

Study on the Strategic Alignment Mechanism and Path Optimization of China-Kazakhstan Geopolitical Cooperation under the Belt and Road Initiative

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Abstract: This paper focuses on China-Kazakhstan geopolitical cooperation under the framework of the Belt and Road Initiative, analyzing the current state of cooperation in four key areas: cross-border energy, border governance, digital economy, and regional security, while identifying existing issues such as insufficient operational coordination and poor standard alignment. On this basis, it constructs a strategic alignment mechanism encompassing energy price linkage, port collaborative management and control, digital standard mutual recognition, and security intelligence integration, and proposes path optimization directions including technology-enabled corridor security, process reengineering for port efficiency, scenario expansion for digital cooperation, and interest coordination for regional synergy. The study provides professional references for the institutionalized deepening of China-Kazakhstan geopolitical cooperation and contributes to enhancing the cooperation efficiency of the Central Asian section of the Belt and Road Initiative.

Keywords: Belt and Road Initiative; China-Kazakhstan Geopolitical Cooperation; Strategic Alignment Mechanism; Path Optimization; Cross-Border Energy Corridors

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Introduction

As the largest country in Central Asia with the richest resources, Kazakhstan is a core cooperative partner of China for the Belt and Road Initiative in the Central Asian region. Its geographical location determines the supporting role of China-Kazakhstan cooperation in the connectivity of the Eurasian continent^[1]. Currently, the global energy pattern is undergoing in-depth adjustments, and regional security demands are continuously escalating, posing new challenges such as insufficient operational coordination and poor standard alignment to the traditional China-Kazakhstan cooperation model. Against this backdrop, this paper analyzes the current state of bilateral cooperation, constructs an adaptive strategic alignment mechanism, and explores implementable path optimization solutions. The aim is to promote the transformation of China-Kazakhstan geopolitical cooperation from "project-driven" to "mechanism-driven," thereby providing support for the stability and sustainability of cooperation in the Central Asian section of the Belt and Road Initiative.

1 Current State of China-Kazakhstan Geopolitical Cooperation under the Belt and Road Initiative

1.1 Current State of Operational Coordination for Cross-Border Energy Transportation Corridors

A transportation network centered on crude oil pipelines and natural gas pipelines has been established for China-Kazakhstan cross-border energy corridors. Among them, the annual oil transportation volume of the China-Kazakhstan Crude Oil Pipeline has stabilized at the ten-million-ton level, and the A/B/C lines of the Central Asia-China Gas Pipeline continuously supply clean energy to China^[2]. The current operational coordination focuses on daily scheduling and regular maintenance. The two sides coordinate oil transportation volume adjustments through monthly video conferences and conduct joint pipeline inspections quarterly. However, from a practical perspective, there remains an issue of delayed information sharing. For instance, the transmission of pipeline pressure monitoring data and crude oil quality inspection results suffers from a delay of more than 12 hours, leading to insufficient timeliness in scheduling adjustments. Additionally, the activation process for backup pipelines lacks standardized design. During the maintenance of a pipeline

section in 2023, the activation of the backup pipeline took 48 hours longer than expected, affecting the overall stability of transportation volume.

1.2 Current State of Practice in Comprehensive Border Port Governance

There are 15 permanently open ports along the China-Kazakhstan border, among which Alashankou and Horgos are comprehensive ports, handling over 70% of the total cargo volume between the two countries. In recent years, port governance has gradually advanced the construction of a "single window" system, allowing enterprises to submit customs declaration and inspection documents through an online platform. The customs clearance time has been reduced by approximately 30% compared to 2019. However, there is still room for optimization in inter-departmental coordination. Local differences exist in inspection standards between customs and border defense. For example, the inspection ratios for cross-border e-commerce parcels are set differently, resulting in repeated unpacking and inspection for some parcels. Furthermore, there is a disconnect in the connection between ports and hinterland logistics hubs. The average cargo storage time at Alashankou Port is 48 hours, and 20% of the cargo cannot be transferred in a timely manner due to delayed railway scheduling in the hinterland, affecting overall logistics efficiency^[3].

