

Overseas Oil Cooperation between China and India Based on Crude Oil Trade Flow Analysis

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Abstract: Globally, China and India are the second and third largest oil consumption and import countries, respectively. As the two countries' economies develop, their oil imports will gradually increase. The influence of India's future oil demand on China's access to overseas resources has been the focus of scholars both in China and overseas. Based on the analysis of oil consumption in China and India and the current status of the global crude oil trade, this paper analyzes the change in the overlap and concentration degrees of China's and India's crude oil importing sources from 2006 to 2015. The study shows that the competition over oil importing sources between China and India is mainly concentrated in eight countries (Saudi Arabia, Iraq, Iran, Venezuela, Kuwait, Brazil, the United Arab Emirates, and Angola) and that Africa and Central and South America will become important competitive regions for energy resources in the future. China and India import crude oil mainly from politically unstable countries and regions. In the future, the two countries should strengthen cooperation in seeking oil supplies from overseas to collaboratively safeguard stable oil supplies.

1. Introduction

Globally, China and India are major oil consuming countries. In 2015, China and India consumed 559.7 million and 195.5 million metric tons of oil, respectively, accounting for 12.7% and 4.5% of the total oil consumed worldwide. China and India are the world's second and third largest oil consumers. Since the beginning of the 21st century, with the development of China's and India's economies, their oil consumption has rapidly increased. Scholars both in China and overseas have focused on studies of the impact of China's and India's oil demand on the global oil market. Hamilton once assumed that increasing oil imports from China and India would push up oil prices [1]. Hong Li and Sharon Xiaowen Lin verify Hamilton's hypothesis in their research [2]. Since 2003, because of the surge in oil imports from emerging developing countries represented by China and India, oil prices have been pushed up, resulting in the "oil crisis" of 2007-2008 [3]. Some scholars believe that the economic growth of emerging developing countries such as Brazil, Russia, India, and China (the BRIC countries) has resulted in the increase in oil demand, pushing up the price of oil [4,5]. On the other hand, some scholars have held the opposite opinion, believing that the economic growth in China has not affected global oil prices [6]. In their study, Wu Kang conclude that China's oil imports did not clearly affect the Brent oil prices [7]. High oil prices would somewhat inhibit China's oil imports [8].

Scholars in China and overseas have conducted many studies on the competition over the oil supply between China and India. For example, Mike Van Moerkerk et al. compare the oil supply crisis that



China and India could face under different climate scenarios in 2035[9]. The conclusion is that China will face a smaller crisis compared to India whereas India's situation is the opposite of that of China. Based on the analysis of China's and India's oil consumption and the current status of the global oil trade, this paper analyzes the changes in the overlapping and degree of concentration of the two countries' oil import sources from 2006 to 2015. Based on the future global oil supply and demand trend, this paper discussed cooperation between the two countries in seeking an oil supply from overseas.

2. The Current Status of Oil Consumption in China and India

China and India have a similar non-renewable energy consumption structure. Coal is the primary energy source, followed by oil. Since 1965, the proportion of oil in the total non-renewable energy consumed in India has been higher than that of China. In 2015, oil accounted for 18.6% of the total non-renewable energy consumed in China. This ratio was 27.9% in India).

China's oil consumption rose from 112.9 million metric tons in 1990 to 559.7 million metric tons in 2015, with an average annual growth rate of 15.8%. During the same period, India's oil consumption rose from 57.9 million metric tons to 195.5 million tons, with an average annual growth rate of 9.5% (Figure 1). In 2015, oil consumption grew by 6.3% and 8.1% in China and India, respectively. Both countries maintained a relatively rapid growth rate of oil consumption.

