Development Countermeasures on Container Multimodal Transport of Railway in China

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Abstract. With the national “One Belt and One Road” strategy put forward, multimodal transport has become the key to break through the bottleneck of China’s comprehensive transport service capacity. In order to speed up the construction of modern integrated transportation system and promote the logistics industry to reduce costs and increase efficiency, this paper analyses the problems existing in the development of China’s railway multimodal transport and analyses the opportunities for the development of China’s railway container multimodal transport from four aspects. Finally, the paper puts forward some countermeasures for the development of multimodal transport, which can improve the efficiency of multimodal transport organization, realize the smooth connection of different modes of transport, and promote the cost reduction and efficiency increase of logistics industry.

1. Introduction
Railway is the main artery of national economy, the backbone of the comprehensive transportation system and one of the main modes of transportation. Status and role of railways in China’s economic and social development is essential. Under the strategic deployment of a powerful transportation country, it is clear that “Railway Leading the Way in Traffic Powerful Countries”, that is, the development of multimodal transport is an important way to build a strong transportation country and reduce logistics costs, and is also an important link in the construction of an integrated transportation system. As the world’s second largest economy, China undertakes 93% of the global container manufacturing and has the inherent basic conditions for the development of multimodal transport. In recent years, the national level has issued a number of policies to promote the development of multimodal transport. With the adjustment of economic structure and consumption upgrade, China’s transportation infrastructure has been continuously improved. The multi-level three-dimensional integrated transportation network with railways, highways, waterways, aviation and pipelines as the main body has basically formed, which provides a good foundation for the development of multimodal transport. In particular, the government issued the “notice of the state council on the issuance of medium - and long-term planning for the development of logistics industry (2014-2020)” as a sign, the relevant departments issued a series of incentive policies, such as the demonstration project of multimodal transport, “Internet +” efficient logistics, express industry development of a number of opinions, etc., these policies have brought the rapid development of multimodal transport into the golden age.

2. Analysis of problems existing in railway container multimodal transport
Although China’s multimodal transport development has entered the golden period and the railway multimodal transport also shows a good development trend, there is still a gap with the high quality of economic and social development requirements, and there are still many problems in the development of multimodal transport.

2.1 Inadequate railway station facilities
Problems such as “The last one kilometre” of railway and insufficient length of loading and unloading lines affect the operation efficiency of sea-railway combined transportation. As shown in Figure 1, only 1.3% of the container throughput of China’s seaports is transferred by railway, 85% by car and the remaining 14% by water. At Shanghai, the world’s largest port, only 0.5 per cent of containers are transferred by rail. Most port container port areas are not directly connected to the railway, which requires the use of container trucks through the social road for short barge, in order to complete the transfer between the container terminal yard and the railway station yard.

![Figure 1. Ratio of multimodal transport modes.](image)

2.2 The relevant regulations and policies of multimodal transport need to be improved
At present, China has defined the development of multimodal transport as a national basic strategy and issued a series of documents in support of the development of multimodal transport. Especially in 2016, the state issued multiple files, policy to promote the development of multimodal transport, such as “Notice of the National Development and Reform Commission of the Ministry of Transport on the Development of Multimodal Transport Demonstration Projects”, “Notice of the Ministry of Transport and Other 18 Departments on Further Encouraging Multimodal Transport”, etc., but also is in a state of relatively lagging in legislation, lack of unified regulations and policies to standardize the multimodal transport.

2.3 Multimodal transport integrated advantage is not obvious
Multimodal transport is not a good connection. Multimodal transport involves road transport, railway transport, water transport and many other transport agencies, the process is complex, procedures are numerous and the linkage of various departments is weak. The “door-to-station” and “door-to-station” of railways need highway transportation, which involves the secondary loading and unloading of goods, leading to an insignificant price advantage and difficulty in attracting customers.

2.4 Information platform construction to be strengthened
Especially through the advanced technologies such as cloud computing, big data, the analysis on flow to predict traffic volume and the best combination of various modes of transportation mode can greatly reduce the total transportation cost of logistics, increase enterprise competitiveness. However, the information of ships, manifests, railways and customs of sea-railway combined transport has not been shared, and the connection between different modes of transport such as railways, highways and waterways, as well as different business systems such as customs, logistics and industrial and commercial enterprises are not smooth, so the whole-process cargo tracking cannot be realized. As a
result, relevant links of multimodal transport cannot be connected in an efficient and orderly way. In terms of transport capacity allocation, it is prone to maladjustment and waste, and it is difficult to connect information with other logistics platforms, which has a great impact on the development of multimodal transport.

