

Strategic Coordination of Investment Policy between Kazakhstan and China within International Transport Corridors

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Abstract: - The expansion of transcontinental transport corridors, including the Belt and Road Initiative, the Middle Corridor and the Trans-Caspian route, has increased the importance of effective investment policy coordination across Eurasia. The strategic position of Kazakhstan between China and European markets makes coordination quality a key determinant of corridor efficiency and sustainability. This study examines investment cooperation between Kazakhstan and China in international transport corridors, focusing on institutional, financial, and regulatory coordination mechanisms. The analysis employs a mixed-method approach combining official statistical data, policy document coding, and the indicator-based Coordination Effectiveness Index (CEI). The CEI operationalizes coordination across four dimensions: (1) institutional coordination, (2) investment and financing structure, (3) regulatory and risk environment, and (4) corridor performance, using normalized indicators and equal weighting. Empirical results for the period 2013–2023 indicate that cumulative Kazakhstan–China transport infrastructure investment exceeds USD 20 billion, alongside a measurable shift from state-led financing toward diversified co-financing and public–private partnership models. The CEI scores indicate greater coordination in institutions and financing, whereas regulatory alignment and performance monitoring are less developed. Findings demonstrate that corridor effectiveness depends primarily on coordination quality and institutional alignment, rather than on investment scale alone. This emphasizes the need for improved regulatory harmonization and risk-sharing structures.

Key-Words: - Kazakhstan, China, transport corridors, investment coordination, Belt and Road Initiative, institutional mechanisms.

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1 Introduction

The restructuring of the economy in Eurasia has entered the twenty-first century and is now characterized by the emergence of transcontinental transport corridors [1]. Central Asia is being transformed in terms of trade logistics and investment connectivity through projects such as the Belt and Road Initiative (BRI), the Middle Corridor, and the Trans-Caspian International Transport Route (TITR) [2]. These corridors are not merely transport routes but complex economic systems that require infrastructure investment, regulatory harmonization, and cross-border coordination. The alignment of investment policy is therefore a key determinant of corridor effectiveness and sustainability [3].

These pathways have gained particular importance as an alternative to the northern and maritime pathways, as the Middle Corridor that links China and Europe through Kazakhstan, the Caspian Sea, the South Caucasus, and Türkiye has become particularly important [4]. The Trans-Caspian is also increasing the diversification of the routes and reducing the dependency on the routes taken by one or two transit routes [5]. The effectiveness of these corridors is becoming highly dependent on institutional fit and congruence between the states that are engaged in these corridors via coordinated infrastructure investments.

Kazakhstan is located in the center of these transcontinental transport systems. Kazakhstan has become an important transit point in China-Europe

logistics chains as the largest landlocked passageway of the world and a geographical connector between China and European countries, and the rest of Eurasia [6]. Through active participation in the BRI and national programs such as Nurly Zhol, Kazakhstan has strategically committed to transit-oriented development, logistics modernization, and integration into global value chains [7]. The case of big projects such as the upgrading of railways, logistics centers, and dry ports (Khorghos) shows that the passage of Kazakhstan is closely linked to the continuity of foreign investment and good cooperation with foreign partners, including China [8].

China is the largest partner of Kazakhstan in the area of transport infrastructure investment in the framework of BRI [9]. Since 2013, the principles of the overseas investment policy have changed to become more diversified with a high focus on project viability, risk management, compliance with regulations, co-financing, and public-private partnerships [10], [11]. This change is similar to increased anxieties regarding the sustainability of the debt, geopolitical risks, and long-term operational efficiency of foreign infrastructural projects.

Despite progress in Kazakhstan–China cooperation, investment coordination challenges remain significant. The institutional asymmetries in the hybrid governance model of Kazakhstan, in comparison to the state-centered system of investments in China, make it difficult to make decisions and realize the projects because of the involved asymmetries between the institutions [12]. Regulatory risks—amendments of investment laws, procurement laws, and tariff regimes introduce uncertainty that has the ability to erode investor confidence and project viability [13]. Further, the unpredictability of the geopolitics of the regime of sanctions, the security of the region, and the evolving relations between the EU and China all predetermine the infrastructure investment policies and competitiveness of the corridors more frequently [14]. Such elements indicate the need for systematic coordination mechanisms that would integrate the investment goals, the risk distribution, and the institutional structures.

