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PECULIARITIES OF LOGISTICS AND DIGITAL INTEGRATION BETWEEN KAZAKHSTAN AND THE EU*

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Received 8 June 2025; accepted 10 September 2025; published 30 December 2025

Abstract. This article presents a comprehensive analysis of the development of transport and logistics cooperation between Kazakhstan and the European Union, with a particular focus on the specific role of Latvia as a strategic gateway for Eurasian freight flows. The study examines institutional reforms, digital integration, and innovative approaches to managing transit corridors, which contribute to the diversification of export–import flows and enhance regional competitiveness. Employing an interdisciplinary methodology, the research applies comparative institutional analysis, case studies, and empirical statistical data. Key drivers of digital transformation include the implementation of electronic platforms, customs automation, and the development of multimodal transport systems. The findings demonstrate that Latvia’s active participation in EU infrastructure and digital projects significantly strengthens Kazakhstan’s position in the European market, ensuring resilience and efficiency of logistics chains amid global geopolitical and economic challenges. The article offers practical recommendations for improving institutional compatibility, developing unified digital standards, and scaling transport and logistics corridors within the Eurasian space.

Keywords: digital integration; European Union; institutional cooperation; Kazakhstan; Latvia; logistics; transport corridors; transit

Reference to this paper should be made as follows: Čižo, E., Komarova, V., Kokarēviča, A., Kudiņš J., Ignatjevs, S., Ostrovska, I. 2025. Peculiarities of logistics and digital integration between Kazakhstan and the EU. *Entrepreneurship and Sustainability Issues*, 13(2), 106-121. <http://doi.org/10.9770/b3776467439>

JEL Classifications: O33, D24, L23, F15, R41, J24, C81

Additional disciplines: logistics, information technology, political science

1. Introduction

The economic partnership between the European Union and Kazakhstan is reaching a new level, encompassing not only traditional trade in raw materials but also joint projects in industry, innovation, and the green economy (Zharmakhanova et al., 2024; Mukasheva et al., 2024; Hussain et al., 2024). In 2023, EU countries accounted for approximately 27.9% of Kazakhstan’s foreign trade and 37% of its exports, while the total accumulated

* The article has been developed and funded within the Daugavpils University’s (Latvia) research project “Using Information Technology and Artificial Intelligence to Increase Labor Productivity in Enterprises of Latvian Regions”, Nr. 14-95/2025/4.

European investments reached €54.8 billion, increasing by 5.5% compared to the previous year (Tonkonog, 2023; European Commission, 2023).

Key investors in the Kazakhstani economy in recent years include companies such as Eni (Italy), TotalEnergies (France), and Royal Dutch Shell (Netherlands/UK) in the oil and gas sector, as well as Carlsberg Group (Denmark) and Alstom (France) in engineering and transport. In 2022, the French company Alstom invested in expanding local locomotive production in Nur-Sultan, while the German firm Szevind launched Central Asia's largest renewable energy project, worth up to \$50 billion, focused on wind and solar power. These investments strengthen Kazakhstan's economic diversification and its focus on green energy (Akhmetkali, 2023; Poberezhskaya & Bychkova, 2022; European Commission, 2023).

Diversifying the commodity structure has become a strategic priority. Beyond hydrocarbons (oil, gas) and uranium, Kazakhstan's exports to the EU increasingly include metallurgical products (refined copper, ferroalloys, zinc, aluminum), grains (wheat), chemical and petrochemical goods, as well as growing volumes of machinery and agro-industrial products (Observatory of Economic Complexity (OEC), 2024; Nakhle, 2023; European Commission, 2023). From the EU side, the most demanded imports into Kazakhstan are industrial equipment, automobiles, electrical goods, pharmaceuticals, and services in digital infrastructure and logistics (European Commission, 2023; Akhmetkali, 2023; Otarbayeva, 2024).

In response to the challenges posed by Kazakhstan's raw material dependence, the country is implementing its National Strategy for Industrial-Innovative Development, alongside special export programs aimed at stimulating the production and export of non-raw goods. Particular emphasis is placed on the development of green technologies, digitalization of industrial clusters, and attracting investment into the processing sector (European Commission, 2022a; Poberezhskaya & Bychkova, 2022).

