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IMPACT OF GLOBAL ECONOMIC AND POLITICAL FACTORS ON LOGISTICS AND TRANSPORTATION

Summary. *The article presents an extensive investigation of the influence of contemporary global economic-political factors on the field of logistics and freight transportation. The purpose of the study is to systematize the main challenges — trade wars, pandemic restrictions, international sanctions, and inflationary processes — and to assess their combined impact on the resilience and efficiency of supply chains. The methodological basis of the research comprises a systems analysis of relevant scientific publications for 2021–2025, statistical data, and specialized industry analytical reports. As a result, a multi-level conceptual model of adaptive management of logistics processes is proposed, integrating mechanisms of risk monitoring, scenario planning, and strategic diversification. The obtained data indicate that the proactive implementation of adaptive strategies not only minimizes damage from global shocks but also generates significant competitive advantages. The conclusion emphasizes the need to shift from a reactive to a predictive approach in managing logistics risks. The materials of the article are of interest to researchers in the field of logistics and supply chain management, as well as to executives of transport companies and strategic planning specialists.*

Key words: *logistics, supply chains, global economic factors, political risks, supply chain resilience, risk management, COVID-19 pandemic, trade wars, transport corridors, adaptive management*

Introduction. The modern global economy is characterized by interdependence among regions and escalating instability generated by a combination of large-scale economic and political factors. The logistics sector and freight transportation, acting as the pulse of global commodity circulation, are the first to face external shocks and serve as a channel for their further transmission. In recent years, traditional supply-chain arrangements have demonstrated their vulnerability: the COVID-19 pandemic, which began in 2020 g., caused widespread terminal disruptions, border closures, rolling-stock shortages, and a rapid rise in freight rates that reached record levels by the end of 2021 g. Although by 2023 g. container-shipping tariffs had returned to more familiar levels, new geopolitical risks and escalating tensions once again triggered higher logistics costs and necessitated the restructuring of transport routes [1].

According to the United Nations Conference on Trade and Development (UNCTAD), after unprecedented growth in the volume of world merchandise trade in 2021 g., a slowdown was observed in 2022 g., and in 2023 g. the overall volume declined by approximately 5 %, which inevitably affected the load on transport networks. Forecast estimates for 2025 g. remain rather restrained, pointing to persistent uncertainty associated with deepening geopolitical fragmentation and the strengthening of protectionist measures by the world's leading economies [2].

The necessity of this research is driven by changes in the logistics operating environment: the era of relative equilibrium has been replaced by a state of constant crisis that requires companies to shift from reactive responses to the development of long-term strategies for enhancing resilience. The scientific

literature lacks models capable of comprehensively assessing the aggregate impact of heterogeneous economic and political risks and offering integrated management mechanisms aimed at strengthening supply-chain resilience. Existing studies generally limit themselves to analyzing the consequences of individual events, such as pandemics or trade conflicts, and do not provide universal tools for adaptation to continuously changing conditions.

The purpose of this study is to systematize the main challenges—trade wars, pandemic restrictions, international sanctions, and inflationary processes—and to assess their combined impact on the stability and efficiency of supply chains.

The author's hypothesis is based on the assumption that integrating real-time monitoring mechanisms, scenario planning, and strategic diversification at the operational, tactical, and strategic levels can reduce the adverse effects of global shocks on logistics systems.

The scientific novelty of the research lies in the systematization of the economic and political determinants of the current macro-environment and, on this basis, in the formulation of a multi-level conceptual model for adaptive logistics management under conditions of high uncertainty.

Materials and Methods. Contemporary studies conducted in the field of logistics and transportation rely on macro- and meso-level statistical indicators that make it possible to track market dynamics and assess the influence of external shocks. For example, the World Container Index provides regular data on container freight rates, reflecting fluctuations in supply and demand within the global network of maritime lines [1], while the UNCTAD Review of Maritime Transport 2023 analyses long-term trends in ports, fleets and cargo throughput, combining descriptive statistics with expert forecasts [2]. The WTO Global Trade Outlook and Statistics complements these data with a survey of trade flows and policy barriers in international trade [9], whereas the US Energy Information

Administration's Short-Term Energy Outlook links fuel-price fluctuations with carrier costs and resource availability [10].

