

TRANSFORMATION OF ASEAN ECONOMY: ASSESSING THE IMPACT OF EMERGING TRANSPORTATION TECHNOLOGIES AND CHINA'S INITIATIVES"

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Abstract

The rail infrastructure in ASEAN nations, marked by significant diversities in governance systems, economies, transportation capacities, and developmental phases, currently stands outdated and underdeveloped. Urgent action is imperative to establish an extensive railway network that seamlessly connects domestic regions with international markets. The maturation of high-speed rail technology has emerged as a pivotal enabler for China's railway expansion abroad. This technological advancement not only furnishes the fundamental technical support for China's railway ventures but also delivers substantial enhancements to transportation capabilities in regions beset by antiquated rail infrastructure.

1. Introduction

Due to the differences in system, economy, transportation conditions and development stages among ASEAN countries, the railway facilities in the region are relatively old and backward, and it is urgent to build a dense railway network connecting the domestic and overseas with external forces. The gradual maturity of high-speed rail technology has also provided the most basic technical support for China's railway to go out and has a great advantage in improving the transportation conditions in the areas with backward railway facilities (Ren Yuanzhe, 2019)[1].

Table 1: Summary of China-ASEAN Railway Cooperation Projects

serial number	Name of railway	mileage	Design speed	Cooperation phase
one	Indonesian Yawan High-speed Railway	142.3km	350km/h	In January 2016, the foundation stone was laid. In June 2018, full-scale construction commenced; Expected to be operational by June 2023
two	The Sino-Lao Kunming-Wanzhou Railway	1022km	160km/h	The construction of the whole line will start in December 2016; It was opened to traffic in December 2021.

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three	sino thai railway	867km	250km/h	The first phase of the project started in 2017 and is expected to be opened to traffic in 2026.
four	Darui railway	330km	140km/h	It is expected that the Baorui Section will be opened to traffic by the end of 2023.
five	Malaysia's East Coast Link up Railway	640km	160km/h	Completion expected in 2026

China has always attached great importance to ASEAN's transportation cooperation. Transportation facilities are the bridge of trade between the two sides. Asean is already China's largest trading partner, and efficient transportation is undoubtedly conducive to deepening bilateral cooperation and preparing for further development in the future. China and ASEAN have more and more cooperation projects and are increasing day by day. Such as Indonesia's Yawan High-speed Railway and China-Laos Railway. Indonesian Yawan High-speed Railway is the first comprehensive and systematic overseas high-speed railway project adopting China technology, China standard and China equipment; It is a major project linking China's "the belt and road initiative" initiative with the Indonesian Ocean Fulcrum Strategy. The China-Laos Railway routes the leaders of the two parties and the two countries to make decisions and promote themselves, forming a cooperation model with the government leading the way and enterprises cooperating the way. The opening of the China-Laos railway at the end of 2021 "changed Laos from a land-locked country to a land-linked country" and promoted the development and opening up of the Lao economy. This railway of friendship, science and technology, green and open, bears the development dreams of the Chinese and Lao peoples.

With the gradual increase of trade volume between China and ASEAN, ASEAN has become the largest trade partner of China. In order to meet the growing demand for trade cooperation, the construction and upgrading of transportation facilities cannot be slowed down. China's high-speed rail technology has reached the world-class level and is becoming more and more perfect. It has the experience and technology to build high-speed rail in various terrain. It can help ASEAN countries to build uniform standard railway facilities, improve traffic convenience and promote the economic and social development of ASEAN countries.

2. Cooperation Basis for the Application of New Transportation Technology between China and ASEAN

2.1. Political dimension

China has frequent contacts with leaders of ASEAN countries and has high political mutual trust. The development and cooperation of major projects between China and ASEAN both stem from the growing strategic foundation of mutual trust and benefit. The frequent interaction between national leaders and the continuous communication between high-level officials have provided a dialogue basis for the good construction of the bilateral cooperation mechanism. In addition, the communication and dialogue between China and ASEAN on governance, understanding and respecting the laws and customs of both sides have provided a good environment for the economic development between China and ASEAN. (Li Wannan and Wang Yaqin, 2016)[2]. Both sides stand on the strategic height of mutually beneficial national development and seek common ground while reserving differences; The good interactive development mechanism has also provided support for the cooperation between the two sides. For example, in the cooperation between China and Malaysia, in order to promote the construction and development of "two countries and two parks" in China and Malaysia as a whole, the governments of both China and Malaysia have formed a joint cooperation Council of "two countries and two parks" in China and Malaysia, led by the Ministry of Commerce of China and the Ministry of Trade and Industry of Malaysia, respectively, to set up a perfect liaison mechanism at the department/bureau level, hold regular meetings and consultations, actively discuss the issue of park convergence, and solve major issues that the two sides may encounter.