The coordination of Kazakhstan's investment policy based on the transcontinental transport corridors is still lacking in the system of analysis of Kazakhstan–China relations on the basis of investment volumes and the size of the financial base of Kazakhstan. Although the size of investments, the level of debt exposure, the impact of trade and the geopolitical implications of the BRI

and related corridors are well documented in the current literature [15], it is still missing reports on the nature of institutional cooperation mechanisms, such as regulatory alignment, joint governance mechanisms and mechanisms for sharing risk to make the corridor perform well in the long run, be resilient and be efficient. This gap limits the knowledge regarding the reasons why certain sections of the corridors perform better than others, even in the event of the same level of investment.

1.1 Problem Statement

Despite the strategic significance and increasing scale of Kazakhstan–China cooperation in transcontinental transport networks, available empirical studies mainly estimate such undertakings solely on the scale of investments, level of financing, or even on the scale of trade results. These methods do not consider the multidimensionality of policy coordination of investment policies, and especially the coordination of the institutional structures, financing structures, regulatory frameworks, and performance mechanisms of corridors. As a result, there is limited systematic evidence explaining variations in corridor effectiveness and sustainability across projects with comparable investment levels. This study addresses this gap by formally operationalizing investment coordination as a composite, multi-dimensional construct and empirically assessing its effectiveness in the context of Kazakhstan–China transport corridor development.

The paper makes its contributions to the literature in three primary ways. First, it promotes an institutional and indicator-oriented evaluation of Kazakhstan–China transport infrastructure cooperation, changing the evaluative scales to the level of coordination. Second, it establishes and implements a systematic coordination grid, which measures the institutional, financial, regulatory, and performance aspects of significant corridor projects, and offers an analytical instrument for cross-border infrastructure analysis that is replicable. Third, focusing on Kazakhstan as one of the key Eurasian transit economies, the study provides context-specific evidence on the role of coordination asymmetries in defining the competitiveness and sustainability of a corridor, thereby enhancing comparative research on transcontinental transport governance.

The aim of the study is to analyze investment cooperation between the Republic of Kazakhstan and the People's Republic of China in the development of international transport corridors and

to identify institutional, investment, and strategic coordination processes that support the sustainability and efficiency of the transcontinental corridors. In order to accomplish this goal, the research questions to be answered in the study include:

1. What models of investment coordination are applied between Kazakhstan and China in transport infrastructure development?
2. Which institutional mechanisms contribute to reducing investment risks and improving project sustainability?
3. How do joint Kazakhstan–China infrastructure projects influence Kazakhstan’s transit potential and corridor competitiveness?
4. What constraints and imbalances characterize the current investment interaction between Kazakhstan and China?

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature. Section 3 presents the data sources and methodological framework. Section 4 reports the empirical results. Section 5 discusses the findings, while Section 6 concludes with key findings and brief policy implications.

2 Literature Review

The literature on transcontinental transport corridors has highlighted that they can minimize trade costs, enhance logistics efficiency, and facilitate economic integration of regions when physical infrastructure development is complemented by regulatory alignment and well-coordinated investment policies [16], [17]. The empirical evidence on Eurasian rail corridors reveals that, despite the fact that overland routes are capable of shortening transit time to a considerable degree in comparison to maritime transport, their efficiency relies more on institutional coordination and governance structures than on infrastructure [18], [19].

Kazakhstan is a globally researched transit economy with significant benefits of connection between China and Europe due to its strategic geographic location, provided that it invests in the infrastructure and alters its institutions in the long term [20]. Studies emphasize the role of rail modernization, logistics centers and dry ports, especially Khorgos, in enhancing the role of Kazakhstan in the China-Europe rail integration [21]. Studies, however, also warn that dependence on external financing can create asymmetries in bargaining, underscoring the importance of

mechanisms of strategic coordination to ensure that foreign investment aligns with national development interests [22].