Among the studies devoted to politico-economic impacts, Salsabila I. N. et al. [5] perform an econometric analysis of the consequences of new US tariff measures on supply chains, paying attention to technological and logistical shifts caused by protectionism. The Interos blog Impact of government sanctions on Russia's supply chain examines the case of sanctions against Russia through the prism of qualitative supply-chain analysis, demonstrating how restrictions create new routes and strengthen regional diversification of suppliers [6].

The body of work on epidemic and pandemic risks focuses on systematising the experience of COVID-19 and developing response models. Chowdhury P. et al. [4] carry out a systematic review of studies devoted to supply disruptions and their consequences, structuring publications into six themes: risk management, chain transparency, return to normality, and so forth. Queiroz M. M. et al. [8] build a road map of research on epidemic disruptions through a structured literature review, highlighting gaps in empirical data and forecasting models. Ivanov D. [3] proposes a conceptual model of a viable supply chain that integrates the perspectives of agility, resilience and sustainability, supported by illustrative examples from the COVID-19 crisis.

In the fields of antifragile design and supply-chain performance assessment, authors employ mathematical modelling and empirical methods. Lotfi R. et al. [7] develop mixed-integer network-optimisation models that consider requirements for antifragility, risk resilience and environmental impact. Salam M. A., Bajaba S. [12] investigate the mediating role of resilience and absorptive capacity in the marketing–supply-chain-management–firm-performance nexus using a moderation–mediation analysis of an empirical sample. Alora A., Barua M. K. [11] conduct an event study showing how supply-chain disruptions affect the stock value of small and medium-sized enterprises and identify temporal lags for local versus global shocks.

Thus, the literature presents a broad spectrum of approaches — from descriptive statistics and indicator analysis to econometric modelling and computer-based optimisation design, as well as systematic reviews. However, several contradictions can be identified:

1. Level of data aggregation: macro-level sources (UNCTAD, WCI, WTO, EIA) rarely connect their findings with micro- and meso-level models of resilience and antifragility.

2. Many theoretical models require validation on real data and cases, whereas empirical studies are limited by samples and do not derive from a unified conceptual framework.

3. Geographical selectivity: the focus on COVID-19 is not sufficiently related to subsequent geopolitical shocks and energy crises (EIA).

In addition, comprehensive scenarios in which trade wars, sanctions and energy shocks act simultaneously are insufficiently covered in the research — in particular, the mutual influence of political restrictions and fuel-price fluctuations on optimal routes and strategic reserves. Furthermore, there is a lack of studies devoted to digital transformation and IoT technologies for overcoming politico-economic barriers, as well as to the impact of blockchain systems on the transparency and security of global supply chains.

Results and Discussion. A comprehensive analysis of global economic and political trends reveals multi-level direct and mediated influences on transport-logistics systems. The classification of these determinants into two interrelated categories — economic and political — makes it possible to demonstrate how their interaction generates synergistic effects that exert a deeper impact on logistics processes than the isolated manifestation of each individual factor. Table 1 presents the aggregate of factors and their direct impact on the operational aspects of logistics.