1.3 Current State of Infrastructure Connection in Digital Economy Cooperation

China-Kazakhstan digital economy cooperation covers two major areas: cross-border e-commerce and digital infrastructure. The jointly operated "China-Kazakhstan Cross-Border E-Commerce Comprehensive Service Platform" has achieved an annual transaction volume exceeding 5 billion yuan, and the digital tracking system for China-Europe Railway Express has achieved a cargo positioning coverage rate of over 85%. In terms of infrastructure connection, the cross-border optical fiber trunk line along the China-Kazakhstan border has achieved a transmission capacity of 100 Gbps, and 5G cross-border roaming has been piloted in some border cities. However, the issue of standard alignment is relatively prominent. For example, the electronic authentication standards for cross-border e-commerce are not unified. The electronic business licenses of Chinese enterprises cannot be directly recognized in Kazakhstan and require additional local authentication. In the field of digital payment, the coverage rate of the Cross-Border Interbank Payment System (CIPS) in Kazakhstan is less than 30%, and most transactions still rely on US dollar settlement.

1.4 Current State of Implementation in Regional Security Collaborative Response

China and Kazakhstan have established a regular meeting mechanism in the field of regional security, holding 2-3 annual joint security cooperation conferences focusing on issues such as combating the "three forces" (terrorism, separatism, extremism), cross-border drug trafficking, and illegal immigration. The two sides have jointly conducted anti-terrorism exercises such as "Tianshan-2022" and "Peace Mission-2023," and established 12 intelligence exchange points in border areas. However, the efficiency of collaborative response is still limited by intelligence integration capabilities. Currently, intelligence sharing mainly relies on the transmission of paper reports, and the real-time sharing system for electronic intelligence has not yet achieved full coverage. Additionally, the collaborative mechanism for addressing cross-border cybercrimes is not yet improved. In a cross-border cyber fraud case in 2024, the unclear evidence transfer process between the police of the two sides prolonged the case investigation cycle by 2 months, affecting the effectiveness of law enforcement.

2 Strategic Alignment Mechanism of China-Kazakhstan Geopolitical Cooperation under the Belt and Road Initiative

2.1 Price Linkage and Risk Hedging Mechanism for Cross-Border Energy Cooperation

Cross-border energy cooperation needs to establish a linkage adjustment mechanism based on international energy market benchmark prices. Taking Brent crude oil prices and Henry Hub natural gas prices as the basis, a floating coefficient should be set in combination with the supply and demand scales of China and Kazakhstan, and the transportation price should be dynamically adjusted monthly according to market changes. At the same time, long-term energy supply and demand forecasting models need to be incorporated into the mechanism design. Through a joint energy research institution established by the two sides, a 12-month forward supply and demand forecast report should be released quarterly to provide data support for price adjustments. In terms of risk hedging, a dual guarantee system of "insurance + backup corridor"

should be constructed. China and Kazakhstan should jointly invest in the establishment of an energy transportation insurance fund to cover risks such as pipeline leaks and geopolitical conflicts. Simultaneously, the expansion and reconstruction of the second line of the China-Kazakhstan Crude Oil Pipeline should be promoted to increase the backup transportation capacity to 50% of the main line, ensuring stable transportation volume in case of a single pipeline failure.

2.2 "Port-Hinterland" Collaborative Management and Control Mechanism for Border Governance

The "port-hinterland" collaborative management and control mechanism should take information interconnection as the core, establishing a cross-regional regulatory data sharing platform that integrates relevant data from port customs, border defense, inspection and quarantine, as well as hinterland logistics hubs and enterprises. This enables full-process traceability of information from cargo entry to hinterland delivery. In terms of process design, a segmented model of "port inspection + hinterland supervision" should be implemented. For low-risk cargo, the model of "rapid release at ports + subsequent verification in the hinterland" should be adopted to reduce cargo storage time at ports. Meanwhile, a regular calibration mechanism for bilateral regulatory standards should be established, with semi-annual meetings held to align customs and border defense inspection standards, unifying key indicators such as parcel inspection ratios and cargo classification codes. To address logistics connection issues, "hinterland scheduling advance offices" can be set up at Alashankou and Horgos ports, where railway departments of China and Kazakhstan work together to plan cargo transfer plans 48 hours in advance, ensuring synchronization between port and hinterland railway scheduling.

