Research on China`s Transport Connectivity Along Corridors of the Belt and Road Initiative

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Abstract. By brief introduction of the Belt and Road initiative, which was proposed by Chinese government, this paper reviews the literature and puts forward the importance of transport connectivity for countries along the Belt and Road routes. Then, the present situation of China`s transport connectivity with the countries along the Belt and Road routes has been summarized. The author thinks that although the initiative has achieved notable outcomes, especially referring to the “Six Corridors Building”, transport connectivity between China and the Belt and Road countries still faces some challenges in lagging infrastructure construction, limited transport service, weak transport hubs and various risks. Finally, this paper gives some suggestions to solve problems both domestically and internationally.

1. The Belt and Road initiative and transport connectivity

1.1. Overview of the Belt and Road initiative
In the fall of 2013, Chinese President Xi Jinping proposed the strategic framework of building the “Silk Road Economic Belt” and a counterpart “21st Century Maritime Silk Road,” collectively referred to in abbreviated form as the “Belt and Road” (B&R) initiative. The initiative calls for policy coordination, facilities connectivity, unimpeded trade, financial integration and people-to-people bonds, in order to promote the establishment of an open, inclusive and balanced regional economic cooperation architecture that benefits all.

Five years ago, the B&R initiative was only a concept starting from China. Now, it runs through the continents of Asia, Europe and Africa, encompassing countries with huge potential for economic development, and has achieved notable outcomes.

With the common understanding of the B&R initiative, 103 countries and international organizations have signed 118 cooperation agreements with China. And the UN has adopted the “Belt and Road Initiative”.

A lot of projects have been launched, solidly promoting the substantial cooperation. For example, the Madaraka Express, connecting the Kenyan port of Mombasa with Nairobi, started operation in 2017. The Addis Ababa-Djibouti Railway, connecting Ethiopia with Djibouti, began operation from 2016. The China-Thailand railway, connecting Kunming and Bangkok, has also started and is expected to be completed by 2021.

The constant cooperation has boosted the trade development. By the year of 2017, the total import and export volume between China and the “Belt and Road” countries has reached US$1,440.32 billion, accounting for 36.2% of China’s total import and export trade at that time. Besides, the overseas
economic and trade cooperation zones built in the countries along the B&R routes have created hundreds of thousands of jobs, and contributed billions of dollars for local taxes.

In addition, eleven Chinese banks have established 71 first-level institutions. Co-financing cooperation with multilateral development banks, such as the African Development Bank, the Inter-American Development Bank, and the European Bank for Reconstruction and Development, has provided solid support for project construction. International cultural and tourism exchanges get much closer than before. In the year of 2017, there were more than 300,000 international students from the countries along the route. It is estimated that by 2020, the tourism consumption will be about 110 billion US dollars.

1.2. Role of transport connectivity under the Belt and Road initiative

As an important industry for social and economic development, transportation is a prerequisite for interconnect [1]. Most of the countries along the “Belt and Road” route, are developing country with a low level of economic development. The weak domestic transportation infrastructure is the bottle neck to economic improvement. The B&R initiative gives priority to the development of transportation infrastructure, in order to constantly promote the investment and trade environment.

Grigoriou found that the transport infrastructure of neighboring countries was important for inland Central Asian countries due to the existence of transit effects [2]. Edwards and Odendaal took 117 countries in the year of 2005 as samples to explore the impact of transport infrastructure quality on export trade, and it was found that the lowest quality infrastructure among trading partners had the greatest impact on transport costs, which in turn affected export trade [3]. By using GTAP model, Iwata made a study of the construction of international transportation infrastructure projects in the Mekong River Basin, and the conclusion was drawn that these transportation infrastructure promoted GDP growth in Laos and other countries in the Mekong River Basin [4]. Behrens found that transportation costs played a decisive role in trade flows, and countries with high levels of transport infrastructure could generate greater international trade flows and more balanced regional economic growth [5]. Francois and Manchin using a gravity model study found that improvements in transportation infrastructure led to increased trade flows [6].

In recent year, different from foreign researchers, China’s domestic researchers paid more attention to the empirical research on the countries along the B&R route. Xu and her fellows simulated and analysed the economic and trade effects of the transportation infrastructure construction, targeting the six economic corridors, and the result was that the transportation infrastructure would benefit the countries along the B&R route [7]. Based on the new economic growth and the new economic geography theory, Ni and Wang selected 14 countries along the B&R route between 2009 to 2015 for panel data research, by adopting the spatial spillover effect model, they came to the conclusion that the promotion of transportation infrastructure would boost the economic development of the selected countries [8]. Zhang and Yu conducted an empirical analysis of the influence of the transportation infrastructures on the export trade, and the conclusion was that the transportation infrastructures of the importing countries and their neighboring countries had a positive effect on China’s export trade [9].