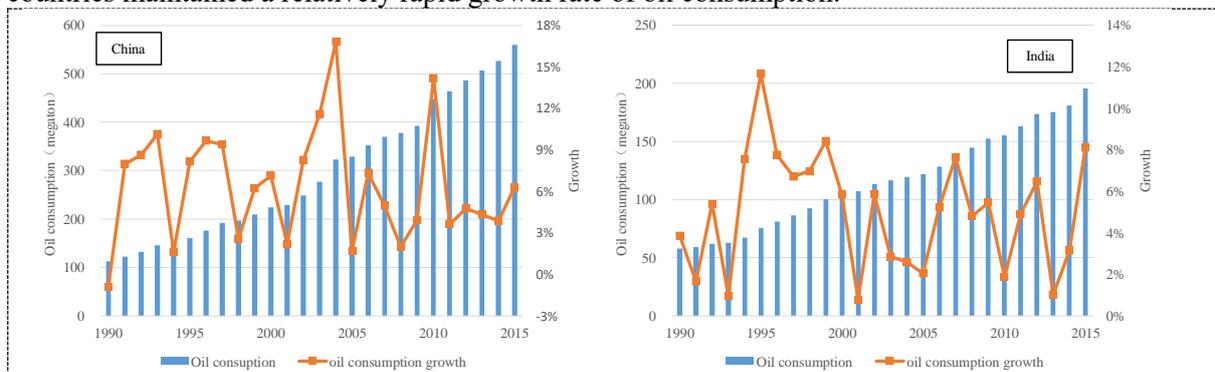


Figure 1. History of oil consumption in China and India (Data source: BP)

Both China and India lack domestic oil resources. Their domestic production cannot meet the domestic demand, and both countries must import large amounts of oil to meet their domestic demand. Since 2000, China's dependence on foreign oil has gradually increased. India's dependence on foreign oil has remained at or above 70%. In 2015, China's oil dependence was 62%; for India, it was up to 79% (Figure 2).

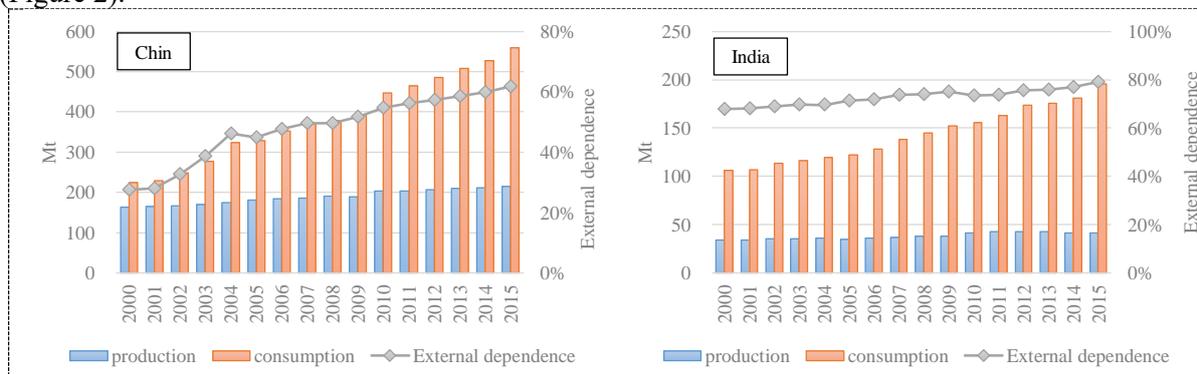


Figure 2. The current status of the oil supply in China and India ((Data source: BP)

3. Comparison of Crude Oil Importing Source Areas between China and India

Global oil is traded in two forms as crude oil and refined oil. Because India imports only a low amount of refined oil, this study focuses on the crude oil trade. In 2015, the global crude oil trade volume was 1977.2 million metric tons. The Middle East was the largest oil export region, accounting for 44% of

total global oil exports. The United States, Europe, China, India, and Japan were the world's major crude oil importing countries and regions.

The share of China and India's crude oil imports in the world rose from 9% in 2000 to 27% in 2015. During the same period, crude oil imports in Europe, the United States, and Japan gradually decreased. Their proportion in global oil imports also declined.