2.2. *Economic aspects*

China's "the belt and road initiative" initiative catered to the ASEAN countries' policy of focusing on economic development. After the China-ASEAN Free Trade Area cooperation was reached, the trade between China and ASEAN developed rapidly, the scale of trade increased significantly, and the economic and trade relations became closer and closer. The economic and trade cooperation between China and ASEAN has laid a solid economic and material foundation for their cooperation and laid the foundation for large-scale economic cooperation projects (Li Wannan and Wang Yaqin, 2016)[2]. China and ASEAN countries have reached a consensus through friendly negotiations to work out cooperation projects that are in the best interests of both sides. China and ASEAN countries have set up joint ventures to provide funding for key projects, taking into account the current situation and economic development needs of China and ASEAN countries. Some ASEAN countries have achieved good cooperation with China, such as Malaysia and Indonesia. The joint venture and its affiliated enterprises jointly funded by China and Malaysia are located in Qinzhou Industrial Park. The joint venture accounts for 51% of the shares of the Chinese side and 49% of the shares of the Malaysian side. China Qinzhou City Development Investment Group Co., Ltd. and Guangxi Beibu Gulf International Port Group Co., Ltd. have established equity participation enterprises, and Malaysia has joint equity participation by Changqing Group, Shida Group and Pahang Development Agency. Guangxi Beibu Gulf International Port Group acquired 40% equity interest in Malaysian port of Guan Dan and became the first shareholder with relative control, realizing the breakthrough of "zero" acquisition of Southeast Asian ports by China enterprises. China and Indonesia have good cooperation in infrastructure construction. Indonesia's infrastructure is backward and its capital demand is large. The Chinese side respects Indonesia's decision not to apply the government budget and not to provide sovereign guarantee in the Yawan high-speed railway project, and agrees to carry out joint construction on the basis of friendly consultation, equality and mutual benefit in Indonesia (Li Wannan and Wang Yaqin, 2016, Ren Yuanzhe, 2019)[1][2].

2.3. *China's own strength*

The overall strength of railway construction in China is strong, and the advantages of the project plan are obvious. China's high-speed railway has advanced technology, good compatibility, strong adaptability to the overall environment, better social effects, rich experience in high-speed railway construction and management, more competitive bidding and financing conditions for the overall bidding project, and high cost performance (Li Wannan and Wang Yaqin, 2016)[2]. In addition, China is rich in power resources and has a strong power reproduction capacity, and the southwest region of China, which borders on ASEAN countries such as Vietnam and Myanmar, has abundant power resources, which can provide sufficient power resources to neighboring countries (Fan Zuojun and He Huan, 2016)[3].

2.4. *Geographical location advantages*

Both China and ASEAN have excellent geographical advantages. Both sides make good use of the geographical advantages to realize common economic development. For example, Thailand-China Luo Yong Industrial Park is located on the eastern coast of Thailand, close to Bangkok, the capital of Thailand, and the deep-water port of Lim Cha Bong, close to Highway 331 of Roh Yong Fu. The industrial park has a well-developed water, land and air transportation network, which is of great benefit to the development of processing and re-export enterprises. In addition, China Malaysian Qinzhou Industrial Park is located in the south of Qinzhou City, adjacent to the Beibu Gulf, with good geographical advantages and convenient port gathering and transportation conditions. It is located at the multi-regional cooperation aggregation points such as China-ASEAN Free Trade Zone and Pan-Beibu Gulf Economic Cooperation Zone, and is an important channel and cooperation platform connecting the above regions (Wu Chongbo, 2016)[4].

2.5. *Risk aversion*

Starting from the level of China, the first is to tell the story of China well, set up cooperation plans according to local conditions in multiple dimensions, avoid political risks, and understand the local political environment, legal risks and investment protection system in a timely manner. Second, we should strengthen capital control, pay attention to market changes in a timely manner and guard against financial risks from various perspectives. Third, we should improve the governance structure, improve the management of talents, do a good job in international operation and reduce internal risks of cooperation.