2. Status quo of China’s transport connectivity

2.1. Transport corridor

The B&R initiative takes advantage of international transport routes as well as core cities to further strengthen collaboration. And there are six international economic co-operation corridors identified, namely the New Eurasian Land Bridge, China-Mongolia-Russia Economic Corridor, China-Pakistan Economic Corridor, China-Central and Western Asia Economic Corridor, China-Indochina Peninsula Economic Corridor, and Bangladesh-China-India-Myanmar Economic Corridor. Within these corridors, the transportation network consisting of railways, highways and waterways together realizes the infrastructure connection [10]. There is no precise definition of the above six corridors
from a geographical view, and these corridors aim to link major economic centers of the involved countries.

2.1.1. New Eurasian Land Bridge. Different from the Siberian Land Bridge starting from Russia, the New Eurasian Land Bridge, also known as the Second Eurasian Land Bridge, is an international railway line beginning from Lianyungang in China’s Jiangsu province, passing Alashankou in Xinjiang province, stretching through Kazakhstan, Russia, Belarus and Poland, and reaching a number of coastal ports in Europe. The 10,800-km-long transcontinental rail link serves more than 30 countries and regions. Within China, this corridor mainly includes Lanzhou-Lianyungang Railway and the Lanzhou-Xinjiang Railway, extending to the eastern, central and western China.

2.1.2. China-Mongolia-Russia Economic Corridor. As the first multilateral cooperation plan responding to the B&R initiative, the China-Mongolia-Russia Economic Corridor relies heavily on infrastructure cooperation, especially the railway. In 2015 the three governments agreed to establish a Mongolian–Russian–Chinese joint railway transportation and logistics company, with the hope to benefit the remote areas of these countries. There are two key traffic arteries within this corridor: one extends from China's Beijing-Tianjin-Hebei region to Hohhot in Inner Mongolia and to Mongolia and Russia; the other extends from China's Dalian, Shenyang, Changchun, Harbin and Manzhouli to Russia's Chita.

2.1.3. China-Pakistan Economic Corridor. This corridor connects Kashgar in China’s Xinjiang province, to Pakistan’s Gwadar Port. A series of transportation projects are involved, in order to build and modernize the overland connections, including the upgrade and renovation of the Karakoram Highway, an expressway at the east bay of Gwadar Port, a new international airport, an expressway from Karachi to Lahore, the Lahore rail transport orange line. By implementation, a well-connected, integrated and dynamic economic belt between China and the coast of Pakistan will be built up.

2.1.4. China-Central and Western Asia Economic Corridor. Following the ancient Silk Road, the China-Central and Western Asia Economic Corridor starts from China’s Xinjiang, transits Alashankou on the China Kazakhstan border, joins the railway networks of Central Asia and Middle East, and finally reaches the Mediterranean coast and the Arabian Peninsula. There are mainly seven countries involved in this corridor, among which Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan and Turkmenistan are in Central Asia, and Iran and Turkey are in West Asia. This corridor comprises some existing transportation infrastructure, like the Kamchiq Tunnel in Uzbekistan.

2.1.5. China-Indochina Peninsula Economic Corridor. This corridor links China with the Indochina Peninsula, and it is critical to the contiguous ASEAN states, like Vietnam, Laos, Cambodia, Thailand, Myanmar and Malaysia. ASEAN has one of the more connected transport networks among the developing regions of the world [11], and this corridor is expected to boost China's cooperation with the ASEAN countries. Among the extensive transportation network, China has completed a number of transportation project, like an expressway leading to the Friendship Gate and the port of Dongxing at the China-Vietnam border.

2.1.6. Bangladesh-China-India-Myanmar Economic Corridor. This corridor refers to four countries, namely Bangladesh, China, India and Myanmar, serving the regional market of over 400 million people. It is comprised of expressways and high-speed rails, and in addition to the land bridge, air and water ways connecting each other will further enhance regional interconnectivity. It is planned to build up an international transport corridor across Southeast Asia and South Asia, starting from Kunming of China, through Myanmar to Bangladesh, and directly to Chattogram Port, which is expected to get significant distance and time savings for trade.
2.2. Railway
There are eight cross-border railways joined up between China and the countries along the B&R routes. And among the eight railways, there are four along the China-Mongolia-Russia corridor, two along the New Eurasian Land Bridge, and the other two along China-Indochina Peninsula corridor. In addition, some border crossings have railways linking to China’s inland cities, such as Heihe border crossings (located in Heilongjiang Province) and etc.

Referring to the infrastructure technical standard grading, the railways in China are generally higher than those in the interconnected countries. For China’s domestic railways, they mainly follow China’s national railway ClassⅠtechnical standards. However, the interconnected railways in the countries along the B&R routes are basically single-track railways, with lower technical levels and smaller transportation capacity.

By the year of 2017, the cross-border rail network has bridged 35 Chinese cities with 34 European cities in 12 countries. The destination cities in Europe are mainly concentrated in Moscow, Hamburg, Duisburg, Lodz and Rotterdam logistics centres.

Since China-Europe “Silk Road” freight trains began to operation in the year of 2011, these trains have made a total of 6,235 trips on 57 routes by the end of 2017. The freight service has been considered a significant part of the B&R initiative, and greatly boosted the trade between China and the countries along the B&R routes.

