

Crude Oil Export Capacity Assessment and Barrier Factor Analysis for Major Belt and Road Initiative Countries Trading with China: Postprint

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Abstract

Taking the 20 major crude oil exporting countries engaged in trade with China under the Belt and Road Initiative as research subjects, this study constructs a crude oil export capacity evaluation index system from five dimensions: crude oil supply capacity, domestic political and economic environment, international relations, relations with China, and transport accessibility, based on cross-sectional data from 2010, 2015, and 2020. The entropy-weighted TOPSIS model is employed to evaluate the crude oil export capacity of sample countries, and an obstacle degree model is utilized to analyze the main obstacle factors. The results indicate that: (1) From 2010 to 2020, the crude oil export capacity of the 20 sample countries exhibited an overall fluctuating downward trend. (2) The spatiotemporal pattern evolution of crude oil export capacity in sample countries was relatively stable overall, yet differences persisted. At the regional level, the Commonwealth of Independent States (CIS) region demonstrated a relatively high overall level of crude oil export capacity, Africa exhibited a lower level, while the Americas, Middle East, and Southeast Asia were at intermediate levels. At the national level, ranking changes in crude oil export capacity were relatively minor; 10 countries including Malaysia and Brunei experienced no ranking changes, 4 countries including Indonesia and Iraq saw their rankings rise, and 6 countries including Iran and the United Arab Emirates experienced ranking declines. (3) Different countries possess distinct advantages and disadvantages across various dimensions. Venezuela and Saudi Arabia scored higher in crude oil supply capacity, Russia and the United Arab Emirates scored higher in domestic political and economic environment, Saudi Arabia and the United Arab Emirates scored higher in international relations, while Russia and Kazakhstan scored higher in relations with China and transport accessibility. (4) The primary obstacle factors affecting crude oil export capacity levels are geographical location relationships, diversification of transport modes, degree of trade openness, etc. Obstacle factors for crude oil export capacity vary among

countries; measures should be tailored to local conditions to reduce obstacle impacts and enhance crude oil export capacity by targeting each country's main obstacle factors.

Full Text

Assessment of Crude Oil Export Power and Analysis of Obstacles of Major Countries along the Belt and Road Involved in Trade with China

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Abstract

This study develops a comprehensive evaluation system of crude oil export capacity based on five dimensions, namely, crude oil supply capacity, domestic political and economic environment, international relations, relations with China, and transport accessibility, using cross-sectional data from 2010, 2015, and 2020. Twenty major crude oil-exporting countries involved in trade with China under the Belt and Road Initiative serve as the research objects. The entropy-weight TOPSIS model is employed to evaluate the crude oil export power of the sample countries, and the obstacle degree model is used to analyze the main obstacles to crude oil export power. The results reveal that: (1) The crude oil export capacity of the 20 sample countries from 2010 to 2020 exhibits a general trend of fluctuation and decline. (2) The evolution of temporal and spatial patterns of crude oil export power among sample countries remains relatively stable overall, though notable differences exist. At the regional level, the Commonwealth of Independent States region demonstrates the highest overall level of crude oil export power, the African region the lowest, and the Americas, Middle East, and Southeast Asia regions occupy intermediate positions. At the country level, ranking changes have been minimal, with ten countries including Malaysia and Brunei showing no change, four countries including Indonesia and Iraq rising, and six countries including Iran and the United Arab Emirates declining. (3) Different countries possess distinct strengths and weaknesses across each dimension. Venezuela and Saudi Arabia score higher in crude oil supply capacity, Russia and the United Arab Emirates in domestic political and economic environment, Saudi Arabia and the United Arab Emirates in international relations, and Russia and Kazakhstan in relations with China and transport accessibility. (4) Geographic location, diversification of transportation modes, and trade openness constitute the primary factors affecting crude oil export power levels. Obstacles to crude oil export power vary among countries, necessitating targeted measures tailored to each country's main obstacle factors to reduce their impact and enhance crude oil export power.

Keywords: crude oil export capacity assessment; index system construction; entropy-weight TOPSIS model; obstacle factors

1. Introduction

In recent years, global crude oil trade markets have experienced shocks from events such as the COVID-19 pandemic and the Russia-Ukraine conflict, yet China's crude oil trade has maintained an upward trend [1]. The Belt and Road Initiative represents an important platform for international cooperation and a significant international public product. As of the study period, China had signed over 200 Belt and Road cooperation documents with 149 countries and international organizations, engaging in crude oil trade with numerous nations. According to United Nations trade database and China Customs statistics, China's crude oil imports from Belt and Road countries increased from 4.33×10^7 tons in 2010 to 2.25×10^8 tons in 2020, accounting for 81.6% of total crude oil imports, underscoring the initiative's importance.