Amid the transformation of global supply chains driven by geopolitical turbulence (Smorodinskaya et al., 2021), Central Asia – and Kazakhstan in particular – is emerging as a reliable transit and production partner for the EU. This status is supported by initiatives such as Global Gateway and Team Europe's joint projects fostering transport, digital, and energy infrastructure development (Karjalainen, 2022; Figueroa-García & Gélvez-Rubio, 2022; Yerimpasheva & Brauweiler, 2025; European External Action Service (EEAS), 2024; Kazakhstan MFA, 2023). In January 2024, the EU confirmed its readiness to invest €10 billion into the development of the Trans-Caspian International Transport Route (TITR) and the modernization of transport hubs in the region, where Latvia is becoming a key logistics and digital "gateway" to Europe (European Commission, 2024; OECD, 2023). It is important to emphasize that Latvia, as an integral part of the European Union, conducts its foreign economic and logistics policies strictly within the framework of broader EU strategies and regulations (Andersone, 2024). Its special role in partnership with Kazakhstan is not a result of independent geoeconomic choices, but rather a combination of factors: its advantageous geographical position, developed port and railway infrastructure, high level of digitalization, and integration into EU strategic projects on the eastern axis (Karjalainen, 2022). For Kazakhstan, utilizing Latvian transport and digital platforms is a pragmatic decision driven by the need to diversify channels accessing the European market and minimize external logistics and political risks (Muratova et al., 2023).

The objective of this article is to analyze the evolution of economic cooperation between Kazakhstan and the European Union through the lens of Latvia's dual role: as an institutional and infrastructural intermediary integrated into the EU system, and as a regional "partner" in digital, logistics, and innovation spheres. Particular attention is given to the institutional constraints on Latvia's autonomy and the benefits this role offers Kazakhstan amid a changing geoeconomic environment.

2. Literature review

The economic partnership between Kazakhstan and the European Union has been extensively examined in recent studies, emphasizing both trade dynamics and long-term investment strategies. Analysts highlight that the EU remains one of Kazakhstan's most significant economic partners, not only in the export of hydrocarbons but also in the diversification of industries and green transition (Tonkonog, 2023; Akhmetkali, 2023; Nakhle,

2023; Observatory of Economic Complexity (OEC), 2024). These studies show that European investments increasingly target high-tech sectors, renewable energy, and industrial modernization, reflecting Kazakhstan's strategic orientation toward sustainable development (Otarbayeva, 2024).

EU strategies in Central Asia form another key strand of the literature. Scholars note that the EU seeks to balance its normative agenda with pragmatic interests in energy and connectivity, as outlined in recent policy papers and academic analyses (Karjalainen, 2022; Tvaronaviciene, 2024; European Commission, 2022a; European Commission, 2023; Andersone, 2024; European Commission, 2024; OECD, 2023). The Global Gateway initiative and Team Europe projects are frequently mentioned as central instruments for strengthening connectivity, digitalization, and energy cooperation in the region.

The role of global value chains and external risks has also been emphasized in theoretical contributions. Studies of de-globalization trends and disruptions in supply chains demonstrate how geopolitical turbulence reshapes Kazakhstan–EU relations, forcing both sides to adapt to uncertainty (Antràs, 2020; Smorodinskaya et al., 2021). This perspective frames Kazakhstan not only as a resource supplier but also as a potential production and logistics partner within reconfigured global chains.

Latvia's position as a logistics and digital hub for Kazakhstan–EU cooperation is underlined in both academic and institutional analyses. The country's developed port and railway infrastructure, combined with advanced digital solutions, make it an attractive partner for transit and technological services (Metera, 2022; Moisé & Sorbello, 2022). These works emphasize Latvia's role as part of the broader EU connectivity strategy, rather than as an independent geopolitical actor.

The literature also highlights the growing significance of green energy, innovation, and sustainability in Kazakhstan–EU cooperation. Recent studies stress the role of large-scale renewable energy projects, such as the German Svevind initiative, as well as the integration of environmental and digital innovations into bilateral relations (Poberezhskaya & Bychkova, 2022; European Commission, 2022a; European Commission, 2023). Additionally, Yerimpasheva & Brauweiler (2025) explore the "Global Gateway" as a tool for sustainable growth in Kazakhstan. These projects are seen as markers of a structural shift toward sustainable economic relations between Kazakhstan and the EU. Furthermore, the connection between energy production and the introduction of ICT and the growth of the agricultural-industrial complex is increasingly recognized (Smagulova et al., 2023).

On a more detailed level, research provides a comprehensive overview of specific challenges and opportunities. Temirgalieva and Junussova (2020) and Minazhova et al. (2023) analyze how the introduction of renewable electricity affects the sustainability of Kazakhstan's national and regional power systems.

An overview of the potentials, deployment, outlook, and existing barriers for renewable energy in Central Asia is provided by Laldjebaev et al. (2021). Vechkinzova et al. (2021) explore the long-term dilemmas facing the electric power industry in Kazakhstan. Zholdayakova et al. (2022) explore the strategic potential and roadmap toward a hydrogen economy in the country. In a more specific analysis, Tleubergenova et al. (2023) conducted a detailed resource assessment for green hydrogen production in Kazakhstan.

Overall, the body of literature provides a comprehensive picture of the evolving Kazakhstan–EU partnership. It demonstrates the interplay between economic diversification, EU strategic frameworks, global value chain transformations, Kazakhstan's multivector policy, Latvia's logistical functions, and the shared focus on innovation and sustainability.