Table 1

Impact of key global factors on logistics

Factor category	Factor	Description	Primary impact on logistics	Example
Economic	Pandemic shocks	Sudden disruption of production and logistics chains due to quarantines, staff illness, port closures.	Reduced throughput, container shortage, freight-rate increases, delivery delays.	Closure of Shanghai port in 2022, which caused collapse on many trade routes.
Economic	Inflation and fuel price volatility	Increase in consumer prices and cost of energy resources caused by monetary policy and supply–demand imbalance.	Growth of operating costs (fuel, storage, labor), reduced profitability of transportation.	Record rise in diesel prices in 2022, which increased the cost of road transport by 20–30 %.
Economic	Trade wars and protectionism	Introduction of import tariffs and non-tariff barriers restricting free movement of goods.	Change in cargo-flow geography, complication of customs procedures, cost growth, need for certification.	US–China trade conflict that shifted part of production to Vietnam and Mexico.
Political	International sanctions	Economic restrictions imposed on countries, companies, or individuals that forbid certain types of transactions and transport.	Blocking of traditional routes, necessity to find bypass routes, increased risk of secondary sanctions, complication of insurance.	Sanctions against the Russian Federation in 2022 that led major ocean carriers (Maersk, MSC) to cease operations with Russian ports.
Political	Regional conflicts and instability	Military actions or high piracy-threat levels in regions critical for shipping.	Longer transit times and higher delivery cost due to the need to use longer routes, rise of insurance premiums.	Attacks on vessels in the Red Sea (2023–2024) that forced carriers to reroute ships around Africa via the Cape of Good Hope

Source: compiled by the author based on [1; 3; 5; 6; 10]

Traditional linear supply chain models focused on cost minimisation and the maintenance of low inventories within the Just-in-Time concept have proved

ineffective under the new conditions. A transition to more complex, networked and adaptive structures is required, which is clearly illustrated by the diagram in Figure 1.

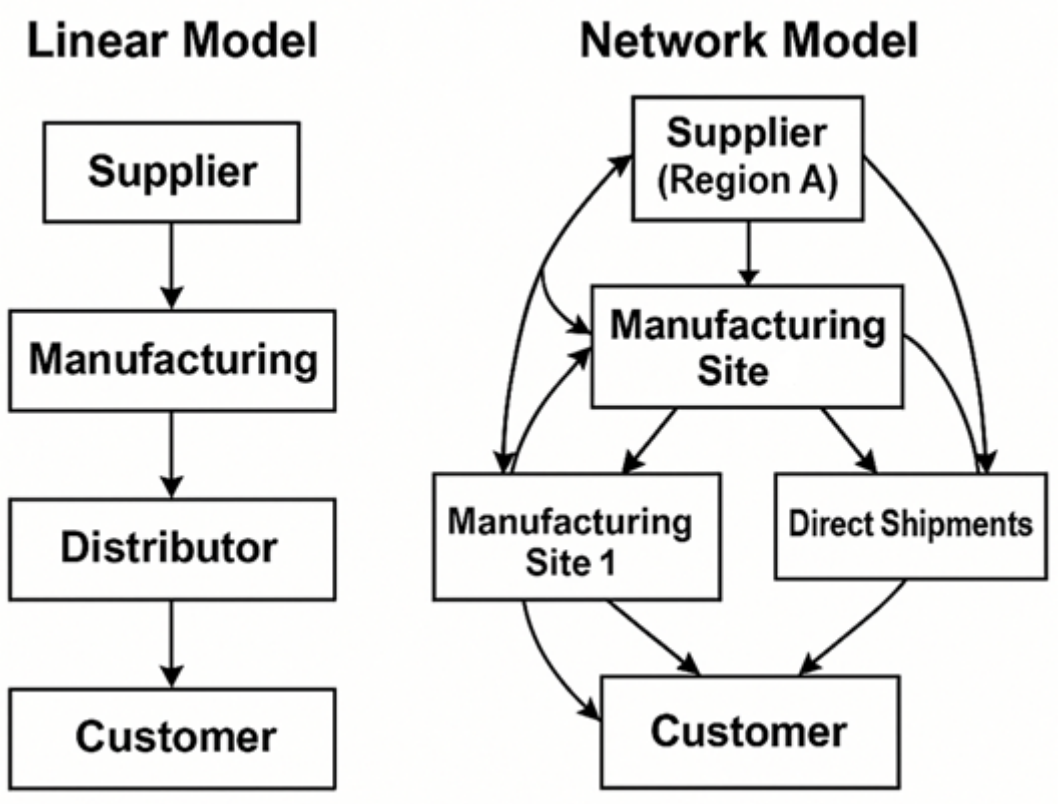

Fig. 1. Transformation of supply chain models

Source: compiled by the author based on [4; 8; 9]

This transformation encompasses not only the expansion of diversification, but also the formation of a dynamic management system. Within the framework of the study, a conceptual model of adaptive logistics management (Figure 2) is presented, constructed on three levels of response and ensuring the evolution from a reactive to a proactive approach in risk management.