Current research on international crude oil trade and cooperation is extensive. International studies are relatively dispersed, employing various models and theories including empirical models [2], multi-attribute decision analysis [3], and portfolio theory [4] to measure crude oil import system risks. Other research conducts qualitative studies or quantitative analyses based on resources, economics, and politics through principal component analysis and static panel data models [5] to explore factors influencing crude oil imports. These studies indicate that crude oil supply, demand, pricing, trade openness, bilateral trade relations, and internal political and economic conditions in exporting countries significantly impact China's crude oil imports.

Given China's challenges of high external dependence [6], lack of pricing power and discourse rights [7], and persistent crude oil transportation dilemmas [8], domestic research has proliferated. As the Belt and Road Initiative serves as China's primary arena for international crude oil cooperation, scholars have examined crude resources in relevant countries [9], trade patterns [10], and cooperation frameworks [11], with some constructing crude oil trade network models [12] to study trade relationships and influencing factors. Other studies have developed indicator systems to evaluate supply security [13] and competitiveness [14] of crude oil exporters, widely employing trade competitiveness indices and revealed comparative advantage indices [15].

While crude oil trade has become a hot academic topic, most research analyzes resource foundations, prospects, strategic advantages, and cooperation models from China's perspective, emphasizing geopolitical situations [16] and import risk assessment [17]. Systematic studies on comprehensive factors affecting crude oil exporters' trade capacity and competitiveness—such as crude supply capacity, domestic political and economic environment, international relations, and transportation—remain relatively scarce. Understanding the comprehen-

sive strength of crude oil exporters and their various influencing factors is equally crucial for comprehensively grasping China's crude oil security.

Therefore, this study adopts the perspective of crude oil exporters to evaluate the crude oil export competitiveness (referred to as "crude oil export power") of major Belt and Road countries involved in trade with China, exploring the main constraints on each country's crude oil export power to provide reference recommendations for advancing China's international crude oil trade cooperation.

1.1 Sample Selection

China's crude oil import sources have become increasingly diversified, with imports from approximately 50 countries, 43 of which have signed Belt and Road cooperation documents with China. However, China's crude oil import sources remain relatively concentrated, with the top ten source countries accounting for over 80% of total imports. Among these ten countries, Russia, Saudi Arabia, Angola, Iran, Iraq, Oman, and Kuwait have consistently been included and have all signed Belt and Road cooperation documents. Venezuela, Colombia, and Brazil in South America have increased crude oil exports to China in recent years and joined China's top ten crude oil import sources, though Colombia and Brazil have not signed Belt and Road cooperation documents and are therefore excluded from this study. Additionally, Malaysia, Indonesia, Brunei, Vietnam, United Arab Emirates, Qatar, Azerbaijan, Kazakhstan, Egypt, Algeria, Libya, and Ecuador have signed Belt and Road cooperation documents and export considerable crude oil to China.

Considering data completeness for the study period, this research selects the top 20 countries as study objects. According to UN statistics, these sample countries are categorized into five regions: Southeast Asia, Middle East, Commonwealth of Independent States (CIS), Africa, and Americas. These 20 countries account for approximately 98% of crude oil exports from Belt and Road countries to China, with nearly 90% maintaining a stable export proportion exceeding 5% [Figure 1: see original paper].

1.2 Index System Construction

Factors affecting a country's crude oil export power include crude oil export capacity and crude oil export realization capacity. Crude oil export capacity is primarily constrained by internal factors of the exporting country, while crude oil export realization capacity is influenced by external factors and global crude oil trade conditions. Crude oil export capacity mainly considers the exporter's supply capacity and domestic political and economic environment, while crude oil export realization capacity must account for international relations, relations with China, and transport accessibility as key influencing factors. Therefore, the measurement of crude oil export power should comprehensively consider five

dimensions: crude oil supply capacity, domestic political and economic environment, international relations, relations with China, and transport accessibility.

Drawing on relevant literature and following principles of scientific rigor, systematicity, and data availability, 19 specific indicators are selected across these five dimensions to construct a comprehensive evaluation index system for crude oil export power of Belt and Road countries involved in trade with China .

