Research on Multimodal Transport Development in China under the Background of Internet Plus

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Abstract. By brief introduction of the importance of multimodal transport, which has been paid great attention by Chinese government, this paper reviews the literature and sums up the present situation of China’s multimodal transport. Then, the evolutionary background of internet plus logistics in China has been summarized, and the influence on intermodal transport has been analysed. By critically analysing the problems, this paper finally gives some suggestions to solve problems from hardware side and software side.

1. Introduction
With the continuous improvement on transportation infrastructure, China’s transportation system has entered a new period calling for the integration and cooperation of different transport modes, in order to promote the overall efficiency of transport service, which is of positive significance to transport green and low-carbon development and improve the modern integrated transportation system\cite{1}.

It is believed that multimodal transport can provide cargo freight transport service throughout the whole process. And by seamless and integrated operation, multimodal transport contributes to reduce logistics cost and increase management efficiency. Multimodal transport not only has the great influence on logistics and transportation, but also affects the economic spatial layout, the economic operation efficiency, the business environment of trade facilitation, and the openness of a country’s inland market\cite{2}. The multimodal transport system connects the international and domestic markets, supporting the international economic and trade cooperation.

Although multimodal transport started late in China compared with some developed countries, and it is still not developed enough, the Internet has brought a late-comer advantage to China’s multimodal transport. The interconnection of resources of all parties is an important prerequisite for the development of multimodal transport \cite{3}. China government has issued a number of policies to promote the information exchange between and among different modes of transport and the construction of multimodal transport information platform.

2. Status quo of multimodal transport development in China

2.1 Achievements
Multimodal transport is based on the effective connection of two or more different transportation modes linked end-to-end, providing a full range of integrated cargo transport services from the point of
origin to the point of destination [4]. As an advanced form of transport organization, great achievement has been made in multimodal transport in China. Especially, the General Office of the State Council issued the “Three-year Action Plan for the Promotion of Transport Structural Adjustment (2018-2020) Notice of State Administration”, which will speed up the modal shift from road to railway.

2.1.1 Rail-road intermodal transport. In China, the volume of rail-road intermodal transport is usually estimated by railway container delivery volume. In the year of 2018, China railway container delivery volume was 13.75 million TEU, a year-on-year growth rate of about 33%, and the railway container delivery volume increased by more than 30% for three consecutive years. Besides, in 2018, China State Council issued a three-year plan aiming at restructuring transportation. This plan is dedicated to the transfer of the freight volume from road to railroads and waterways. By efforts, China completed the volume of goods delivered by 4.026 billion tons in 2018, with an increase of 337 million tons.

2.1.2 Railway-water container multimodal transport. The railway-water container intermodal transport volume at large-scale ports in China has reached 4.3 million standard containers in 2018, with an annual average increase of more than 26% in recent five years [5]. According to the statistics from China Transportation Association, among the main coastal ports in 2018, the railway-water container intermodal transport volume in Qingdao Port has reached 1.154 million TEU, making it the first port of China’s with a million TEU. And Ningbo-Zhoushan Port, Qingdao Port and Tianjin Port have a growth rate of more than 40%; among the inland river ports, the volume has grown rapidly, with an increase of 35% compared with the previous year, and Guoyuan Port situated at Chongqing’s Liangjiang New Area ranks first with the volume of 77,000 TEU.

2.1.3 China railway express. China Railway Express showed rapid growth. In 2018, 59 cities in China and 49 cities in 15 countries in Europe have opened China Railway Express. The routes of trains in China have reached 65. In 2018, 6,363 trains have been put into operation, and the accumulated volume has exceeded 13,000 in the last eight years. Chengdu, Chongqing, Zhengzhou and Wuhan have always been the cities with the largest number of train route since the start of China Railway Express. In 2018, Chengdu operated more than 1,500 trains of China Railway Express. According to the statistics, Horgos Customs supervised 18 routes of China Railway Express in 2018, and 2, 055 trains operated, a year-on-year increase of 146%, accounting for one-third of the whole China Railway Express. And Xinjiang Province has become the main area of China Railway Express.

2.2 Problems

By efforts from many participants, periodical achievements have been made by means of planning guidance, policy support, standard application and pilot demonstration. Although the achievements are significant, comparing with other advanced countries, multimodal transport in China is still lagged behind.

In 2018, multimodal transport (railway-water container intermodal transport at China’s coastal ports) accounts 4% of the total freight transport volume, compared to a proportion of approximately 20-25% internationally [6]. And the problems may include unreasonable transport structure, incomplete standard system, obstructed infrastructure connection, insufficient information sharing and interconnection, and backward development of technical equipment.