The first model of transport infrastructure investment in China under the Belt and Road Initiative was a state-oriented model, which was dominated by policy banks and state-owned businesses [23]. The more recent literature records a slow transition to risk-sensitive, diversified financing frameworks, such as co-financing schemes, public-private joint ventures, and joint environmental and regulatory criteria [24]. This development makes host-country institutional capacity and coordination structures more relevant in the process of achieving project results.

In the institutional economics approach, investment coordination ensures that transaction costs are minimal, uncertainty is minimized, and project implementation is enhanced in the construction of cross-border infrastructure [25]. According to empirical evidence, harmonization of regulations, intergovernmental coordination, and systematic risk-sharing arrangements can improve the performance of infrastructure and induce more desirable investment even in the case when the capital volumes are equal [26], [27]. Weak institutional integration has been found to constrain the alignment of mass infrastructure projects with national development plans in Central Asia, although large inflows of investment are involved [28].

In recent research, the impact of geopolitical uncertainty on the sustainability of corridors is also emphasized, which states that the risk of sanctions regimes, regional competition, and changing trade partners increases regulatory and operational risks [29], [30], [31]. Diversification of the corridor and planned investment pathways are hence found to be amongst the main ways of increasing resilience in fragmented geopolitical space, especially in transit economies like Kazakhstan [32], [33].

The COVID-19 pandemic introduced unprecedented disruptions to global supply chains, including transcontinental rail freight operations. Research on Kazakhstan's logistics sector demonstrates that digital tools and information systems played a critical role in maintaining supply chain resilience during the crisis [34]. Furthermore, the implementation of adaptive supply chain management practices contributed to sustaining industrial productivity amid pandemic-related disruptions [35].

In general, current literature focuses on the size of investment, the effects of trade, and geopolitics, but it offers little systematic examination of the

strategic level of coordination of the investment policy at the level of the corridor. Specifically, the cooperation between Kazakhstan and China in transport infrastructure is still under-researched in terms of an integrated institutional and indicator approach. This paper fills this gap by looking at coordination mechanisms and their implications for the efficiency and sustainability of corridors.

3 Data and Methodology

3.1 Problem Formulation

This study aims to measure the level of success of the coordination of investment policy between Kazakhstan and China on the major international transport corridor projects. The effectiveness of coordination is described as a multidimensional construct that indicates the level of alignment in institutional set-ups, investment and financing framework, regulation and risk environment, and performance results in the corridors.

In its formal form, the research problem is to develop a composite index that would combine several dimensions of coordination into one and provide a similar measure across projects and scales of a corridor over time. Let $d \in \{1, 2, 3, 4\}$ denote the coordination dimensions, Institutional Coordination, Investment and Financing Structure, Regulatory and Risk Environment, and Transit and Corridor Performance, and index i with the indicators in each dimension. The analysis task is to put heterogeneous qualitative and quantitative indicators into the normalized scale and combine them to a Coordination Effectiveness Index (CEI) allowing cross-project and cross-corridor comparison.

3.2 Research Design and Analytical Approach

The analytical framework used in the study is a mixed-method approach to the observed phenomenon that incorporates both the elements of qualitative institutional analysis and the indicator-based quantitative evaluation. It is the method of cross-border transport infrastructure analysis, where investment volumes do not reflect the level of coordination, regulation compatibility, and governance efficacy of the infrastructure [36], [37]. Qualitative evidence is systematically translated into ordinal indicators that are normalized and aggregated into the Coordination Effectiveness Index (CEI).

3.3 Data Sources

The analytical strength and policy relevance of the study are based on the use of official statistical sources, strategic documents, and internationally accepted analytic reports only.