3. Economic Impact of the Construction of the Central-South Railway (the Central-South Peninsula Railway Network and the Southeast Asian Segment of the Trans-Asian Railway)

The whole "Central-South Railway" is mainly divided into three parts of the "East, Central and West" lines. One is the eastern route plan, which runs from Kunming, Hanoi, Ho Chi Minh City, Phnom Penh, Bangkok and Kuala Lumpur to Singapore. The project includes the Kunyu River Railway in China, the Sino-Vietnamese Railway and the Cambodian Railway to the Thai capital of Bangkok. The second is the midline plan, from Kunming, Xiangyun (Dali), Lincang, Shang Yong, Vientiane, Bangkok and Kuala Lumpur to Singapore. The projects include: the Jade Mill Railway in China, the Sino-Lao Railway, the Sino-Thai Railway, the Thai-Malaysian High-speed Railway connecting Bangkok with the Malaysian capital Kuala Lumpur, and the Singapore-Malaysia Railway connecting Kuala Lumpur to Singapore. The third is the western route plan, from Kunming, Ruili, Yangon, Bangkok and Kuala Lumpur to Singapore. The works include: Darui Railway, China-Myanmar Railway and Thailand-Myanmar Railway in China. All sections of the "Central South Railway" between China and Laos have been opened, and other lines are under orderly construction. Although there is still a long way to go before the completion of the project, it is foreseeable that the construction of the "Central South Railway" will greatly promote the economies of the China-ASEAN countries.

First, reduce transportation costs and improve trade transportation safety. The Indo-China Peninsula is an important area to safeguard China's energy security, and the Malacca Strait is a necessary passage for China to import oil from the Middle East and Africa. The stability of the Malacca region is closely related to China's energy security. Under the circumstances of historical grudges, cold war mentality and the recent rise of trade protectionism, there are some dangerous factors in the Malacca region. If the "South-Central Railway" can be successfully opened, the China-Myanmar section of the western route will allow China to obtain a major access to the Indian Ocean by bypassing the Strait of Malacca. Myanmar's kyaukpyu to the west of the western route is a natural deep-water port. Once the western route is opened, China will be able to bypass the Strait of Malacca for a large amount of import and export goods, including important strategic goods such as oil, and avoid potential risks (Nie Yongyou and Lei Zhao, 2012)[5].

Second, reduce transportation time and promote economic integration between China and Indochina. The "Central-South Railway" has effectively promoted economic cooperation and exchanges with countries in the Central-South Peninsula, greatly expanding the types and volume of trade imports and exports between the two sides. The economies of China and ASEAN are highly complementary, and the resources of ASEAN countries can guarantee the sustainable development of China's economy; On the other hand, China can also support the economic development and industrial upgrading of ASEAN countries with its advantages of capital and technology. Before the "Central-South Railway" was not opened up, the trade between China and ASEAN countries in the Central-South Peninsula was mainly by road and sea transportation, while the trade between the Central-South Peninsula was mainly by road transportation. The long transportation time and high time cost affected the import and export volume of commodities such as some tropical fruits and seasonal crops that were difficult to store for a long time. If the "Central South Railway" can be successfully opened, it can greatly shorten the transportation time, effectively avoid the trade barriers of some commodities with short shelf life, increase the types of import and export products, and expand the trade transportation channels.

It can bring rich economic and cultural income and technological level to the countries and regions along the line, improve the trade quality and efficiency, and in the long run, it can promote the improvement of the trade level between the two sides.

Third, pull more western provinces to participate and break through the bottleneck of economic growth in western provinces. In the past, the trade between China and the ASEAN countries in the Indochina Peninsula was mainly in the border provinces of Yunnan and Guangxi. Although the border provinces are closer to the Indochina Peninsula, the border provinces themselves have limited human resources, capital and technology, and the transportation is not developed. Besides, Guangxi, Yunnan and other border provinces still have certain competitive relationship with each other, which makes it difficult to form a joint force. Therefore, it is difficult for the border provinces to coordinate the economic development of the entire Indochina Peninsula. The construction of the "Indochina Railway" can effectively alleviate this problem. In August 2019, the National Development and Reform Commission of People's Republic of China (PRC) issued the "Master Plan for the New Land-Sea Corridor in the West", which connects the whole western region with the new land-sea corridor in the west. It improves the mobility of labor, capital, technology and other productivity factors in the western region, and provides a new development pattern and strategic channel for the western development strategy. In addition, the new land-sea corridor in the west combines the geographical advantages close to Southeast Asia to coordinate and unify the international and domestic dual markets, to do a good job in all-round high-quality development and opening up of the inland, coastal, riverside and border areas in the west, and to strengthen the ties between the southwest of the northwest and the Indochina Peninsula, and to promote the rational allocation of industries, transformation and upgrading, and economic development (National Development and Reform Commission of the People's Republic of China, 2019)[6].