Diversifying importing sources is one important measure of safeguarding the supply security in oil-importing countries [10]. As India's imports of crude oil gradually increase, the importing sources have gradually been diversified. UN Trade data show that from 2006 to 2015, the sources of India's oil imports grew from 26 to 44 countries and regions, which gradually coincided with China's import sources. Moreover, this overlap is gradually increasing. In 2015, 94.5% of India's oil and 98.5% of China's oil were imported from the same countries and regions (Figures 3 and 4).

China's and India's crude oil imports mainly depend on the Middle East, West Africa, and Central and South America; in 2006, these three regions accounted for 45.2%, 24.4%, and 5.1% of China's oil imports, respectively, compared to 72.1%, 12.7%, and 1.5%, respectively, of India's oil imports; in 2015, China's percentages were 50.7%, 14.9%, and 12.4%, respectively, whereas for India, the percentages were 58.3%, 16.4%, and 15.0%, respectively.

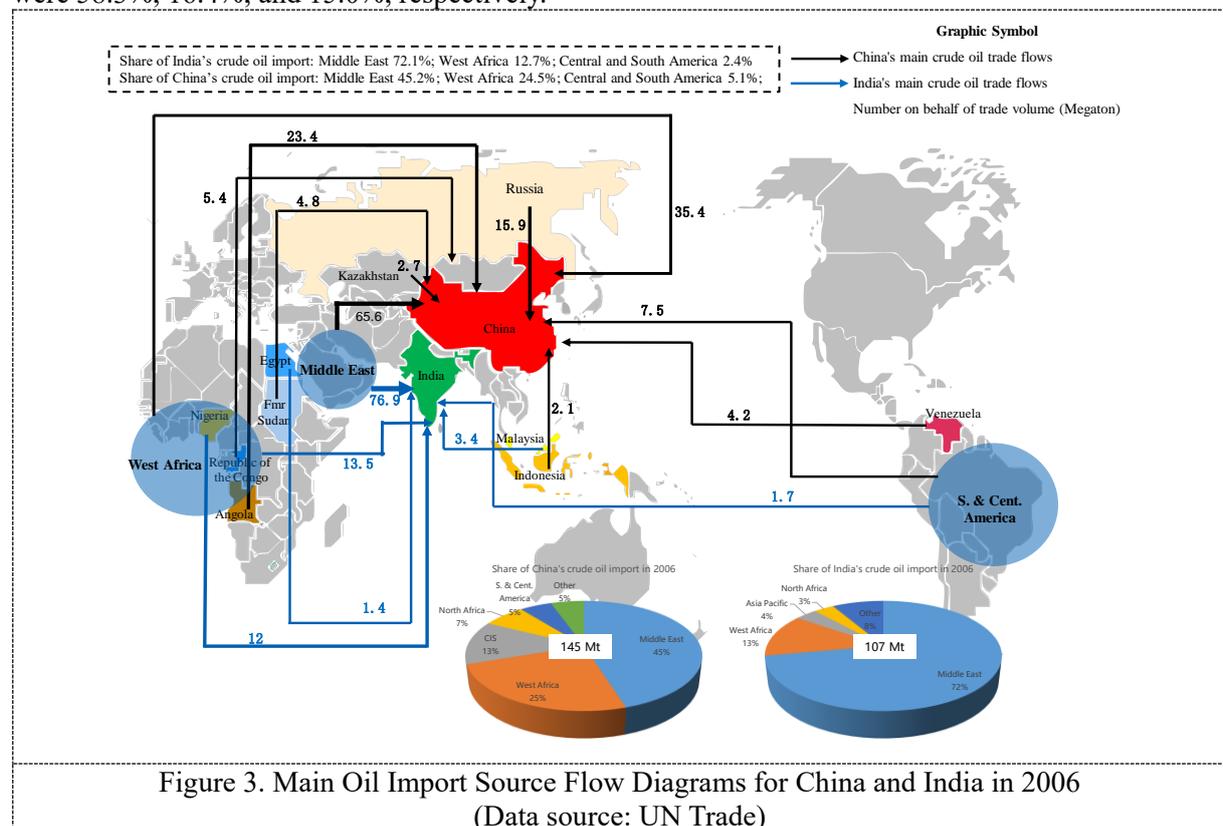


Figure 3. Main Oil Import Source Flow Diagrams for China and India in 2006 (Data source: UN Trade)