3. Trade and economic relations between Kazakhstan and Latvia: dynamics and trends

Trade and economic interaction between Kazakhstan and Latvia in recent years demonstrates not only quantitative growth but also qualitative improvements, reflecting systemic changes in logistics, export structures, and the institutional mechanisms of bilateral cooperation. The dynamics of trade turnover between the two countries are shaped against the backdrop of broader European trends, the expanding opportunities of

the Trans-Caspian International Transport Route (TITR), as well as intensified digital and infrastructure initiatives within EU cooperation and structural transformations in global supply chains (Figuerola-García & Gélvez-Rubio, 2022; Smorodinskaya et al., 2021; Birkeland et al., 2021; European Commission, 2023; Muratova et al., 2023).

It is important to emphasize that, in contemporary academic literature, Latvia is viewed not as an independent geoeconomic actor, but as a functional element of the European Union’s infrastructure and regulatory environment (Smorodinskaya et al., 2021). Most theoretical approaches highlight that Latvia’s “intermediary” role in Eurasian logistics and digital initiatives is a direct consequence of its integration into the pan-European economic and regulatory frameworks, rather than the result of an independent foreign economic policy (see Boonstra, 2019). This status positions Latvia as a flexible and convenient channel for advancing the interests of third countries – particularly Kazakhstan – into the EU market, without turning it into an autonomous regional player.

3.1. General trends and dynamics of trade turnover

In 2023, the volume of bilateral trade between Kazakhstan and Latvia reached a record €275.6 million, marking a 63% increase compared to 2021 (Observatory of Economic Complexity (OEC), 2024; Omirgazy, 2024). This growth is largely driven by the diversification of Kazakhstan’s export flows and the shift of transit routes in favor of the Baltic ports amid geopolitical and logistical changes in Eurasia (Muratova et al., 2023; Middle Corridor, 2022).

Table 1. Trade dynamics between Kazakhstan and Latvia (2021–2023)

Year	Kazakhstan’s export to Latvia (€ million)	Kazakhstan’s import from Latvia (€ million)	Total trade turnover (€ million)
2021	114.0	50.0	164.0
2022	147.0	59.0	206.0
2023	198.4	77.2	275.6

Sources: the authors’ compiled based on the data from Bureau of National Statistics of the ASPR RK, 2024.

Kazakhstan’s exports to Latvia increased by nearly 1.75 times, while imports grew by more than 54%. A significant role in this growth was played by new contracts for the supply of metals, petroleum products, and agricultural goods, as well as the expansion of cooperation in logistics and transit services. Additionally, strengthened institutional interaction within frameworks such as TRACECA, TITR, and joint digital platforms helped reduce transportation costs and enhance Latvia’s attractiveness as a transit country (Saktaganova et al., 2025; Birkeland et al., 2021).

Compared to other Baltic countries, Latvia has taken a leading position in the growth rate of trade turnover with Kazakhstan over the past three years: an increase of 68% surpasses similar figures for Lithuania (+26%) and Estonia (+15%). This is associated both with the expansion of port infrastructure and with the institutional flexibility of Latvian logistics operators (Muratova et al., 2023; European Commission, 2023).

3.2. Export and import structure: diversification and innovation

A structural analysis of Kazakhstan’s exports to Latvia reveals a shift from a dominance of raw materials toward a diversified portfolio that includes metals, agricultural products, and chemical goods (Boute, 2020; Observatory of Economic Complexity (OEC), 2024; Nakhle, 2023; Kazakhstan MFA, 2023).

Table 2. Major categories of Kazakhstan’s exports to Latvia (2023)

Product	Volume (€ million)	Share (%)
Refined Copper	80.5	40.6
Coal Briquettes	32.0	16.1
Mineral Fertilizers	16.3	8.2
Grain	10.4	5.2
Uranium, Petroleum Products	23.6	11.9
Others	35.6	18.0

Sources: the authors’ compiled based on the data from Observatory of Economic Complexity (OEC), 2024.

The growth in shipments of agricultural and chemical products reflects Kazakhstan’s efforts to diversify its exports and develop the non-raw material sector. The presence of uranium, petroleum products, and machinery in the export structure demonstrates the complexity of modern logistics chains and adaptation to European quality and safety standards (Birkeland et al., 2021; Smagulova et al., 2023).

Kazakhstan’s imports from Latvia are characterized by a focus on high-tech goods, industrial equipment, pharmaceuticals, and IT solutions, confirming the growing innovative component of bilateral trade (European Commission, 2023; Metera, 2022; Otarbayeva, 2024).

Table 3. Structure of imports from Latvia to Kazakhstan (2023)

Product/Service	Volume (€ million)	Share (%)
Industrial Equipment	25.9	33.5
Pharmaceuticals	13.8	17.9
IT/Logistics Solutions	8.0	10.4
Transport Components	9.7	12.6
Chemical Products	6.9	8.9
Others	12.9	16.7

Sources: the authors’ compiled based on the data from Trading Economics, 2024

The import structure confirms active development in sectors related to production modernization, digitalization of business processes, and the adoption of new technologies in Kazakhstan. Latvia acts here not only as a transit country but also as a provider of high-value-added technological solutions and services. This trend strengthens Kazakhstan’s integration into European production and logistics chains (Moisé & Sorbello, 2022).