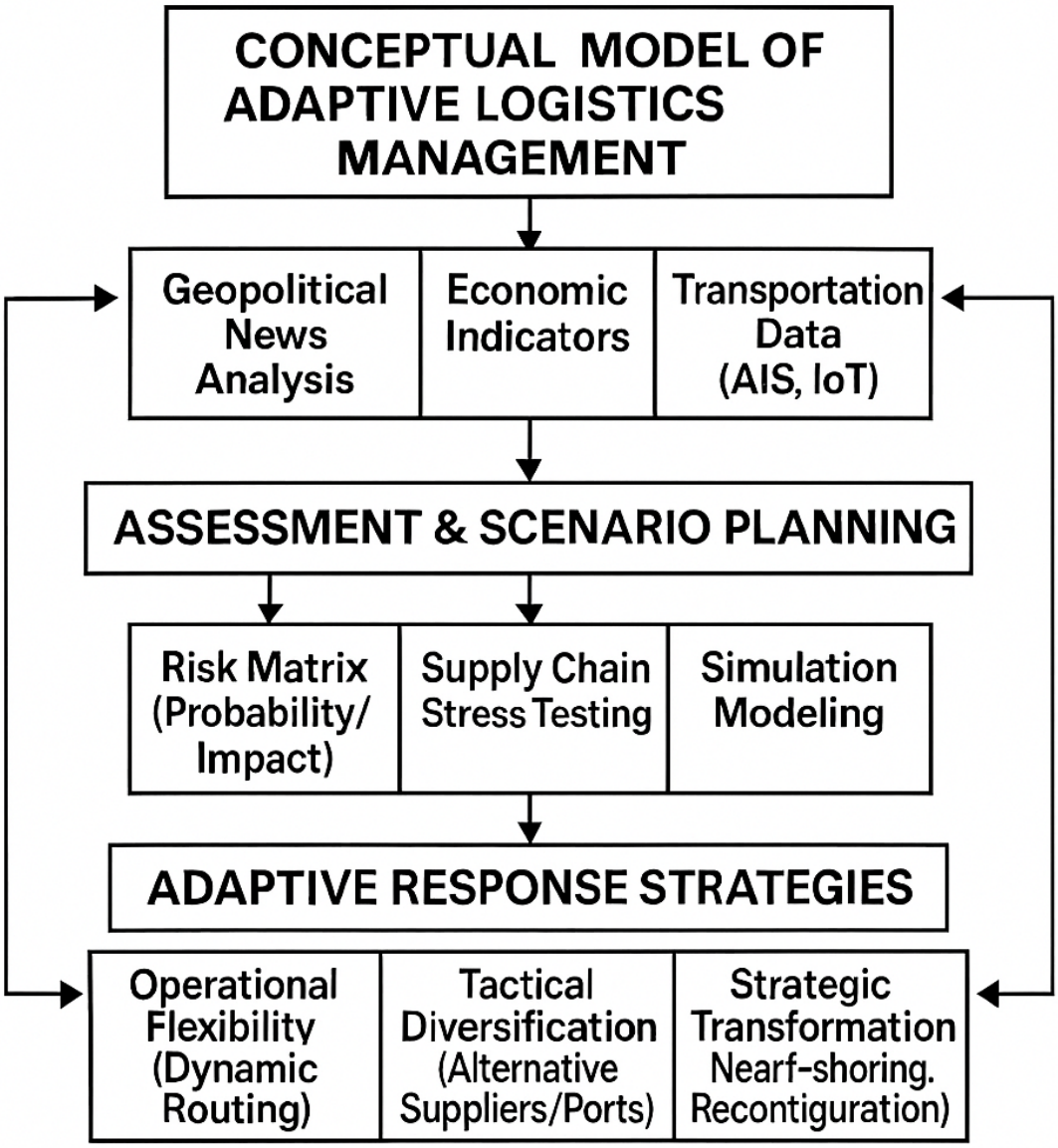

Fig. 2. Conceptual model of adaptive logistics management

Source: compiled by the author based on [3; 7; 8]