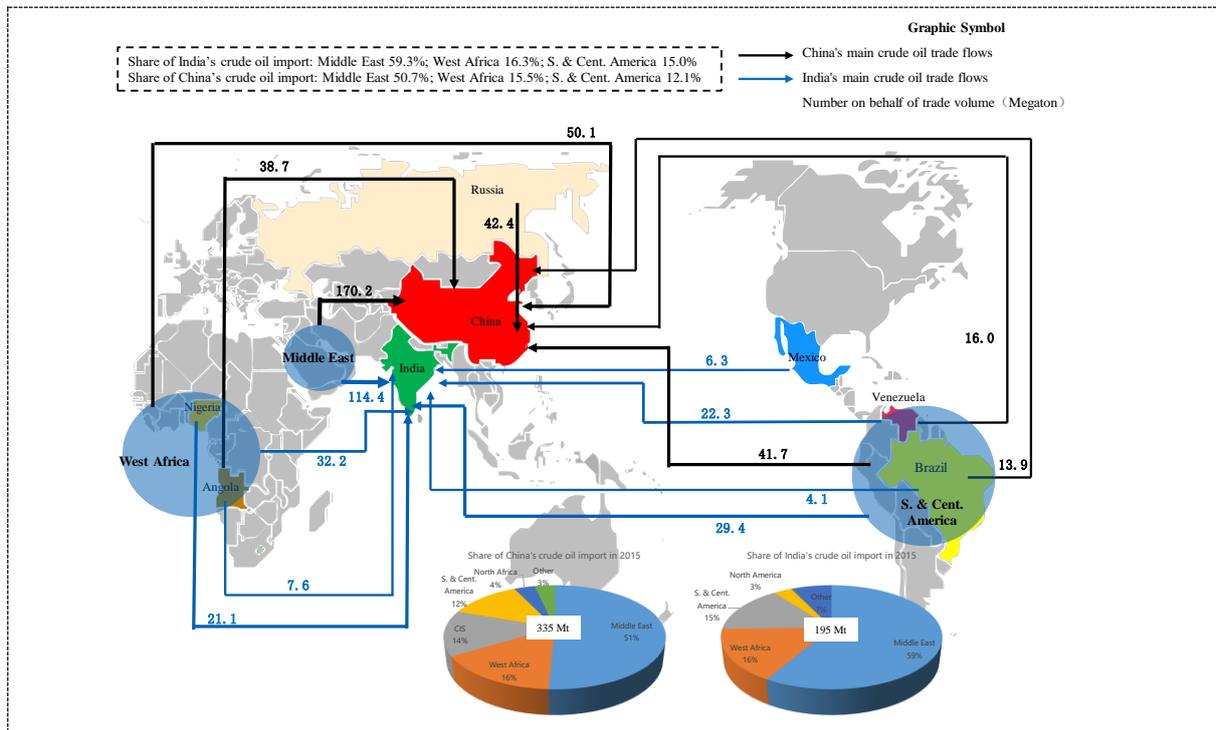


Figure 4. Major oil import flow diagrams for China and India in 2015 (Data source: UN Trade)

China imports crude oil mainly from Saudi Arabia, Russia, Angola, Iraq, Oman, Iran, Venezuela, Kuwait, Brazil, and the United Arab Emirates. From 2006 to 2015, the imports from these 10 countries accounted for 78% of total imports for China. In contrast, the crude oil imports from these countries accounted for 73% of the total imports in India (Figure 5).