2.3 Standard Mutual Recognition and Cross-Border Data Flow Mechanism for Digital Economy Cooperation

Digital economy cooperation should prioritize the establishment of an electronic authentication standard mutual recognition system. Market supervision departments of China and Kazakhstan should jointly formulate a cross-border electronic authentication catalog, incorporating electronic business licenses and electronic product quality certificates into the scope of mutual recognition to achieve "one authentication, dual recognition." In terms of cross-border data flow, a mechanism of "security assessment + classified management" should be constructed. Hierarchical control should be implemented for data involving personal information and trade secrets, and the security assessment process for data outbound should be clarified. Meanwhile, a China-Kazakhstan cross-border data circulation platform should be established, using blockchain technology to achieve traceable data transmission and ensure the integrity and security of data during transmission. To address digital payment issues, efforts can be made to promote the connection between CIPS and Kazakhstan's local payment systems, piloting direct settlement in "Renminbi + Tenge" in scenarios such as cross-border e-commerce and energy transactions, and gradually increasing the proportion of local currency settlement.

2.4 Intelligence Integration and Joint Response Mechanism for Regional Security Cooperation

The intelligence integration mechanism needs to break the traditional paper-based transmission model and establish a China-Kazakhstan border security intelligence sharing system to achieve real-time transmission and automatic analysis of intelligence related to counter-terrorism and cross-border crimes^[4]. The system should be equipped with hierarchical access rights, opening corresponding intelligence data according to the responsibilities of the two sides' departments, and be provided with multi-language intelligent translation functions to eliminate language barriers. In terms of joint response, a standardized emergency response process should be formulated, clarifying the response levels, responsible departments, and handling time limits for different types of security incidents (such as terrorist attacks and cross-border drug trafficking). Meanwhile, a "quarterly drill + annual assessment" mechanism should be established, conducting targeted joint drills quarterly and evaluating and optimizing the mechanism's operation effectiveness annually. For cross-border cybercrimes, a China-Kazakhstan joint cybersecurity laboratory can be established to share cyber attack signature databases, conduct collaborative traceability and evidence preservation, and shorten the case investigation cycle.

3 Path Optimization of China-Kazakhstan Geopolitical Cooperation under the Belt and Road Initiative

3.1 Path for Enhancing Security Redundancy and Operational Efficiency of Cross-Border Energy Corridors

Enhancing the security redundancy of cross-border energy corridors should focus on hardware transformation and technology empowerment. Intelligent monitoring equipment should be added along the China-Kazakhstan Crude Oil Pipeline and the Central Asia-China Gas Pipeline, using optical fiber sensing and AI video analysis technologies to achieve real-time early warning of pipeline leaks and third-party damage, reducing the fault detection time from the current 2 hours to less than 15 minutes. Meanwhile, the construction of emergency material reserve points along the pipelines should be promoted, with one reserve point established every 200 kilometers on both sides of the China-Kazakhstan border, storing pipeline maintenance equipment, crude oil adsorption materials, and other supplies to ensure that maintenance can be initiated within 1 hour after a fault occurs. In terms of operational efficiency improvement, digital twin technology can be introduced to construct a pipeline operation model, simulating the pipeline's operating status under different transportation volumes and pressures to optimize scheduling plans. Simultaneously, a joint office mechanism for the operation teams of the two sides should be established, setting up a China-Kazakhstan joint scheduling room at the pipeline operation center to achieve 24-hour collaborative scheduling and reduce information transmission delays^[5].