3.3. Innovation and institutional effects

A qualitative leap in the development of bilateral relations has been made possible through institutional transformations: the entry into force of the EPCA agreement, expanded involvement in the TRACECA and TITR platforms, the implementation of digital solutions, and port infrastructure modernization programs (Birkeland et al., 2021; European Commission, 2019; Saktaganova et al., 2025). Particularly noteworthy is the integration of electronic customs services and the development of systems such as the Baltic Port Community System (PCS), SmartPort Riga, e-Customs Latvia, along with pilot blockchain initiatives for tracking transit containers. These innovations have reduced the average cargo clearance time from 48 to 28 hours and increased the share of electronic exports to 61% by 2023 (Saktaganova et al., 2025).

4. Research Methodology

This chapter presents the methodological foundations of the study, including the theoretical approaches employed, data sources, and analytical methods. A comprehensive interdisciplinary approach combining both quantitative and qualitative methods has been applied, enabling a thorough examination of transport-logistics cooperation and digital integration between Kazakhstan, Latvia, and the European Union. The chapter further details the selection of data, analysis criteria, and procedures for verifying the results.

4.1. Theoretical and methodological foundations

This study is grounded in an interdisciplinary approach that combines comparative economic, institutional, and political-geographical analyses (Birkeland et al., 2021; Baldwin & Tomiura, 2020; Andersone, 2024). The theoretical framework is primarily based on works addressing the Europeanization of post-Soviet economies, the theory of "small states as intermediaries" within Eurasian value chains (Boonstra, 2019; Gulomova, 2023), as well as studies on the strategic integration of energy, logistics, and investment flows between the EU and Central Asia (Andersone, 2024; Moisé & Sorbello, 2022; Metera, 2022; Muratova et al., 2023; Boute, 2020; Smagulova et al., 2023).

Special emphasis is given to research investigating institutional transformations within the frameworks of EPCA, TRACECA, and new EU initiatives such as "Global Gateway" (European Commission, 2019; Akhmetkali, 2023; Antràs, 2020; Gereffi, 2020; Miroudot & Nordström, 2020; Karjalainen, 2022; Harutyunyan, 2022). The methodological foundation draws on contemporary concepts of comprehensive regionalization, network effect theories, and the notion of "flexible economies," alongside analyses of ripple effects and vulnerabilities in global supply chains (Figueroa-García & Gélvez-Rubio, 2022; Birkeland et al., 2021; Muratova et al., 2023), allowing for the recognition of the multidisciplinary nature of Kazakhstan-Latvia cooperation and the hybrid character of modern logistics platforms.

4.2. Sample and structure of empirical data

To ensure the validity and comparability of the analysis, the following data sources were used:

- International statistical databases (UN COMTRADE, OEC) covering trade dynamics and structure, service flows, as well as product and regional breakdowns for the period 2010–2023 (Observatory of Economic Complexity (OEC), 2024; Omirgazy, 2024; Khitakhunov, 2023);
- Official reports from the European Union, governments, and industry associations (European Commission, 2023; Middle Corridor, 2022);
- Publications by international organizations and research centers (European External Action Service (EEAS), 2022; Moisé & Sorbello, 2022);
- Peer-reviewed academic articles addressing issues of institutional integration, energy, export diversification, and logistics connectivity (Metera, 2022; Muratova et al., 2023; Gulomova, 2023; Birkeland et al., 2021);
- National statistical agencies (Central Statistical Bureau of Latvia, Ministry of Trade and Integration of Kazakhstan);
- Reports from transport operators (LDz Cargo, 2023; KTZ Express, 2025);
- Intergovernmental memoranda and agreements (European Commission, 2019).

For contemporary digital aspects, data and reports on the implementation of electronic logistics platforms, port infrastructure digitalization, and the development of “green” and multimodal corridors were also utilized (European External Action Service (EEAS), 2022; Moisé & Sorbello, 2022).

4.3. Selection criteria and analytical indicators

The study applies the following criteria and indicators, drawn from international practices (Muratova et al., 2023; Metera, 2022):

- Total and sectoral trade turnover (in euros and dollars), including annual and five-year dynamics;
- Export/import structure by product categories (metals, agricultural products, petroleum products, pharmaceuticals, IT services);
- Diversification coefficients (for example, calculated using the Herfindahl-Hirschman Index – see Muratova et al., 2023);
- Share of services (logistics, transport, digital) in the composition of foreign trade flows;
- Institutional parameters: number and nature of agreements, participation in international initiatives, degree of digitalization of procedures (Birkeland et al., 2021; European Commission, 2023);
- Key transport infrastructure indicators: port throughput capacity, cargo volumes, processing speed, share of multimodal transportation (Middle Corridor, 2022).