Crude Oil Supply Capacity (B1-B3). Proven crude oil reserves (B1) reflect a country's crude resource abundance—greater reserves indicate stronger export capacity. Crude oil production-consumption gap (B2), calculated as production minus consumption, indicates greater export availability when positive. The reserves-to-production ratio reflects how many years existing reserves can sustain current production levels, serving as an important parameter for evaluating supply capacity. However, this ratio alone cannot fully reflect supply capacity. This study adopts the method of Yang et al. [] to construct crude oil supply potential (B3) using the reserves-to-production ratio and the country's share in world crude oil exports.

Domestic Political and Economic Environment (B4-B9). Corruption control (B4), government effectiveness (B5), and political stability (B6) reflect domestic political conditions—higher values indicate better political environments and greater trade security. Economic scale (B7), economic growth rate (B8), and trade openness (B9) reflect the domestic economic environment. Stronger economic advantages indicate more favorable export conditions and capacity.

International Relations (B10-B11). The Organization of the Petroleum Exporting Countries (OPEC) coordinates member countries' oil policies. If a sample country belongs to OPEC (B10), it positively impacts crude oil exports, so a dummy variable is introduced (1 for OPEC members, 0 otherwise). The number of crude oil trading partner countries (B11) indicates institutional and policy support for crude oil trade—more partners suggest stronger export realization capacity.

Relations with China (B12-B15). Crude oil export volume proportion to China (B12) represents a country's export share to China relative to its total crude oil exports, reflecting its dependence on the Chinese market []. Crude oil export volume ranking to China (B13) indicates China's position among the country's trading partners—higher ranking suggests closer trade ties and greater export realization capacity. Geographic location relationship (B14) uses a dummy variable (1 for land border with China, 0 otherwise). Geopolitical relationship (B15) is scored based on China's partnership diplomacy framework, ranging from comprehensive strategic partnership to new-type relations, with reference to relevant literature [].

Transport Accessibility (B16-B19). Transport distance (B16) follows the methodology of Liu et al. [] and Deng et al. []: landlocked countries bordering China use capital distance, while non-bordering landlocked countries use mar-

itime distance plus straight-line distance from capital to port. Transport mode diversification (B17) reflects export realization capacity, with three modes (maritime, pipeline, railway) scoring 1 point each—more diverse transport modes indicate stronger realization capacity. Logistics service capacity and quality (B18) and trade- and transport-related infrastructure quality (B19) reflect infrastructure support for crude oil transport, with higher values indicating stronger export realization capacity.

1.4 Research Methods

1.4.1 Entropy-Weight TOPSIS Model The determination of indicator weights directly affects the quality and reliability of crude oil export power evaluation. Methods such as expert scoring, principal component analysis, and analytic hierarchy process involve subjective judgments that may overestimate or underestimate certain indicators, potentially biasing results. This study adopts the data-driven entropy-weight TOPSIS model to evaluate the crude oil export power of Belt and Road countries involved in trade with China. Specific calculation steps follow referenced literature [1].

1.4.2 Obstacle Degree Model To identify major constraints on crude oil export power, the obstacle degree model calculates each indicator's impact. The formulas are as follows [2]:

$$A_{ij} = 1 - y_{ij}, \quad P_{ij} = \frac{w_{ij} \times A_{ij}}{\sum_{i=1}^n w_{ij} \times A_{ij}} \times 100\%$$

where A_{ij} is the deviation degree of indicator i in year j , y_{ij} is the standardized value, P_{ij} is the obstacle degree, and w_{ij} is the indicator weight. T represents the obstacle degree at the criterion level.

2. Results and Analysis

2.1 Comprehensive Evaluation of Crude Oil Export Power

2.1.1 Overall Fluctuating Decline Trend Calculating the crude oil export power scores for sample countries and regions across three time points reveals that the overall crude oil export power level exhibits a fluctuating downward temporal evolution trend [Figure 2: see original paper]. The mean crude oil export power showed turbulent growth, peaking in 2015, then declining annually from 2016 to 2020. At the regional level, the CIS region consistently achieved the highest comprehensive scores, followed by the Americas, Middle East, and Southeast Asia, with Africa scoring lowest. The 2010-2020 average annual growth rates for the Americas, Southeast Asia, CIS, Middle East, and Africa were -0.94%, -0.17%, -0.25%, -0.38%, and 0.10% respectively, with all regions showing fluctuating declines consistent with the overall trend.