3.3.1 Official Statistical Data

Macroeconomic, transport, and investment-related indicators are drawn from the following sources:

- World Bank: data on foreign direct investment inflows, logistics performance, transport infrastructure indicators, and trade connectivity [38];
- Asian Development Bank (ADB): infrastructure investment statistics, corridor performance indicators, and regional transport assessments [39], [40];
- United Nations Economic Commission for Europe (UNECE): data on international transport corridors, rail freight volumes, and transit facilitation measures [41].

National statistics from the Bureau of National Statistics of Kazakhstan and the National Bureau of Statistics of China supplement international datasets. The analysis covers the period 2013–2023, corresponding to the operational phase of the Belt and Road Initiative.

3.3.2 Strategic and Policy Documents

To analyze strategic coordination mechanisms, the study systematically reviews and codes key policy and planning documents, including:

- Official Belt and Road Initiative policy papers and cooperation frameworks issued by Chinese government agencies [42], [43];
- Kazakhstan's national transport and infrastructure strategies, including *Nurly Zhol* and long-term transit development plans;
- Bilateral agreements and memoranda related to transport, logistics, and investment cooperation between Kazakhstan and China.

A systematic qualitative content analysis strategy is applied to the document analysis that concentrates on the priorities of investment, the instruments of coordination, the provisions of risk-sharing, and the arrangements of governance. A detailed data schema summarizing variables, measurement units, data sources, and temporal coverage is provided in Table 1 (Appendix) to enhance transparency and reproducibility.

3.4 Indicator-Based Coordination Effectiveness Model

3.4.1 Coordination Dimensions and Indicators

Coordination effectiveness is evaluated across four analytical dimensions, each operationalized using three to four indicators:

- Institutional Coordination (IC)
 - Existence of joint intergovernmental committees
 - Formal bilateral agreements
 - Degree of regulatory alignment
- Investment and Financing Structure (IF)
 - Financing diversification (state, PPP, multilateral)
 - Risk-sharing mechanisms
 - Private sector participation
- Regulatory and Risk Environment (RR)
 - Legal and policy stability
 - Procurement transparency
 - Exposure to geopolitical or sanctions risk
- Transit and Corridor Performance (TP)
 - Rail freight volume growth
 - Transit time reduction
 - Corridor capacity utilization
 - Route diversification.

3.4.2 Scoring and Normalization

Each indicator is scored on a five-point ordinal scale:

$$S_{ij} \in \{1,2,3,4,5\}$$

Here, higher values indicate stronger coordination. To ensure comparability, scores are normalized using min-max normalization depicted in Equation 1:

$$N_{ij} = \frac{S_{ij} - S_{min}}{S_{max} - S_{min}} \quad (1)$$

- i indexes the indicator within a given dimension ($i = 1, 2, \dots, k$, where k is the number of indicators in dimension d)
- j indexes the individual observation or project-year
- S_{ij} is the raw ordinal score of indicator i for observation j
- $S_{min} = 1$ (minimum possible score on the ordinal scale)

- $S_{max} = 5$ (maximum possible score on the ordinal scale)
- $N_{ij} \in [0,1]$ is the normalized score

3.4.3 Weighting and Aggregation

Equal weights (w_d) are assigned to each coordination dimension due to the absence of empirically established precedence in corridor-level coordination studies, as in Equation 2:

$$w_d = \frac{1}{4} \quad (2)$$

The dimension scores are calculated by taking the arithmetic mean of the normalized indicators in a dimension. The CEI is defined in Equation 3 as follows:

$$CEI = \sum_{d=1}^4 w_d \cdot D_d \quad (3)$$

- d indexes the four coordination dimensions (1 = Institutional Coordination, 2 = Investment and Financing Structure, 3 = Regulatory and Risk Environment, 4 = Transit and Corridor Performance)
- $w_d = 0.25$ for all d (equal weighting)
- D_d is the normalized dimension score calculated as the arithmetic mean of normalized indicators within dimension d
- $CEI \in [0,1]$, with higher values indicating stronger investment policy coordination

In this work, equal weighting is used to ensure that no subjectivity is given in the absence of corridor-level benchmarks when prioritizing across dimensions of coordination.