For the first time, quantitative indicators were used to assess digitalization, including the implementation of electronic document management, cargo processing times, and the volume of container shipments utilizing electronic platforms (Moisé & Sorbello, 2022).

4.4. Methods of empirical and comparative analysis

Quantitative analysis is conducted based on official foreign trade data, employing methods such as averages calculation, growth rate assessment, concentration indices, and dynamics of flow structure (Observatory of Economic Complexity (OEC), 2024; Muratova et al., 2023; Akhmetkali, 2023).

Additionally, the following methods are used:

- Comparative Institutional Analysis – to compare the evolution of bilateral relations between Kazakhstan and Latvia with that of other Baltic countries, as well as to identify differences in institutional cooperation models and the management of logistics and energy flows (Birkeland et al., 2021; Metera, 2022; Khitakhunov, 2023; Gulomova, 2023; Harutyunyan, 2022).
- Case Study Analysis – to reveal the specifics of implementing major infrastructure, investment, and digital projects (port development, adoption of electronic platforms, intergovernmental initiatives), as well as to analyze the impact of macroeconomic and political shocks (COVID-19, sanctions, geopolitical turbulence) (Moisé & Sorbello, 2022).
- Content Analysis – to study regulatory acts, agreements, EU and Kazakhstan work programs, company and government press releases (European Commission, 2019).
- Network and Political-Geographical Analysis – to explain Latvia’s specific role as a “logistics gateway” and intermediary between Kazakhstan and the EU, including the assessment of infrastructure nodes, transport routes, and digitalization strategies (Birkeland et al., 2021).

4.5. Procedure for comparison and verification of results

To enhance the reliability of the conclusions:

- Data from various statistical systems (EU, Kazakhstan, UN COMTRADE, OEC) are compared – any discrepancies are analyzed and interpreted according to a unified methodology (Omirgazy, 2024; Observatory of Economic Complexity (OEC), 2024; Khitakhunov, 2023);
- Cross-validation is performed: findings on dynamics, structure, and institutional changes are corroborated by multiple sources simultaneously – including scholarly publications, EU reports, and materials from Kazakhstan and Latvia (European Commission, 2019; Akhmetkali, 2023; Muratova et al., 2023).

4.6. Limitations and assumptions

Not all types of services and digital solutions are fully reflected in official statistics, and some data on new logistics platforms and “green” corridors remain preliminary (European External Action Service (EEAS), 2022).

There are discrepancies in the methods of accounting and data publication between the EU and Kazakhstan (Metera, 2022; Khitakhunov, 2023). Certain areas, such as innovative investments and internal corporate strategies, have been studied primarily through case examples and may require further validation as new open data become available.

5. Research Results

This chapter presents the outcomes of a structural, institutional, and infrastructural analysis of the trade and economic relations between Kazakhstan and Latvia during 2021–2023. Unlike the descriptive dynamics outlined in Chapter 3, the main focus here is on interpreting the identified trends and explaining the “mechanics of success” through digitalization, institutional arrangements, and new logistics corridors.

First and foremost, it should be emphasized that the institutional and infrastructural gains achieved in the cooperation between Kazakhstan and Latvia are largely driven not by independent strategic decisions of the Latvian side, but by its integration into pan-European logistics and digital platforms (Boonstra et al., 2019; Boute, 2020). Acting as the “Eurasian gateway,” Latvia relies on the normative and investment framework of the European Union, which enables the country to offer competitive transit conditions and seamless interaction.

This status makes the Latvian route particularly attractive for Kazakhstan as a pragmatic yet derivative instrument for accessing EU markets within the overall strategy of the European Union, rather than as a result of Latvia’s own foreign economic initiatives.

5.1. Next-generation logistics and institutional effects

To accurately assess the impact of institutional and logistical reforms, it is essential to analyze the structural shifts that drive them. The qualitative shift in logistics flows between Kazakhstan and the EU is due to Latvia’s role as a functional component of the pan-European infrastructure. Its position as the “Eurasian gateway” is a direct result of its systemic integration into EU initiatives and multilateral transport corridors like TITR and TRACECA. The 68% growth in trade turnover between Latvia and Kazakhstan highlights Latvia’s institutional and technological advantage in the region. This is confirmed by the fact that its growth rates surpass those of Lithuania (26%) and Estonia (15%) (Muratova et al., 2023). This effect is directly linked to investments in digital infrastructure, such as e-Customs Latvia and SmartPort Riga. These solutions have created a seamless logistics environment, reducing the average cargo processing time from 48 to 28 hours and increasing the share of electronic export processing to 61% (Birkeland et al., 2021). These indicators show that digitalization is a key factor in ensuring efficient and reliable interaction between the two countries.