2.1.2 Ranking Changes Calculating crude oil export power values for 20 sample countries across 2010, 2015, and 2020 shows that Malaysia, Brunei, Vietnam, Saudi Arabia, Azerbaijan, Russia, Kazakhstan, Egypt, Venezuela, and Ecuador maintained unchanged rankings. Indonesia, Iraq, Oman, and Kuwait experienced rising rankings, while Iran, United Arab Emirates, Qatar, Algeria, Angola, and Libya saw declining rankings .

Specifically, the top five countries in 2010 were Venezuela, Saudi Arabia, Iraq, Iran, and United Arab Emirates. By 2015, Russia, Kazakhstan, Vietnam, Saudi Arabia, and Venezuela ranked highest. In 2020, Russia, Kazakhstan, Vietnam, Saudi Arabia, and United Arab Emirates remained top performers. Russia consistently ranked first, while Kazakhstan and Vietnam maintained high levels without ranking changes. Compared with 2010, Malaysia, Iraq, Oman, United Arab Emirates, and Kuwait rose in 2015, with Oman showing the most rapid ascent (5 positions). Iran, Saudi Arabia, Algeria, Angola, and Libya declined, with Angola's drop most pronounced (4 positions). By 2020, Indonesia, Malaysia, Vietnam, Iraq, Saudi Arabia, Kuwait, and Libya rose slightly, while Malaysia, Oman, United Arab Emirates, Qatar, and Venezuela declined marginally.

2.2 Evaluation Results by Dimension

2.2.1 Crude Oil Supply Capacity From 2010 to 2020, ranking changes in crude oil supply capacity scores were minimal. Countries with strong supply capacity remained stable, with Russia maintaining its leading position despite relatively low reserves. Venezuela possesses the world's richest crude oil reserves (approximately 17.55% of global total), while Russia benefits from abundant reserves and large production volumes. In Africa, only Libya scored relatively high, while Angola, Algeria, and Egypt scored moderately low. Southeast Asian countries (Indonesia, Malaysia, Vietnam, Brunei) lack advantages in reserves and production while facing high domestic demand, resulting in weaker supply capacity.

2.2.2 Domestic Political and Economic Environment From 2010 to 2020, some countries experienced significant ranking changes in this dimension. Russia, United Arab Emirates, Kazakhstan, Indonesia, Saudi Arabia, and Qatar scored relatively high. Although Russia's corruption control, government effectiveness, and political stability scores were relatively low, its economic scale and trade openness far surpassed other countries. The United Arab Emirates' total import-export volume as a share of GDP ranked second after Russia, with high political environment scores. Oman and Kuwait maintained relatively stable political situations and good economic development, scoring at intermediate levels. Angola, Iraq, Egypt, and Azerbaijan scored poorly across corruption control, government effectiveness, political stability, economic scale, and trade openness, reflecting weaker overall political and economic environments. Ecuador showed major ranking improvements after 2015 due to enhanced government effectiveness, political stability, and expanded economic scale, while Iran's scores

gradually declined due to severe economic contraction under U.S. sanctions.

The global political and economic environment has faced intensifying fragmentation and deglobalization trends [], with the Russia-Ukraine conflict exerting widespread impacts on global and national economies while escalating geopolitical conflicts []. The conflict's repercussions extend beyond the immediate region, complicating political games among the U.S., China, EU, and Russia. Coupled with U.S. Federal Reserve interest rate hikes and “black swan” events like COVID-19, the global economy has fallen into recession, causing declining scores across all countries in this dimension.

2.2.3 International Relations From 2010 to 2020, OPEC members and countries with numerous crude oil trading partners (United Arab Emirates, Saudi Arabia, Iraq) scored relatively high. Although Russia is not an OPEC member, its status as a major crude oil exporter with many trading partners places it at intermediate levels. Malaysia, Brunei, Iraq, Kuwait, Azerbaijan, Russia, Kazakhstan, and others experienced rising rankings, with Iraq's ascent most notable due to increased trading partners. Iran and Qatar declined significantly: Iran faced severe sanctions with the U.S. “oil ban” causing many countries to halt imports, while Qatar's 2019 withdrawal from OPEC contributed to its ranking drop.