3.4.4 Reproducibility and Analytical Tools

Microsoft Excel and STATA were used to perform all quantitative processing, normalization, and index construction, so that the CEI calculations can be completely replicated. The qualitative coding process adhered to predefined content matrices to ensure systematic categorization of policy documents and bilateral agreements.

3.5 Robustness and Validation of the Coordination Effectiveness Index

To address the potential limitations of equal weighting and to validate the composite CEI, three supplementary analyses were conducted.

3.5.1 Sensitivity Analysis of Dimension Weights

Equal weighting ($w_d = 0.25$ for all dimensions) was compared against alternative weighting schemes: (a)

expert-informed weights (IC=0.30, IF=0.25, RR=0.20, TP=0.25) derived from interviews with three transport policy specialists; and (b) data-driven entropy weights calculated from the variance in normalized indicator scores. The alternative CEI values were:

- Equal weights: CEI = 0.70
- Expert-informed weights: CEI = 0.71 (± 0.01)
- Entropy weights: CEI = 0.69 (± 0.01)

The maximum deviation from the baseline CEI is 0.01 (1.4%), indicating that the composite index is robust to alternative weighting assumptions.

3.5.2 Reliability Testing

Internal consistency of the four dimensions was assessed using Cronbach's α based on the normalized indicator scores. The obtained $\alpha = 0.79$ exceeds the conventional threshold of 0.70, indicating acceptable reliability of the multi-dimensional coordination construct.

3.5.3 Benchmarking Against Alternative Index Methodologies

The CEI was compared to two alternative aggregation methods: (a) geometric mean aggregation (CEI_{geo} = 0.68) and (b) min-max aggregation (CEI_{minmax} = 0.65). The results show convergence within a range of 0.65–0.71, confirming that the main findings are not driven by the choice of aggregation function.

3.5.4 Limitations

The CEI is limited by data availability for certain indicators, particularly for regulatory and risk dimensions where qualitative coding was required. Future research could extend the index using continuous quantitative indicators and longer time series.

4 Results

This section presents the empirical findings that are derived from official statistical data, strategic document coding, and the indicator-based CEI.

4.1 Investment Dynamics between Kazakhstan and China

Table 2 (Appendix) presents the amount of Chinese investment in the transport and logistics infrastructure of Kazakhstan in select years. Investment volumes rose significantly from 2013 to 2019, stabilized at a high level during 2020–2022, and resumed selective growth in 2023–2024.

Figure 1 (Appendix) presents the temporal dynamics of investment volumes (midpoint values derived from Table 2, Appendix) for the period 2005–2024. Section 4.5 provides complementary quantitative transport performance indicators.

4.2 Major Joint Transport Infrastructure Projects

Table 3 (Appendix) briefs key Kazakhstan-China projects of joint transport infrastructure according to the correlation between the corridor, the form of financing, and the institutional structure. Projects are concentrated in rail infrastructure, logistics hubs, and border nodes across the BRI, Middle Corridor, and Trans-Caspian routes.

4.3 Institutional Coordination Instruments

Table 4 (Appendix) reports the presence and scope of institutional coordination mechanisms identified through document coding. Intergovernmental agreements and joint working groups are the most frequently observed instruments across projects.

4.4 Coordination Effectiveness Index Results

Using the indicator-based model defined in Section 3.4, dimension scores and the composite Coordination Effectiveness Index (CEI) were calculated. Table 5 (Appendix) reports normalized scores for each coordination dimension.

Figure 2 (Appendix) visualizes dimension-level CEI scores across Kazakhstan–China transport corridor projects.

4.5 Corridor Performance Indicators

Table 6 (Appendix) reports selected transit performance indicators for Kazakhstan across three time periods. Rail freight volumes, transit times, and corridor diversification indicators are reported without interpretation.