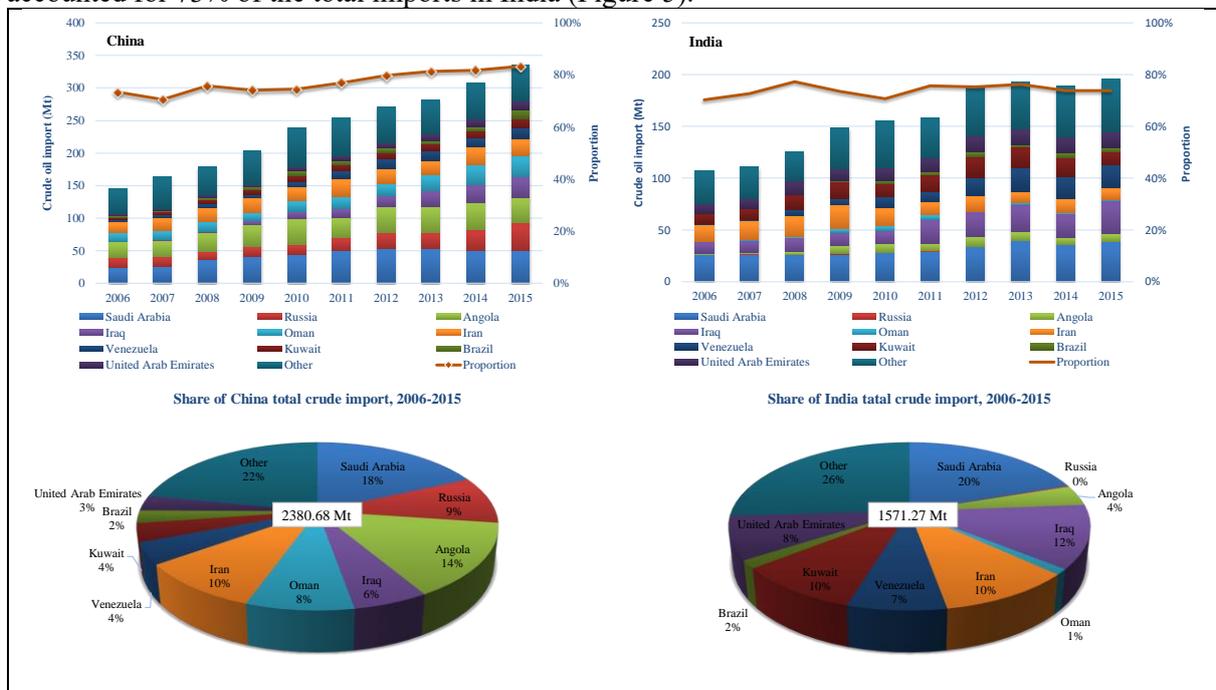


Figure 5. China's and India's percentages of crude oil imports from major export countries from 2006 to 2015 (Data source: UN Trade, BP)

In 2006, the high overlapping oil export countries (i.e., those from which both China and India

imported large amounts of crude oil) were Saudi Arabia, Iran, Yemen, and Venezuela. In 2015, the list of overlapping countries grew to eight countries: Saudi Arabia, Iraq, Iran, Venezuela, Kuwait, Brazil, the United Arab Emirates, and Angola. The percentages of China's and India's oil imports from these eight countries in their total oil imports gradually increased (Table 1).