2.2.4 Relations with China From 2010 to 2020, scores and rankings in this dimension changed considerably. Russia, Vietnam, and Kazakhstan consistently ranked top three, having established partnerships with China early, maintaining high proportions of crude oil exports to China, and being the only three sample countries sharing land borders with China. Venezuela, Algeria, Indonesia, and Egypt initially scored relatively high due to partnership establishment. Subsequently, China established strategic partnerships with United Arab Emirates (2012), Malaysia (2013), Iraq (2015), Ecuador (2016), and Kuwait (2018), deepening mutual support and consultation, particularly under severe global COVID-19 conditions. By 2020, 18 of 20 sample countries had established partnerships with China; only Libya and Azerbaijan remained without partnerships and exported relatively small volumes to China, resulting in lower scores. Venezuela's crude oil exports to China plummeted in 2020 due to the pandemic and U.S. sanctions, significantly reducing its ranking.

2.2.5 Transport Accessibility From 2010 to 2020, Kazakhstan and Russia consistently scored highest in transport accessibility, benefiting from well-developed crude oil transport infrastructure. The China-Kazakhstan crude oil pipeline became fully operational in 2009, and the China-Russia crude oil pipeline was completed in 2011. While China has only two railway crude oil import channels (in Kazakhstan and Russia) with limited capacity, they remain important where maritime and pipeline transport are unavailable. Middle Eastern countries (United Arab Emirates, Kuwait, Saudi Arabia) primarily use Middle East shipping routes with relatively short distances and strong domestic

logistics infrastructure. The China-Myanmar crude oil pipeline trial operation in 2017 diversified transport modes for Middle Eastern crude oil via the Indian Ocean, improving accessibility scores.

Southeast Asian countries (Vietnam, Malaysia) initially scored high due to short transport distances despite single-mode transport, but rankings gradually declined without infrastructure improvements. African (Algeria, Libya, Angola) and American (Venezuela, Ecuador) countries scored low due to long maritime transport distances and lower security.

2.3 Obstacle Factors Affecting Crude Oil Export Power

2.3.1 Identification of Obstacle Factors Applying the obstacle degree model to identify constraints on crude oil export power, the top five obstacle factors were calculated and ranked for each indicator. Among obstacles to crude oil export capacity, resource-related factors appeared most frequently (B1, B3), followed by political (B4-B6), economic (B7-B9), and international relation factors (B10-B11). Based on top-ranked obstacles, Malaysia, Indonesia, Brunei, Vietnam, Oman, Qatar, Azerbaijan, Egypt, Algeria, and Ecuador are classified as resource-constrained types, needing to fully exploit domestic crude resources and expand trade volumes. Iraq, Russia, Angola, Venezuela, and Libya are political-constrained types, requiring strengthened governance, corruption control, and enhanced government effectiveness and stability. Iran, Saudi Arabia, Kuwait, Kazakhstan, and United Arab Emirates are economic-constrained types, needing industrial structure optimization and expanded foreign trade to accelerate economic growth.

Among obstacles to crude oil export realization capacity, relations with China appeared most frequently (B12-B15), followed by transport accessibility (B16-B19). Geographic location relationship represents a major constraint for all countries except Vietnam, Kazakhstan, and Russia, which border China. The proportion of crude oil exports to China also shows high obstacle degrees due to significant variations among countries. Geopolitical relationship shows relatively low obstacle degrees, reflecting China's continuous sharing of development dividends and willingness to cooperate.

Transport mode diversification constitutes a primary obstacle for Southeast Asian, African, and American exporters. While the Belt and Road Initiative has achieved major successes in facility connectivity, forming a basic "six corridors, six routes, multiple countries and ports" framework, China's heavy reliance on maritime transport via Middle East, Africa, and America routes remains fundamentally unchanged.

2.3.2 Analysis of Obstacle Factors At the dimension level, relations with China (29.76%) constitute the most significant obstacle to crude oil export power, followed by domestic political and economic environment (24.55%), crude oil supply capacity (18.63%), transport accessibility (18.68%), and international

relations (8.38%). The top five individual indicators are geographic location relationship (12.87%), transport mode diversification (10.23%), trade openness (8.92%), crude oil supply potential (8.82%), and proven reserves (8.46%) [Figure 4: see original paper].

GDP, as a fundamental aggregate indicator, cannot fully reflect economic activity but serves as an important tool for evaluating national economic prosperity. Significant gaps in economic scale and trade volumes among sample countries result in high obstacle degrees. While global trade has not fully recovered from its downturn, the Belt and Road Initiative provides opportunities for promoting openness. As the initiative's initiator and advocate, China welcomes all like-minded countries to participate, helping expand trade scale and achieve mutual benefits.