5.2. Diversification and technologization of exports

An assessment of the export structure from Kazakhstan to Latvia reveals tangible changes in the pattern of interaction between the two countries. The shift in the sectoral profile of exports reflects the outcomes of national strategies and the operation of new logistics chains – we observe how the portfolio of exported goods becomes more complex, while dependence on raw materials declines.

The data demonstrate not only the dominance of metallurgical products but also a significant increase in shipments of non-raw goods, including agricultural products, fertilizers, and machinery. The growth of the “Others” category signals diversification and increased complexity of Kazakhstan’s production base and reflects the effectiveness of cooperation with Latvia in establishing logistics and technological “gateways” to the EU market (Gereffi, 2020; Nakhle, 2023), as shown in Table 2.

5.3. Import from Latvia: Focus on technology and innovation

The changing structure of Latvian exports to Kazakhstan serves as a direct indicator of integration quality: the higher the share of technological goods and IT solutions, the greater the institutional compatibility between the countries and their capacity to develop modern production chains.

The technologization of imports from Latvia strengthens Kazakhstan’s position in the digital economy, supports the modernization of production capacities, and fosters the development of new industries. The significant share

of IT solutions and equipment signals Latvia's transition to the role of a supplier of intellectual and service products, rather than merely a transit country (Metera, 2022; Moisé & Sorbello, 2022; Miroudot & Nordström, 2020), as reflected in Table 3.

5.4. Digitalization and “smart” logistics corridors

To assess the depth of these transformations, it is important not only to record the shift towards electronic document management but also to analyze its tangible economic effects: acceleration of processes, increased containerization, and reduction of transaction costs.

Table 4. Dynamics of digitalization and logistics innovations in the EU (2021–2023)

Indicator	2021	2023	Δ, %
Electronic export processing (%)	38	61	+60.5
Average processing time (hours)	48	28	–41.7
Share of containerized transport (%)	24	31	+29.2

Sources: the authors' compiled based on the data from European Commission, 2023.

The growth in digitalization contributes to a sustainable reduction of time and financial costs in export/import operations, facilitates integration into EU supply chains, and enables Latvia and Kazakhstan to develop competitive advantages in the region. Institutional innovations are also evident in the expansion of joint forums, working groups, and blockchain pilot projects for cargo tracking (Saktaganova et al., 2025; Moisé & Sorbello, 2022).

5.5. Infrastructure and multimodal Projects: Zubr and Rail Baltica

The contemporary efficiency of Eurasian transport links is determined not only by cargo volumes but also by flexibility, digital density, and the capability to integrate different modes of transport into a cohesive logistics ecosystem. The assessment of infrastructure projects requires analyzing their contribution to throughput capacity, multimodality, as well as their potential for digital transformation and the resilience of regional flows.

Zubr project. The Zubr project is an integrated rail–sea service connecting Latvia, Kazakhstan, Ukraine, and China, creating synergy between railway and port capacities. Its main competitive advantage lies in flexible multimodal logistics, rapid adaptation to market fluctuations, and the deployment of digital platforms for cargo tracking and processing. As a result, Zubr has become not only an effective complement to the Trans-Caspian International Transport Route (TITR) but also an example of an innovative service enhancing the transit capabilities of the entire region (Middle Corridor, 2022; Muratova et al., 2023; Organisation for the Cooperation of Railways (OSJD), 2024).

Rail Baltica project. Special attention is warranted by the Rail Baltica project—the largest transport initiative of the European Union in the Baltic region, capable of transforming the architecture of Eurasian logistics chains. Rail Baltica serves as a strategic integration axis, linking Latvian ports with Central Europe and Central Asian countries (Karjalainen, 2022; RB Rail AS, 2024; Harutyunyan, 2022). The implementation of this project elevates Latvian hubs from national transit nodes to integral parts of a unified European and Eurasian infrastructure.

Key differences: While Zubr operates as a flexible, rapidly scalable multimodal service capable of adapting to changing flows – especially in containerized, agricultural, and machinery sectors – Rail Baltica is conceived as a long-term European-level megacorridor. Its objectives include not only radically increasing throughput and delivery speed but also ensuring “green” multimodality, digital integration, and full interconnection with TITR for expanded access to Kazakhstan and Chinese markets (Piterina & Masharsky, 2019).

The expected effects of Rail Baltica are summarized in Table 5 below.

Table 5. Impact of Rail Baltica on Eurasian Transit Parameters

Indicator	Before Rail Baltica	After Rail Baltica (forecast)
Delivery time Kazakhstan–EU (days)	12–16	7–9
Throughput capacity (TEU/year)	<150,000	>350,000
Containerization share (%)	28	52
Integration with TITR	Partial	Full
Kazakhstan grain export via Baltic States (thousand tons)	~300	>600

Sources: the authors’ compiled based on the data from European Commission, 2023; RB Rail AS, 2024.