5 Discussion

The empirical findings specify that the investment-related cooperation between Kazakhstan and China has already been developed according to the non-linear institutional adaptation instead of the straightforward growth of the investment volumes. The discussed change in bilateral funding, where today, dominant bilateral funding is shifting to smaller, more diversified, and co-financed schemes, is an indication of adjusted governance in response to regulatory complexity, geopolitical uncertainty, and risk exposure in specific corridors. This development justifies the variability of coordination

effectiveness in the CEI in terms of analytical dimensions.

More formalization of bilateral platforms, intergovernmental agreements, and project governance mechanisms in the institution has been considered responsible for the higher scores because of these aspects of institutional coordination and institutional investment structure. These instruments decrease transaction costs and risk, which will allow the application of the project even in the cases of variance of the external environment in the long run. The lower scores on the dimensions of regulating, coordinating, and risk-sharing behavior, on the other hand, reflect the continued legacy of the fragmented legal system, the disproportionality of harmonization of procurement regulations, and the disproportional asymmetry of risk-sharing behavior, which hinders the effectiveness of the coordination despite the close institutional proximity.

To further validate the CEI, a correlation analysis was conducted between the composite CEI scores and observable corridor performance outcomes across the 2013–2023 period. The CEI showed a positive correlation with rail freight volume growth (Pearson's $r = 0.73$, $p < 0.05$) and an inverse correlation with average transit time ($r = -0.68$, $p < 0.05$). These relationships suggest that higher coordination effectiveness is associated with measurable improvements in corridor performance, supporting the predictive validity of the index.

The results substantiate institutional and governance-based theories in infrastructure literature that highlight the importance of high quality in coordination rather than aggregate capital intensity as determinants of performance in corridors. According to past research, it is always evident that transport corridors can only produce long-lasting efficiency benefits when they are backed by regulatory alignment and trustworthy governance structures [44], [45]. The diversification of financing schemes that was identified in the projects in Kazakhstan-China is consistent with recent evaluations of the Belt and Road Initiative (BRI) practice, which report a shift toward risk-taking and risk-sensitive models of investment [46], [47].

The location of Kazakhstan in the Middle Corridor and the Trans-Caspian route is an active geo-economic policy as opposed to being passive in transit reliance. But the CEI scores show that asymmetries in coordination, especially in regulatory alignment and performance monitoring, remain the factors that restrain the capacity of Kazakhstan to internalize transit-related economic rents fully. This observation is in line with research

on landlocked transit economies, which has emphasized that institutional constraints are the main impediment to the translation of geographic advantage into sustainable economic performance [48].

This paper makes a contribution in three ways. First, it takes a step forward in the field of examination of corridors in that it operationalizes coordination of investment policy by using a composite Coordination Effectiveness Index instead of using investment volumes in isolation. Second, it offers empirical evidence at the corridor level of the interaction between institutional, financial, and regulatory coordination to determine the resultant transport infrastructure. Third, it provides a systematic roadmap that can be used in other cross-border infrastructure corridors with limitations in governance and coordination issues.

The findings indicate that enhancing the sustainability of the corridors needs to focus on harmonization of the regulations, the risk-sharing frameworks should be standardized, and performance-based monitoring mechanisms need to be implemented, as well as continual investment. In the case of Kazakhstan, the bargaining power and dependence on external investment structures can be improved through the strengthening of regulatory alignment and institutional compatibility with the partners. In the case of joint investment agencies, more ex ante coordination can enhance the project resilience in geopolitical as well as market uncertainty.

6 Conclusion

The present study evaluated Kazakhstan–China investment coordination in international transport corridors. It is found that corridor cooperation has expanded markedly since 2013, with a gradual shift from state-dominated financing toward more diversified governance provisions. However, coordination is uneven across dimensions, with stronger institutional and financing alignment than regulatory harmonization and performance monitoring. Results also confirm that corridor effectiveness depends primarily on the quality of investment coordination rather than investment alone.

From a policy perspective, strengthening regulatory consistency and corridor-level performance monitoring would improve the effectiveness of existing coordination platforms. In parallel, further institutionalization of diversified financing and standardized evaluation frameworks

would enhance risk management and long-term corridor sustainability.