Table 1. The percentage of China's and India's crude oil imports to the total production of major oil exporting countries

Percentage of import in the total oil production of export countries	Saudi Arabia		Angela		Iraq		Iran		Venezuela		Kuwait		Brazil		United Arab Emirates	
	China	India	China	India	China	India	China	India	China	India	China	India	China	India	China	India
2006	5%	4%	34%	1%	1%	10%	8%	6%	2%	1%	2%	6%	2%	0%	2%	4%
2007	5%	5%	30%	2%	1%	11%	10%	9%	2%	1%	3%	8%	2%	0%	3%	7%
2008	7%	5%	32%	2%	2%	12%	10%	10%	4%	4%	4%	10%	3%	0%	3%	10%
2009	9%	6%	37%	8%	6%	11%	11%	12%	3%	3%	6%	13%	4%	2%	3%	9%
2010	9%	6%	44%	9%	9%	11%	10%	8%	5%	7%	8%	11%	7%	2%	4%	9%
2011	10%	6%	37%	9%	10%	17%	13%	6%	8%	6%	7%	12%	6%	3%	4%	9%
2012	10%	6%	46%	11%	10%	16%	12%	8%	11%	13%	7%	13%	5%	4%	6%	10%
2013	10%	7%	46%	10%	15%	17%	13%	6%	11%	16%	6%	14%	5%	2%	6%	9%
2014	9%	7%	49%	9%	18%	14%	16%	8%	10%	16%	7%	12%	6%	4%	7%	9%
2015	9%	7%	44%	9%	16%	16%	15%	6%	12%	17%	10%	8%	11%	3%	7%	9%

Data source: BP, UN Trade.

India adopted the strategy of stabilizing the oil supply from the Middle East, vertically developing supplies from Russia, and horizontally developing supplies from Africa and Southeast Asia [11]. India has cooperated with 25 countries around the world in oil and gas exploration and production, with a total investment of more than 20 billion and 465 million US dollars, respectively [12]. Africa and Central and South America have become the focus of India's overseas oil and gas resources development regions. To meet the increasing dependence on oil suppliers from overseas, both China and India are actively laying out plans to develop overseas oil supplying sources. The plans of the two countries highly overlap with one another. The overlapping is increasingly pronounced (Figure 6).