Crude oil supply capacity forms the basic condition for crude oil exports and represents a major influencing factor. The indicator encompasses reserves, production, consumption, exports, and world market share. Endowments of crude resources directly affect export scale, efficiency, and trade possibilities. Malaysia, Indonesia, and other countries suffer from low proven reserves, limited production, and insufficient supply potential, resulting in low scores. Despite Belt and Road cooperation promoting energy collaboration, significant variations in reserves, production, consumption, and exports among sample countries create high obstacle degrees for sub-indicators.

Transport accessibility has become a crucial factor in evaluating crude oil export competitiveness. Malaysia, Brunei, Azerbaijan, Libya, and Ecuador face primary obstacles from transport mode diversification. Although the Belt and Road Initiative has made major achievements in facility connectivity, with the China-Myanmar oil and gas corridor and China-Russia and China-Kazakhstan crude oil pipelines becoming operational, China's massive crude oil imports still fundamentally rely on maritime transport.

3. Conclusions and Recommendations

3.1 Conclusions

This study constructs a crude oil export power evaluation index system, selects 20 Belt and Road sample countries, analyzes their crude oil export power scores and spatiotemporal differentiation characteristics across dimensions, and explores obstacle factors, yielding the following conclusions:

- 1) From 2010 to 2020, the overall crude oil export power of the 20 sample countries showed a fluctuating downward trend. The mean crude oil export power exhibited turbulent growth, peaking in 2015, then declining annually through 2020.
- 2) The evolution of temporal and spatial patterns of crude oil export power among sample countries remained relatively stable overall, though regional differences persist. At the regional level, the CIS region scored highest

comprehensively, followed by the Americas, Middle East, and Southeast Asia, with Africa scoring lowest. At the country level, Malaysia, Brunei, and eight other countries showed no ranking changes, Indonesia and Iraq rose, while Iran and United Arab Emirates declined.

- 3) Countries demonstrate distinct advantages and disadvantages across dimensions. Russia, Kazakhstan, Vietnam, Saudi Arabia, and Venezuela scored relatively high across all five dimensions. Specifically, Venezuela, Russia, and Middle Eastern countries scored highest in crude oil supply capacity; Russia and United Arab Emirates scored highest in domestic political and economic environment; Middle Eastern and African countries scored high in international relations due to OPEC membership and numerous trading partners; Russia, Vietnam, and Kazakhstan scored high in relations with China; and Kazakhstan, Russia, and Middle Eastern countries demonstrated high transport accessibility.
- 4) Relations with China consistently represent the primary obstacle factor, followed by domestic political and economic environment, crude oil supply capacity, and transport accessibility, with international relations being the least significant. High-obstacle individual indicators include geographic location relationship, transport mode diversification, and trade openness.

3.2 Recommendations

As the world's largest developing country with rapid economic growth and soaring crude oil demand, China became a net crude oil importer in 1996 and currently ranks as the world's largest crude oil importer. China's crude oil imports concentrate primarily in the Middle East, Africa, Russia, and the Americas. Based on the assessment of sample countries' crude oil export power, the following recommendations are proposed:

- 1) The Middle East and Africa constitute China's primary current crude oil import sources, yet their crude oil export power levels are relatively weak due to significant political risks and instability factors in countries like Iran, Iraq, Algeria, and Libya. China should appropriately reduce dependence on high-risk countries and increase investment in regions with high crude oil export power scores, relatively stable politics, and resource endowment advantages, such as Russia, Kazakhstan, Venezuela, and Saudi Arabia.
- 2) The China-Russia, China-Kazakhstan, and China-Myanmar crude oil pipelines, products of the Belt and Road Initiative, have significantly alleviated China's over-reliance on maritime transport channels and improved transport accessibility for Russia, Kazakhstan, and Middle Eastern countries. China should actively promote and implement crude oil pipeline construction projects to diversify transport modes, disperse maritime transport risks, and enhance crude oil transport security.

- 3) As the proponent of the Belt and Road Initiative with an expanding “circle of friends,” China should conduct effective energy diplomacy under the principle of “extensive consultation, joint contribution, and shared benefits,” further developing and consolidating partnerships with trade-involved countries to form an energy community with a shared future. As the world’s largest crude oil importer with growing international influence, China should strive to enhance its discourse power and influence in international crude oil trade markets, construct a new international crude oil market order under the Belt and Road framework, and leverage its market advantages of large demand and import volumes to increase crude oil exports to China from countries like Algeria, Egypt, Indonesia, Brunei, and Azerbaijan, thereby improving their relations with China scores and ensuring China’s crude oil supply security.

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