In addition, the problems in China Railway Express are complicated. Multimodal transport includes domestic and overseas two systems that are relatively independent but connected to each other. The problems may come from the different track standards of most countries, the unbalanced return freight compared with the cargo loaded from China to Europe, the weakness in cargo handling capacity from Europe sides [7].
3. Internet plus logistics and intermodal transport

3.1 Introduction of internet plus logistics
In March 2015, Premier Li Keqiang first proposed the “Internet Plus” action plan in China’s Government Work Report. Here, “Internet Plus” refers to the integration of the Internet and traditional industries based on Internet information technology, in order to enhance the traditional economies and create new areas of economic development [8]. In July 2015, China State Council issued the guidance and proposed 11 key actions including “Internet + Efficient Logistics”. In July 2016, Premier Li Keqiang chaired the State Council executive meeting to promote “Internet + Efficient Logistics” from the national level. The National Development and Reform Commission subsequently issued the implementation measures of “Internet + Efficient Logistics”.

The launch of “Internet + Efficient Logistics” complies with the transformation and upgrading requirements of China’s logistics industry. At present, China’s logistics industry is in a critical period of strategic transformation. According to the data of the China Federation of Logistics and Purchasing, the total value of social logistics goods in 2018 has reached 283.1trillions of Yuan, a year-on-year increase of 6.4%, which is 2.3 percentage points lower than the average annual growth rate during the 12th Five-Year Plan period. The growth rate of the logistics industry has continued to slow down and is entering a new stage of medium-speed growth. The Internet has a profound impact on the logistics industry, which is believed to help logistics industry reshaping and upgrading[9].

3.2 Influence on intermodal transport
In recent years, with the rise of a new generation of information technology in which the Internet of Things, big data, cloud computing and mobile internet act as the representatives, a group of vehicle-cargo matching platform enterprises have emerged[10]. These enterprises are characterized by “extensive interconnection of online information, optimal configuration of offline resources, online and offline collaborative linkage”. The development of these enterprises remakes the organization mode of logistics, expands the service fields and advances the new pattern of profit, which has a positive significance for the development of multimodal transport in China [11].

Firstly, it helps to improve matching efficiency of different transport modes. Through optimizing the matching of vehicles and cargo, these platform enterprises intensify upstream and downstream linkage of supply chains, and reduce time lag in the process of integrated transportation.

Secondly, it is beneficial to sharing information among different transport modes. Through collecting data from relevant parties, these platform enterprises get through various links for information exchange and promote the “one-bill coverage” of integrated transport.

Thirdly, it provides a good chance for accumulating big data. Through collecting and accumulating data including node and route information, transport capacity and relevant governmental information, it is easier for these platform enterprises to establish the multimodal transport big data system, making the optimizing paths for multimodal transport possible.

Fourthly, it promotes to cultivate market entities and nurturing multimodal transport operators. Through the matching of vehicles and cargo, information financial service and the construction of physical network, the enterprises have a solid foundation for the transformation to multimodal transport operators.

3.3 Problems
In recent years, China’s vehicle-cargo matching platform enterprises have experienced rapid development. At present, the top ten platform enterprises have business with more than 15 million individual drivers, serving almost half road transportation in China. However, as a whole, China’s vehicle-cargo matching platform enterprises are still at an initial stage of development and confront some bottlenecks. Firstly, it doesn’t fully adapt to some existing policies. With fast update of services provided by new format enterprises, new modes and new fields constantly come forth, where existing laws and regulations are hard to reach. Secondly, the channels for information acquisition need to be
expanded. Although enterprises have accumulated a great number of operational data in the process of operation and promotion at early stage, it is difficult to acquire relevant government data and operating data of railways, ports and airports in time. Thirdly, it is required to make innovations in government management. Since these platform enterprises carry out trans-boundary operation, it is relatively difficult to identify and classify, which raises a challenge to industry management.

4. Suggestions
Now, China’s multimodal transport is facing the period of strategic opportunity, with the national policy support, infrastructure improvement and market interests. Especially, the Internet provides the data driven possibility for the effective connections of related elements of multimodal transport, and the ultimate goal of multimodal transport is to realize the Internet operation and management. For this, the following four suggestions have been proposed.

Firstly, promote the openness and sharing of public information resources. Basing on the national data sharing and exchange platforms, it is needed to further open government related data, topromoted data integration among different platforms, and to utilize of information resources in the transport field. Besides, the platform-type enterprises are encouraged to develop transport big data analysis, to establish the information collection and sharing mechanism in which government and the society could be interactive, and government information and social information realize exchange and integration.

Secondly, deepen the reform of government supervision, and adapt to the new development patterns. On one hand, the social capital is greatly encouraged to participate in the development of transport, and the government is required to ease market access. On the other hand, considering the development characteristics of platform-type enterprises, it is needed to formulate relevant laws and regulations, in order to specify rights, responsibilities and obligations of different parties.

Thirdly, speed up the upgrade of intelligent level of transport infrastructure, and support platform-type enterprises to expand new services. It is suggested to strengthen information collection of basic status of transport infrastructure network, vehicle operation, and transport arrangement. Besides, it needs to establish transport operation monitoring system, as a result to realize the overall coverage and extensive interconnection.

Fourthly, continue to carry out the construction of logistics parks, especially those can provide multimode transport service. Meanwhile, make full use of existing logistics parks, release and improve huge potential of existing transport infrastructure, providing support for offline layout of platform-type enterprises.

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