3.2 Path for Technology Empowerment and Process Reengineering in Border Port Governance

Border port governance should promote process reengineering through technology empowerment. In the port inspection link, the Internet of Things (IoT) technology should be introduced, equipping cross-border cargo with intelligent electronic tags to achieve automatic collection and verification of cargo information, reducing manual inspection time. Meanwhile, blockchain technology should be applied to construct a customs clearance document sharing platform, storing documents such as customs declarations, bills of lading, and inspection and quarantine certificates on the blockchain to achieve real-time multi-party sharing and anti-counterfeiting verification, avoiding repeated submission and verification. In terms of process optimization, the existing customs clearance links should be streamlined, eliminating unnecessary approval steps, and implementing a "paperless customs clearance + post-event verification" model for enterprises with good credit. For cross-border e-commerce parcels, a mechanism of "batch inspection + random sampling inspection" should be established to improve the parcel inspection efficiency by more than 50%. Additionally, efforts should be made to strengthen the connection between ports and hinterland logistics hubs, launching "point-to-point" railway services from ports to hinterland cities such as Urumqi and Almaty, enabling cargo to be "loaded and transferred immediately upon entry at ports" and controlling the storage time within 24 hours.

3.3 Path for Infrastructure Shortage Mitigation and Scenario Expansion in Digital Economy Cooperation

Digital economy cooperation should prioritize mitigating infrastructure shortages, promoting the upgrading and transformation of the China-Kazakhstan border digital trunk line, increasing the optical fiber transmission bandwidth to 200 Gbps, and achieving full 5G network coverage in border areas. Meanwhile, data centers should be built in cities such as Nur-Sultan and Almaty in Kazakhstan to provide localized cloud computing services for enterprises of both sides, reducing data transmission costs. In terms of scenario expansion, cross-border e-commerce cooperation can be deepened by establishing a "China-Kazakhstan Cross-Border E-Commerce Industrial Park" in Kazakhstan, providing one-stop services such as warehousing, logistics, and local marketing for Chinese enterprises. Simultaneously, digital agriculture cooperation scenarios can be expanded, using China's agricultural IoT technology to provide services such as precision irrigation and pest monitoring for wheat planting bases in Kazakhstan, improving agricultural production efficiency. Additionally, joint training of digital technology talents should be promoted, with Chinese and Kazakhstani universities cooperating to offer digital economy professional courses and jointly training more than 200 professional and technical talents annually to provide talent support for cooperation.

3.4 Path for Interest Coordination and People's Livelihood Linkage in Regional Synergistic Cooperation

Regional synergistic cooperation needs to establish a regular interest coordination mechanism. For cooperation fields such as energy and logistics, a China-Kazakhstan Joint Interest Consultation Committee should be established, holding quarterly meetings to negotiate the distribution ratio of cooperation benefits and cost-sharing plans, ensuring a balanced distribution of interests between the two sides. In terms of people's livelihood linkage, efforts can be made to promote the connection of cross-border people's livelihood services, piloting cross-border medical insurance settlement between China and Kazakhstan, and incorporating designated hospitals in border areas of both sides into each other's medical insurance

reimbursement scope to facilitate medical treatment for border residents. Meanwhile, cross-border bus routes in border areas should be opened, and the schedule arrangement should be optimized to address the cross-border travel needs of residents. Additionally, cultural exchange cooperation should be strengthened, establishing "Cultural Exchange Centers" in border cities of China and Kazakhstan, holding regular art exhibitions and folk activities to enhance mutual understanding between the people of the two sides. Simultaneously, educational cooperation should be promoted, expanding the scale of student exchanges between Chinese and Kazakhstani universities, and offering Chinese and Kazakh language training courses to lay a public opinion foundation for cooperation.

4 Conclusion

China-Kazakhstan geopolitical cooperation has formed a multi-field and multi-level cooperation pattern under the framework of the Belt and Road Initiative, but there is still room for optimization in aspects such as operational coordination, standard alignment, and efficiency improvement. The strategic alignment mechanism constructed in this paper addresses the issue of insufficient institutionalization in cooperation through energy price linkage, port collaborative management and control, digital standard mutual recognition, and security intelligence integration. The proposed path optimization solutions provide implementable directions for enhancing cooperation efficiency from the perspectives of technology empowerment, process reengineering, scenario expansion, and interest coordination. In the future, China-Kazakhstan geopolitical cooperation needs to further strengthen the implementation of the mechanism, promote in-depth adaptation of technology applications to local needs, and ensure that the benefits of cooperation reach the people of both sides. This study not only provides support for the deepening of China-Kazakhstan cooperation but also offers a reference model for geopolitical cooperation among countries along the Belt and Road Initiative.

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