First Level: Continuous data collection and predictive analytics. The foundation of the model is permanent monitoring and prompt processing of information from heterogeneous sources in real time. This encompasses traditional logistics metrics (fleet geolocation, terminal loading level), macroeconomic indicators (inflation dynamics, trade-balance condition) and data from unstructured streams — textual analysis of news feeds and expert reports employing artificial-intelligence methods. The integration of Internet-of-Things

(IoT) solutions and predictive analytics enables the capture of early warning signals: for example, semantic analysis of political publications can identify the risk of sanctions being introduced in advance, while meteorological data can forecast the suspension of port hubs [11].

Second Level: Qualitative assessment and scenario modelling. The accumulated data are used to construct a probability–impact matrix and to conduct stress tests of key chain links. Through digital twins and simulation platforms, organisations model critical events, for example: what are the financial and operational losses if a partner's main port is blocked for three weeks? or how will the cost of transportation change with a 40-percent rise in fuel prices? This approach highlights the most vulnerable sections and allows the development of response schemes in advance [7].

Third Level: Multilevel adaptive measures. On the basis of scenario analysis, a set of response strategies in three categories is formed:

● Operational mobility: rapid reassignment of routes, change of transport mode or adjustment of delivery schedules to smooth short-term disruptions (for example, dynamic redirection of containers to less congested ports).

● Tactical diversification: maintenance of a pool of pre-qualified alternative suppliers, carriers and storage facilities ready for activation during medium-duration disruptions, reducing the risk of dependence on a single counterparty or channel.

● Strategic restructuring: justified redistribution of supply-chain elements in the long term — relocation of part of production capacity closer to sales markets (near-shoring), increase in the share of regional partners and investment in creating a distributed warehouse network. Such decisions are taken in response to fundamental shifts in the global landscape [4; 12].

The implementation of the proposed model requires investment in technological platforms and the development of professional competencies, yet it transforms risk management from a cost item into a source of strategic advantage.

Companies capable of adapting more rapidly to changing conditions not only minimise losses but also obtain the opportunity to occupy newly available market niches. The analysis conducted demonstrates that the influence of global factors is composite and non-linear, and without the synergy of strategic vision, advanced technologies and operational flexibility, modern logistics management becomes ineffective. The proposed model lays the foundation for creating integrated systems that transition from reactive responses to proactive forecasting and crisis prevention.

Conclusion. The study provided an in-depth systematization and comprehensive analysis of the impact of key global economic and political factors—ranging from pandemic shocks and inflationary trends to trade conflicts and geopolitical tensions—on the functioning of the logistics and transportation sectors. It was found that the current context of supply-chain operations is characterized by constant fluctuations and a high level of uncertainty, which renders classical models focused solely on cost minimization inefficient and vulnerable.

The study confirmed the hypothesis that it is necessary to shift the emphasis from reactive approaches to proactive and adaptive management methods in order to ensure the resilience of logistics systems. As a solution, a multi-level conceptual model of adaptive management was developed, combining 24/7 risk monitoring and forecasting, digital scenario planning, and a three-tier strategic response system—operational, tactical, and strategic levels.

The proposed model enables companies not only to reduce the damage from inevitable global shocks but also to seize new opportunities, forming competitive advantages through increased flexibility and reliability. The practical significance of the results lies in providing managers of logistics and manufacturing organizations with a conceptual foundation for revising and strengthening supply-chain management strategies. In the future, it is advisable to conduct an empirical validation of the developed model using specific

industries and to create quantitative metrics for assessing its level of adaptability and resilience.

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