2.3. Road
There are total fifty-two cross-border highways joined up between China and the countries along the B&R routes, including eighteen along the China-Mongolia-Russia corridor, eleven along the New Eurasian Land Bridge, three along the China-Central Asia-West Asia corridor, ten along the China-Indochina Peninsula corridor, one along the China-Pakistan corridor, and the other nine along the Bangladesh-China-India-Myanmar corridor.

Referring to the highway technical standard grading, the highways in China have basically realized the standards of expressway or national & provincial trunk lines. Among the border crossings in China, seven have expressway, and ten have first-class highway. However, the interconnected highways in the countries along the B&R routes are mostly substandard, especially in the Mongolia region with poor technical situation.

According to China’s Ministry of Transport, there are 73 ports have already carried out international road transport business. The annual passenger volume is around 8 million, and the freight volume about 50 million tons.

2.4. Inland waterway
There are mainly five cross-border inland waterways joined up between China and the countries along the B&R routes, namely Heilongjiang River, Songhuajiang-Amur River, Lancangjiang-Mekong River, Dulongjiang-Ayeyarwady River and Honghe River. China’s domestic inland waterways are usually Class v5, however the inland waterways of the interconnected countries are lower grade.

Among the above five waterways, Lancangjiang-Mekong River gets more attentions than others, mainly because of its importance for the involved countries. Lancangjiang-Mekong River is an international river flowing through China, Laos, Myanmar, Thailand, Cambodia, and Vietnam. It official began the international shipping from the year of 2001. From 2002 to 2004, China, Laos, Myanmar and Thailand jointly implemented the first phase project for the waterway remediation, and improved the navigation situation from China-Myanmar Boundary Marker 243 to Ban Houayxay in Laos. The second phase starts from China-Myanmar Boundary Marker 243, and will ends at Luang Prabang of Laos. Among the second phase, the construction work from Boundary Marker 244 to Lincang Port of China will follow the standard of Class ivand with 500 tons shipping capacity.
3. Challenges for present transport connectivity

Although the B&R countries have achieved the consensus that the completion and improvement of the transport corridors will benefit trade and economy, and some construction of associated railways, highways, and ports is progressing in a steady manner, China still faces a number of challenges and will take time to realize.

First of all, the construction of some transport corridors lags behind the expectation. For example, the present transportation connecting China and Europe mainly transits by Russia and Kazakhstan. However, China-Pakistan land transport corridor has not yet been completed, with missing railways and ports, and poor road condition. Besides, from China’s coastal ports to Indian Ocean, port relay stations are lacking.

Secondly, the transport service is quite limited by the weakness of infrastructure construction and technical standard disintegration. For some B&R countries, the transport facilities are obviously lacking and aging seriously, resulting in the insufficient transit capacity of the corridors. In addition, the technical standards of railways and highways in different countries vary, and the complicated cross-border transport rules and the inefficient operation becomes another constraint to the seamless transportation of these corridors.

Thirdly, integrated transport hubs along the overland transport corridors are lacking. These hubs are needed not only for managing different transport modes, by also for improving the industrial convergence, in order to promote the regional cooperation. Compared with the unique position along these corridors, some western regions of China are obviously weak in forming integrated transport hubs, especially in fully using the transport facilities to get the advantage in trade and economy.

Fourthly, the complexities among the B&R countries increase the risks of transport connectivity. There are a number of countries involved in the B&R initiative, with various cultures, religions, economies and societies. When starting the transport projects, especially which are weak in economic benefits although strong in social welfares, various risks including historical, political, natural and technical factors, are easy to emerge but hard to solve.

4. Suggestions

The cross-border movement of goods and passenger will boost the regional economic growth, and an integrated transport system will play a leading role during this process. To strength China’s transport connectivity along the corridors of the B&R initiative, both domestic and international efforts are needed.

Domestically, China needs to speed up to complete a national integrated transport system, identify key regions and give the priority to related projects, and enhance the transport capacity of border areas. Firstly, China must strive to build an open and comprehensive transportation system. Through facility connectivity, policies, rules and standards can work on key corridors, cities, and projects. Secondly, it is needed for China to carefully select economic centres along the corridors, then leverage their positions, and maximize the benefits. Different from China’s 18 provinces participation in the B&R initiative with equal importance, some centres in some provinces may have much higher degree of integration with the regional development. Thirdly, borders have a strong influence on the corridor connectivity. For different border cities in China, it is proposed that the construction of transportation facilities closely combine with city industrial layout, resource utilization and foreign exchange.

When taking the international perspective, both benefits and risks are necessary to fully considerate. On one hand, the benefits should be taken for the most stakeholders and from the long time. For example, the existing railways of the B&R countries have differences of narrow and broad-gauge systems, which becomes a major bottleneck to overland connectivity. On the other hand, a comprehensive risk prevention mechanism needs to establish, which requires seamless integration in different fields, such as industry, laws and regulations. And the limited funds should focus on advancing the projects which are possible to achieve the goal.
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