The deployment of Rail Baltica entails not just technological modernization but also institutional transformation of logistic processes in the region. It is anticipated to reduce transit times between Kazakhstan and EU countries to 7–9 days, more than double throughput capacity, and significantly increase containerization and the export volume of key commodities, primarily grain. Integration of Rail Baltica with TITR minimizes both logistical and administrative costs, facilitating “seamless” cargo movement between the EU and Central Asia (Prause, 2019; European Commission, 2023; RB Rail AS, 2024).

Thus, the Zubr and Rail Baltica projects stand as critical examples of synergy among innovation, digitalization, and institutional reforms. Their implementation not only strengthens Latvia’s and Kazakhstan’s positions in the Eurasian logistics system but also shapes the framework for sustainable development across the EU–Central Asia corridor. Together with digital platforms and institutional initiatives (TITR, TRACECA), these infrastructure megaprojects become the “growth points” that determine the region’s long-term competitiveness.

6. Discussion of results

This chapter discusses the main findings and key factors influencing the development of transport-logistics cooperation and digital integration between Kazakhstan, Latvia, and the European Union. Special attention is given to institutional reforms, innovative digital solutions, and infrastructural projects that create new opportunities and challenges for the sustainability and efficiency of logistics corridors (Karjalainen, 2022; Andersone, 2024). The discussion is based on a comparison of empirical data with theoretical premises and aims at formulating practical recommendations to strengthen economic partnership across the Eurasian space.

6.1. Synergy of institutional reforms, digitalization, and infrastructure projects

The analysis confirms that the modern model of cooperation between Kazakhstan and Latvia relies on a unique combination of institutional flexibility, proactive adoption of digital technologies, and reliance on large-scale infrastructure initiatives (Birkeland et al., 2021; European Commission, 2023; Saktaganova et al., 2025). Latvia exemplifies a “small state intermediary”, effectively implementing a strategy of integration with the EU and Central Asia by developing ports, railway hubs, and digital platforms such as SmartPort Riga and Baltic Port Community System (PCS). Kazakhstan, in turn, leverages this window of opportunity for export diversification, enhancing the resilience of logistics flows, and adopting innovative services (Figueroa-García & Gélvez-Rubio, 2022; Muratova et al., 2023).

6.2. Competitive advantages and institutional effects

Latvia's leading role among the Baltic countries is secured not only by favorable geography but also by accumulation of institutional capital—active participation in the EPCA, TRACECA, TITR agreements, sustained engagement in multilateral formats, and the implementation of pilot digital and infrastructure initiatives

(Metera, 2022; Muratova et al., 2023; European Commission, 2019; Andersone, 2024). Latvian transport and digital infrastructure functions not merely as a transit channel, but as a testbed for new logistics solutions, facilitating growth in non-raw material and high-tech exports from Kazakhstan (Nakhle, 2023; Harutyunyan, 2022).

Crucially, Latvia's competitive advantages and dominant role in Eurasian logistics are not the product of an autonomous or independent foreign economic policy. Rather, these institutional effects and the enhanced significance of the Latvian route stem directly from its integration into EU transportation, digital, and regulatory systems. Latvia mainly operates as a functional EU infrastructure and regulatory channel whose opportunities for Kazakhstan depend on EU-wide decisions, the distribution of flows, and support from European institutions (Karjalainen, 2022). Thus, Latvia's "dual" role as mediator and conditional partner is primarily dictated by external politico-economic conditions and may shift depending on the EU's future eastern strategy.

6.3. Digitalization and "smart" logistics corridors

The transition to digital platforms, the growing share of electronic cargo processing, and the reduction of customs clearance times position Latvia and Kazakhstan as regional leaders in digital logistics. Implementation of electronic documentation, blockchain solutions, and IT platforms synergizes with infrastructural initiatives, minimizing transaction costs and enhancing operational transparency (Miroudot & Nordström, 2020; Saktaganova et al., 2025; Moisé & Sorbello, 2022). These developments lay the foundation for sustainable growth and the integration of new participants into Eurasian supply chains.

6.4. Infrastructural megaprojects and their long-term impact

The implementation of the Rail Baltica and Zubr projects enables the countries not only to scale physical cargo flows but also to introduce standards of "green" multimodality, digital integration, and institutional compatibility.

Rail Baltica enhances Latvia's transit potential by creating fast and reliable connections with Central Europe and EU markets, whereas Zubr exemplifies efficient, flexible multimodal logistics, demonstrating resilience against external shocks (Prause, 2019; Karjalainen, 2022; OECD, 2023; RB Rail AS, 2024).

6.5. Barriers, risks, and areas for improvement

Despite the achievements, significant challenges remain:

- Differences in standards and the lack of harmonization in customs procedures,
- Varied levels of digital maturity and insufficient integration among some IT systems,
- The need for further modernization of port and railway infrastructure,
- Enduring geopolitical and market risks requiring adaptive strategies and coordinated responses (European Commission, 2019; Birkeland et al., 2021; Andersone, 2024).

