the development of tailored risk management strategies, facilitating supply chain continuity despite high-risk regional conditions.

Developed as a comprehensive framework, the proposed risk management strategy for Ukrainian companies incorporates key mitigation tactics, including supply chain diversification, alternative route creation, and the application of insurance mechanisms. This framework's design allows for adaptive responses to both immediate and systemic threats, enhancing the resilience of supply chains against external disruptions and operational instabilities.

Recommended as part of this study, the practical case study involving the import of industrial fasteners provides a concrete example of adaptive risk management. By detailing processes such as partner selection, contingency planning, and response to disruptions, this case allows Ukrainian companies to adopt proven strategies, thereby reducing the impact of interruptions on supply chain effectiveness and stability.

In conclusion, this research provides empirically grounded recommendations for Ukrainian companies seeking to minimize the adverse effects of both external and internal risks on their supply chains. By adopting a proactive, adaptive risk management approach, Ukrainian enterprises can maintain competitive resilience and supply chain stability, despite ongoing global and regional uncertainties. The findings underscore the necessity of continuous risk assessment and strategic flexibility as key components for navigating the complex dynamics of international supply chains.

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