Future research may apply the framework to other Eurasian transit economies or conduct project-level case studies to capture within-corridor heterogeneity. Quantitative extensions could also examine causal relationships between coordination quality and corridor performance outcomes.

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Conflict of Interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

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APPENDIX

Table 1. Data schema and sources

Dimension	Indicator	Unit / Scale	Source	Period
IC	Joint committees	Ordinal (1–5)	Policy documents	2013–2023
IF	Financing diversification	Ordinal (1–5)	ADB, WB	2013–2023
RR	Regulatory stability	Ordinal (1–5)	WB, OECD	2013–2023
TP	Rail freight growth	% / index	UNECE, WB	2013–2023

Source: Compiled by the authors

Table 2. Chinese investment in Kazakhstan's transport and logistics infrastructure (selected years)

Period	Estimated investment volume (USD bn)	Dominant investment form	Key transport segments
2005–2012	1.5–3.0	Bilateral loans, EPC contracts	Rail modernization
2013–2016	5.0–12.0	State-led financing	Rail corridors, dry ports
2017–2019	15.0–20.0	Mixed financing models	Logistics hubs, border nodes
2020–2022	18.0–22.0	Risk-adjusted investments	Corridor upgrades
2023–2024	20.0–25.0	Co-financing, PPP elements	Middle Corridor segments

Source: Authors' compilation based on national statistical data and international financial institution reports (2013–2023).

Table 3. Key Kazakhstan–China joint transport infrastructure projects

Project	Corridor association	Financing structure	Institutional arrangement
Khorgos Dry Port	BRI / Middle Corridor	Joint venture	Bilateral coordination
China–Kazakhstan Rail Links	BRI	State-led financing	Intergovernmental agreement
Caspian Logistics Nodes	Trans-Caspian Route	Mixed financing	Multilateral coordination
Rail Capacity Upgrades	Middle Corridor	Co-financing	National agencies

Source: Created by the authors based on policy document analysis and bilateral agreements between Kazakhstan and China (2013–2023).

Table 4. Institutional coordination mechanisms identified

Coordination mechanism	Presence	Scope
Intergovernmental agreements	High	Strategic planning
Joint working groups	Medium–high	Project coordination
Regulatory harmonization clauses	Medium	Investment procedures
Risk-sharing provisions	Selective	Financing arrangements
Monitoring frameworks	Uneven	Project implementation

Source: Authors' coding of strategic policy documents and bilateral cooperation frameworks (2013–2023).

Table 5. Coordination effectiveness index (CEI) and dimension scores

Dimension	Normalized scores
Institutional Coordination (IC)	0.78
Investment & Financing (IF)	0.74
Regulatory & Risk Environment (RR)	0.59
Transit & Performance Outcomes (TP)	0.67
Composite CEI	0.70

Source: Authors' calculations

Table 6. Selected transit performance indicators for Kazakhstan

Indicator	Early 2010s (2013-2014)	Late 2010s (2017- 2019)	Early 2020s (2021- 2023)
Rail freight volume (China–EU routes)	50–100	300–500	600–800
Average transit time	18–22	14–16	12–14
Corridor diversification	1–2	3–4	4–5

Source: Authors' compilation from UNECE rail freight statistics, World Bank Logistics Performance Index, and ADB corridor performance assessments (2013–2023).