Nevertheless, the accumulated experience and rapid pace of institutional, digital, and infrastructure transformations enable Latvia and Kazakhstan not only to maintain but also to increase their significance as key actors in Eurasian integration. These countries serve as models for replication in other parts of the region, and their ongoing projects become benchmarks for new EU-Central Asia initiatives.

Looking ahead, the further development of Latvian-Kazakh cooperation, as well as the stability and resilience of transport corridors, will depend not only on national strategies but also on priorities set by the European Union. Kazakhstan would be prudent to support flexibility and diversification of export routes, given that Latvia's institutional advantages will persist only with stable backing and integration within pan-European transport-logistics initiatives. In this context, the long-term positioning of Latvia as a key logistics and digital hub remains sustainable only with continued EU support and Kazakhstan's adaptive export route policies.

7. Conclusion

The conducted study has provided a comprehensive analysis of the transformation of the economic and institutional partnership between the European Union and Kazakhstan, as well as identified the unique role of Latvia as an intermediate logistical and politico-institutional link within the emerging architecture of Eurasian connectivity.

The results of the analysis confirm the initial hypothesis that, amid a changing geo-economic environment—including the crisis of traditional transit routes, the growth of the EU's strategic autonomy, and Kazakhstan's diversification policy—a qualitative transition is occurring from declarative forms of partnership to instrumental integration. The substantial increase in trade turnover, the development of the TITR corridor, and Latvia's involvement in the EU's strategic initiatives indicate a genuine convergence of interests and enhanced resilience of Eurasian logistics chains.

The scientific novelty of this work lies in examining the EU–Kazakhstan interaction not only through the “center–periphery” dichotomy but also through the prism of regional intermediation, using the Latvian case as an example. For the first time in academic literature, an attempt is made to interpret Latvia's case as a catalyst for coupling EU policy in Central Asia with the practical logistics and institutional implementation of major infrastructure projects.

The practical significance of the study manifests in the formulation of proposals for developing transport-digital corridors, eliminating institutional barriers, and strengthening investment cooperation. These findings can be utilized in strategic planning of EU programs (Global Gateway, NDICI) and in Latvia's national foreign economic policy.

Prospects for further research include:

- Conducting empirical analysis of the efficiency of Latvian logistics hubs within the EU–Central Asia supply chains;
- Quantitative assessment of investment participation by Latvian and European institutions in Kazakhstan;
- Comparative study of the roles of other small EU countries (e.g., Lithuania, Czechia, Finland) in the strategy of integration with Central Asia.

At the same time, it is important to emphasize that Latvia's unique role in Eurasian logistics and institutional chains is fundamentally not the result of autonomous policy or strategic independence. All key infrastructural and institutional advantages of Latvia derive from its deep integration into European Union systems and depend on pan-European decisions, investment priorities, and the EU's logistics architecture. In this context, Latvia functions as a practical channel and infrastructural platform for realizing Kazakhstan's interests in the European direction, rather than as an autonomous actor in regional politics. The prospects for further strengthening Latvian-Kazakh partnership are directly influenced by the dynamics of the EU's foreign policy and strategy toward Central Asia.

The EU–Kazakhstan institutional and logistics partnership is entering a new phase where Latvia can and should act not only as a transit territory but also as an independent subject of Eurasian integration dynamics.

Practical recommendations:

- Intensify the implementation of unified digital standards for document flow (in particular, through expanding the electronic data exchange platform between Latvia and Central Asian countries);
- Initiate the development of a unified EU regulation for harmonizing customs clearance normative procedures;
- Support projects aimed at modernizing Latvian transport hubs linked to TITR within the frameworks of Global Gateway and NDICI programs;
- Ensure systematic assessment of the resilience of infrastructure nodes against geopolitical and logistical risks.

Thus, the cooperation model developed in this study not only addresses current challenges in global logistics but also lays a foundation for continued scientific and practical integration of the Eurasian space.

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Funding: The article has been developed and funded within the Daugavpils University's (Latvia) research project "Using Information Technology and Artificial Intelligence to Increase Labor Productivity in Enterprises of Latvian Regions", Nr. 14-95/2025/4.

Author Contributions: E. Čižo – developed the plan and research design of the study, theoretical justification of study's aim and research questions, and the structure of the study; V. Komarova & A. Kokarēviča – reviewed the scientific literature on Eurasian logistics and digital integration between Kazakhstan and the EU, providing an extensive theoretical background; J. Kudiņš – presented the original conceptual framework of Latvia's dual role in Eurasian logistics and digital integration between Kazakhstan and the EU, integrating theoretical models and empirical indicators from statistics; S. Ignatjevs – developed a research methodology for studying Latvia's dual role in Eurasian logistics and digital integration between Kazakhstan and the EU, analyzed current projects in the investigated field; I. Ostrovska – compiled and analyzed the relevant statistics, draw conclusions from the study, addressed its limitations, and offered recommendations for future empirical research, as well as edited and corrected the text.

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