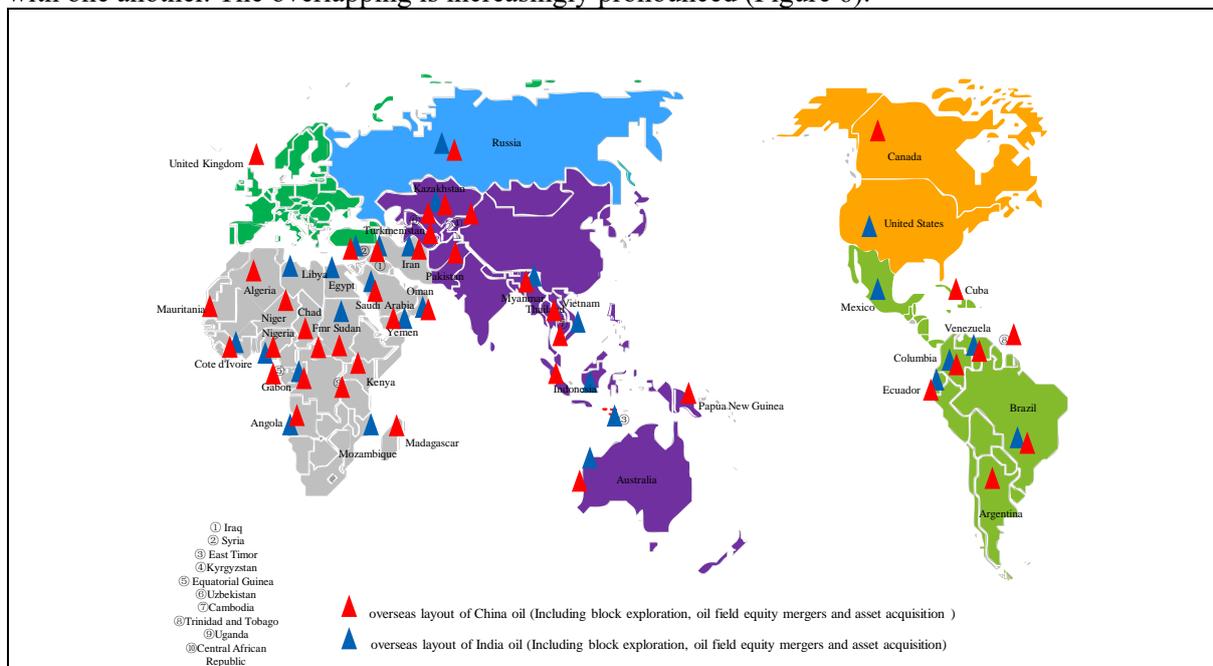


Figure 6. Layout of China's and India's overseas oil suppliers
 (Data source: Chen et al., 2015; Indian Oil Company Annual Report; China Petroleum Company Annual Report)

4 Discussion

It is predicted that China's crude oil demand will be approximately 700 million metric tons by 2030[13]. Because of the lack of domestic natural resources, China's maximum crude oil production will be approximately 250 million metric tons in the future, which means that China will need import 500 million metric tons of crude oil to meet domestic demand. The Indian Planning Commission predicts that India's crude oil demand will reach approximately 486 million metric tons by 2030[14]. Because India's domestic conventional and unconventional oil production growth potential is limited [15], its dependence on foreign oil will gradually rise. In its "India Energy Security Scenario 2047", the Indian Department of Energy predicts that India's dependence on imported oil will rise to approximately 90% in 2030, at which time India will import approximately 400 million metric tons of crude oil annually.

China's and India's increasing oil demand is reshaping the existing oil trade pattern. Global crude oil exports are gradually tilting toward China and India. Because of the high degree of overlap between these two major crude oil importers, India's effort to access overseas oil resources will inevitably affect the interests of China. China's and India's bidding experience for oil resources in Angola and Ecuador demonstrates that the competition over overseas oil resources between the two countries is inevitable [16]. This competition will somewhat drive up the cost of obtaining overseas oil resources for China and India [17].

BP's "World Energy Outlook 2035" data show that before the year 2030, China's and India's increasing demand for oil will result in an expanding oil supply gap in the Asia-Pacific region. The Middle East is still the main oil supplier globally. Africa's oil production will grow slowly. South America's own oil consumption is growing, which will somewhat negatively affect the crude oil exports from this region. China's and India's crude oil imports from Africa and South America are gradually increasing. In India's "2025 oil and gas development strategy", India proposes to strengthen cooperation with Africa and Latin America. In the future, China's and India's most severe competition over oil sources may mainly be in these two regions.

5 Conclusions

China and India are both major oil importers. Both are heavily dependent on oil imports from countries with complicated geopolitical situations, such as Saudi Arabia, Iraq, Iran, Venezuela, Kuwait, Brazil, the United Arab Emirates, and Angola. China and India share a common interest in ensuring that the oil supply is stable and that the oil price is reasonable. Therefore, the two countries should strengthen their cooperation in obtaining oil sources from overseas. China has built a refinery in Khartoum, Sudan, whereas India has built a pipeline to deliver refined products to a nearby port for export. This example is a nice model of cooperation between the two countries on developing oil sources. There exists a security risk in oil transportation. For China, the "Malacca Strait Crisis" is a potential risk to its oil supply security [19, 20]. To solve this dilemma, China is building crude oil pipelines in Pakistan and Myanmar, but India is still a key factor affecting this plan. China should negotiate with India by "equivalent exchange", i.e., allowing an India-Russia crude oil pipeline to pass through China. China can also co-share these pipelines.

The Sino-Indian relationship is one of the most complicated bilateral relations in Asia. On one hand, the two countries share many common interests because of their similar characteristics. On the other hand, the relationship is fragile because of the geopolitical competition between the two countries. Therefore, by strengthening cooperation between the two countries in seeking overseas oil resources, the two countries can avoid the "resource premium" caused by the competition between the two countries. Based on this cooperation, the two countries will collaborate in a series of other energy source development programs and achieve the "win-win" objective.

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