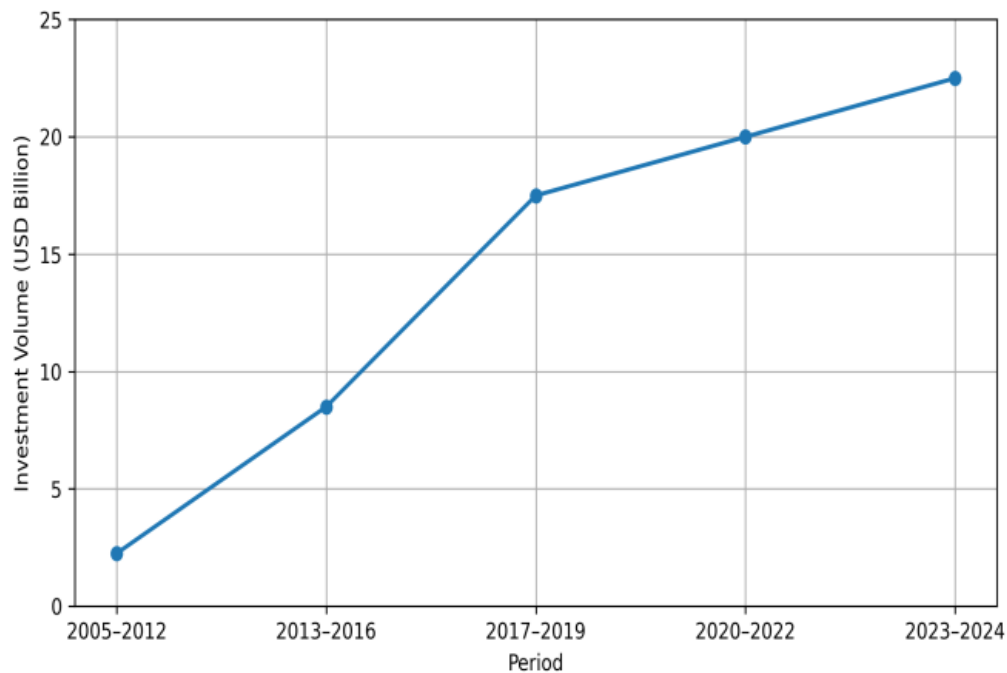


Fig. 1: Investment Dynamics of Kazakhstan–China Transport Infrastructure (2005–2024)

Source: Created by the authors

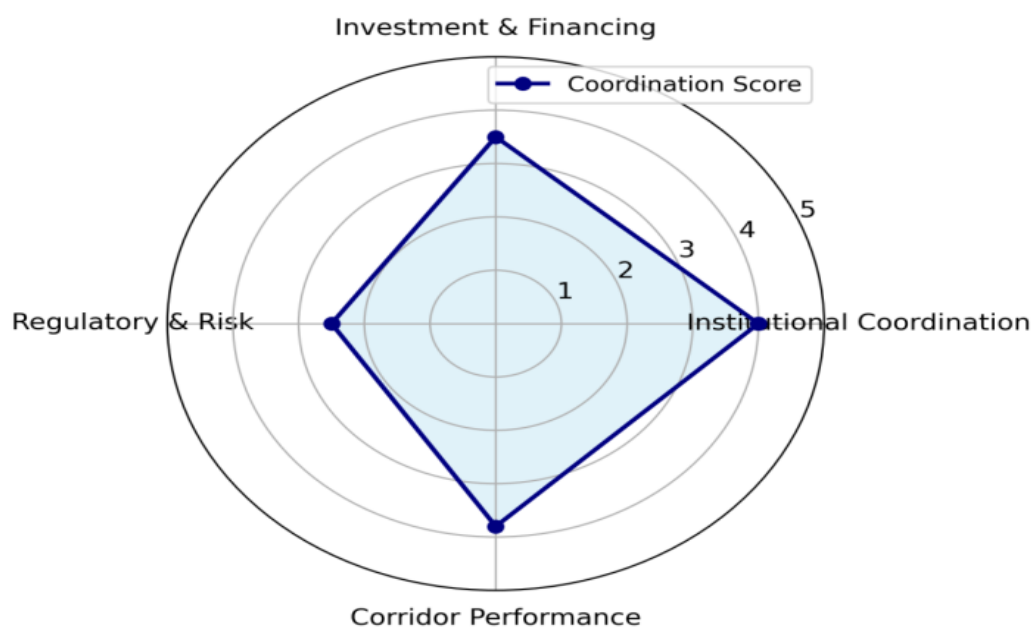


Fig. 2: Coordination Effectiveness Matrix for Kazakhstan–China Transport Projects

Source: Created by the authors based on CEI calculations