4. Impact of New Transportation Infrastructure, including High-speed Railway and New Land-sea Passage, on Economic Development of ASEAN Countries

First, the new land-sea corridor will increase the logistics capacity to meet the load demand of the logistics capacity of ASEAN countries. With the gradual development of social economy in China and ASEAN countries and the increasing logistics volume in the China-ASEAN Free Trade Zone, the current infrastructure is difficult to meet the needs of social and economic development and exchange trade within both sides (Yang Xiangzhang and Zheng Yongnian, 2019)[7]. The opening of transportation infrastructure such as high-speed rail and new land-sea routes can effectively improve the trade capacity and transportation efficiency of ASEAN countries, open up new trade routes, increase the quantity of goods and materials that ASEAN countries import and export, allow ASEAN countries to enjoy more international products to benefit the local people, and improve the overall trade level.

Second, the new land-sea corridor promotes the flow of human capital to meet the demand of ASEAN countries for human resources. (Yang Xiangzhang and Zheng Yongnian, 2019) The social and economic levels of China and ASEAN countries are increasing day by day. After the completion of the China-ASEAN Free Trade Zone, the demand for human capital of both sides is also increasing day by day. The current level and quantity of human resources cannot meet the demand for economic and social development and bilateral economic and trade activities within both sides [7]. The new land-sea channel can promote the flow of human capital, strengthen the communication and learning among professionals, and promote the training of human resources in production, management, trade, technology and translation between China and ASEAN countries. ASEAN developing China countries can absorb and learn advanced production, management, industry, information industry and other technologies from China, and more effectively promote economic, cultural and political exchanges and cooperation between the two sides.

Third, the new land-sea route can reduce the CIF price of ASEAN countries' exports to China, expand the scale of trade, increase the trade surplus and improve the per capita welfare level. (Cong Xiaonan, 2021) Using

the GTAP equation system, the study found that the new land-sea corridor reduced the export transportation costs and export prices in the ASEAN region, and ASEAN countries obtained better terms of trade; This will help ASEAN countries gain comparative advantages in export prices and improve the level of trade balance and per capita welfare among ASEAN countries [8].

Fourth, trade complementarity between China and ASEAN countries can be enhanced under the new land-sea corridor in the west. (Yu Chuanjiang et al., 2022) The study found that the emerging economies of ASEAN–Singapore, Malaysia, Thailand, Viet Nam and China have relatively similar economic structures, while the developing countries of ASEAN–Laos, Myanmar, Brunei, Indonesia, Cambodia, etc. have a large economic gap with China, but these two types of countries are highly complementary in trade with China [9]. High trade complementarity will help the two sides to strengthen trade exchanges, enhance the export level of ASEAN countries and promote the development of their trade economy.

5. How can the Chinese government lead enterprises to better design new land-sea routes and carry out China-ASEAN economic cooperation under the background of new transportation infrastructure?

First, the government should accelerate and improve the railway and highway comprehensive transportation network system. We will build a multi-functional coastal port, build a main railway passage from Chongqing and Chengdu to the Beibu Gulf, and build or renovate some branch lines and old sections with limited traffic capacity. Improve the road coverage network, increase the radiation scope of the main channel, and reasonably plan and construct local expressway projects leading to coasts and ports that play an important auxiliary role in the main channel. We will strengthen the division of labor and cooperation among ports, strengthen the construction of port facilities, promote their professional and green development, and improve navigation conditions. Finally, an integrated three-dimensional transportation network of railways, highways, ports and seaports with reasonable division of labor among the eastern, central and western routes and complementary land and sea will be formed (National Development and Reform Commission of the People's Republic of China, 2019)[6].

Second, the government should guide enterprises to strengthen the construction of logistics infrastructure and promote the development of cross-border e-commerce logistics. We will accelerate the construction of modern, information-based and intelligent logistics infrastructure and public information platforms. The government encourages and supports internet companies and logistics companies to build and integrate e-commerce service platforms on the basis of the new land-sea channels, and to build a fully covered sub-regional network; We will support and promote the integration of market information platforms and public information platforms of the new land-sea channel with e-commerce platforms, and strive to promote information connectivity. In addition, the government needs to build cities such as Chongqing, Chengdu, Guiyang, Kunming and Nanning as cross-border e-commerce development hubs, build cross-border e-commerce comprehensive service areas, and promote the implementation of cross-border e-commerce retail import and export policies (National Development and Reform Commission of the People's Republic of China, 2019)[10]. Moreover, the government should encourage the construction of an efficient information transmission platform between the railway and the maritime transportation system, and provide value-added services for all levels of government and market players through information sharing, big data cloud computing enhancement and professional data analysis (National Development and Reform Commission of the People's Republic of China, 2019)[6].

Third, the government should guide enterprises to improve the operation efficiency of the new land-sea channel, build and share an organizational platform, and cultivate diversified channel operating enterprises. Encourage railway, shipping, port transportation enterprises and logistics enterprises to cooperate with each other, set up a professional and efficient operation hub, build a land, water and air combined transport platform, and develop multi-dimensional combined transport business. Promote regional organizations and

enterprises along the the belt and road initiative line to jointly form a land-sea new channel operating company, develop professional services to improve logistics efficiency, reduce trade barriers, support industrial development, maintain financial vitality, do a good job in data analysis and other services to enhance the service capabilities of the integrated supply chain system. On the basis of controlling risks, local governments encourage local governments to adopt government and private capital cooperation in accordance with the law, and attract domestic and foreign capital to participate in the construction of the new land-sea corridor project in western China. We will encourage various financial institutions to increase their support, innovate financial products and financing models, and provide financial support for channel-related projects. Governments and enterprises actively invite governments, enterprises and intermediary organizations of ASEAN and other relevant countries to participate in the construction and operation of the channel, develop foreign market platforms and enhance international influence (National Development and Reform Commission of the People's Republic of China, 2019, National Development and Reform Commission of the People's Republic of China, 2021)[6][10].

Fourth, the government should optimize the business environment and strengthen personnel training; Promote the green development of industry and logistics in the areas along the line. We will improve the market access mechanism, eliminate the market barriers, do a good job in the standards of the market evaluation system, enhance the interregional flow of productivity factors such as labor, capital, technology and entrepreneurial talent, and optimize and balance the allocation of production factors. Establish fair, open and transparent market rules and strengthen cooperation in market supervision. We will continue to improve the expert think tank of the new land-sea channel, train and introduce talents in trade, logistics and other fields, coordinate and promote the facilitation of contacts between overseas investment partners, and do a good job in the living and resettlement of partners. Support the development of industrial and logistics green development policies in the regions along the route, and strive to promote peak carbon dioxide emissions, Carbon Neutralization (National Development and Reform Commission of the People's Republic of China, 2021)[10].

Last, the government should also introduce policies to support small and medium-sized enterprises in the west to participate in cooperation. The new land-sea corridor in the west has opened up new economic growth points for the western region and provided a wider business space for small and medium-sized enterprises in the west. The government needs to issue relevant policies to reduce institutional transaction costs, deepen the "streamline administration, delegate power, strengthen regulation and improve services" reform, reduce duplication of processes, eliminate market barriers, and help the development of small and medium-sized enterprises in the west (National Development and Reform Commission of the People's Republic of China, 2019)[6]. Under the guidance of the government, small and medium-sized enterprises in the west can fill in the gap in the relative lack of branch channel resources in the implementation plan of the new land and sea channel in the west, improve the economic development conditions of the branch channels along the line, provide trade opportunities and employment space for the branch channels along the line, promote the families in the branch channels to achieve prosperity and the enterprises to achieve sound development, and add brick and tile to realize "common prosperity".

6. Summary

With the continuous development of China, its ties with ASEAN countries are becoming closer and closer. ASEAN is already China's largest trading partner. ASEAN's social stability and economic progress are also important to China's development. From the perspective of transportation, this paper combs the past cooperation experience and analyzes the impact on ASEAN economic development from the perspective of new transportation technology. China's relatively good political relationship with ASEAN, its strong economic level, its technological advantages, its geographical advantages and its ability to avoid risks can all make the new transportation technology helpful to the development of ASEAN. New transportation technologies, such

as high-speed rail, will be able to increase the logistics capacity through new land and sea routes to meet the load demand of the logistics capacity of ASEAN countries; It can promote the flow of human capital and meet the demand of ASEAN countries for human resources; And strengthen trade complementarity, reduce import and export prices, expand the scale of trade, increase the trade surplus and improve the per capita welfare level. In this regard, this paper puts forward five policy recommendations: (1) to promote and improve the railway and highway comprehensive transportation network system. (2) Strengthen the construction of logistics infrastructure and promote the development of cross-border e-commerce logistics; Promote the green development of industry and logistics in the areas along the line. (3) Guide enterprises to improve the operation efficiency of the new land-sea channel and build and share a diversified organization platform. (4) Optimize the business environment and strengthen personnel training. (5) Support small and medium-sized enterprises in the west to participate in cooperation.

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