3. The development opportunity of container multimodal transport of Chinese railway

3.1 Railway transformation and upgrading brings new ways to multimodal transport development

The reform of railway freight transportation has transformed the traditional development mode and accelerated the transition to modern logistics. In 2018, the proportion of railway container traffic (tonnage) in total railway traffic increased from 5.46% to 7.16%, as shown in Figure 2. Accelerating the development of multi-modal railway transport organization with container as the core, reducing freight loss, improving logistics efficiency, intensively utilizing resources, strengthening cross-regional transport, and adapting to regional transport demand under the new situation have become an important content of expanding railway freight supply and an important way of railway transformation and upgrading.

Figure 2. Railway container traffic volume ratio railway total freight volume statistics (2012-2018)

3.2 National all-round opening strategy creates new opportunities

The new pattern of all-round opening up with the focus on the "One Belt, One Road" international cooperation has been continuously formed. China’s economic and trade exchanges with countries along the "Belt and Road" have developed rapidly infrastructure interconnection and international multimodal transport corridors have been continuously improved. As of the end of June 2018, with the Central European trains as the representative, the cumulative amount of operations has exceeded 9000, with nearly 800,000 TEUs of goods, 48 domestically operated cities, and 42 cities in 14 countries in Europe. The transportation network covers the Eurasian continent. The main areas have brought rare development opportunities for the development of international container multimodal transport systems and the creation of international container transport brands.

3.3 New technologies and formats change promotes the formation of a new rail intermodal mode

With the gestation and rise of the current new round of scientific and technological revolution and industrial transformation, the extensive application of modern information technology such as Internet+ and big data. And the depth of cross-border integration is reshaping the form of transportation organization, the whole service mode and the logistics supply mode. The level of multimodal transport information has been continuously improved. With the implementation of the national “Great Customs
Clearance” strategy and the accelerating process of railway marketization, cross-departmental information sharing has made significant progress.

3.4 5G brings opportunities for the development of multimodal transport of railway containers
On December 21, 2018, the National Development and Reform Commission and the Ministry of Transport jointly issued the “National Logistics Hub Layout and Construction Plan”. The “Planning” pointed out the direction for the innovative development of railway multimodal transport. By 2025, the modern multimodal transport network with the main features of “trunk transportation + regional distribution” has been basically established. The proportion of national railway freight turnover has increased to about 30%, and the proportion of railway container transportation and container iron and steel combined transportation has increased significantly. The advanced transportation organization methods such as multimodal transport are widely used, and the proportion of national logistics hub unitized and containerized transportation exceeds 40%.

4. Development Countermeasures of Railway Container Multimodal Transport

4.1 Improve the construction of integrated logistics hub facilities
The layout of logistics hubs is from the perspective of the state providing public goods, it is necessary to further increase the construction of infrastructure such as railways, Coordinating space layout.

- Railway hubs should be reorganized to optimize the layout of logistics nodes. In combination with the development of comprehensive transportation network, by adjusting the scale and function of existing railway stations, land shifting construction, railway introduction of existing highway hubs, logistics parks, ports and other ways, strengthening the function of container transport, deepening the layout research of railway container stations, and optimizing the site selection scheme of railway stations. In accordance with the medium - and long-term railway network planning and the national logistics hub planning and construction requirements, and in line with the construction goals of 127 national logistics hub cities and 212 national logistics hubs, we will connect six types of logistics hubs, integrate 19 comprehensive railway hubs and 204 primary and secondary logistics bases. In addition, we should complete the short slabs, compile the general plan of railway hub, and improve the construction of comprehensive logistics hub facilities.

- Junction joints should be strengthened. Coordinating high-speed and general-speed, new and existing, hubs and passages, and coordinated development of railways in different regions, paying attention to the coordination of road network supporting facilities, strengthening the main channel, dredging microcirculation, realizing the optimization of network structure, clear hierarchy and maximize efficiency. To achieve “door-to-door” transportation, solve the problem of “one kilometre before and after” poor connection, reduce logistics links, and improve the level of integrated hub operation. Unicom’s national highway and port freight hubs will build a backbone logistics channel structure based on railways.

- Promote the construction of inland ports and build logistics channels. Cooperate with relevant enterprises such as ports and shipping to build railway inland ports, increase inland container return yard stations according to local conditions, enhance the distribution capacity of import and export goods and cargo distribution capacity of molten iron combined transportation, and build a complete international intermodal transport and molten iron combined transportation system. Relying on railway transport corridors and stations, linking up trunk and branch line transportation in inland areas, we should focus on building a land-port-type national logistics hub; relying on the railway port front station, we should build a port-type national logistics hub to smooth the “first kilometre” and “last kilometre” of railway transport.

4.2 Increase policy support
We will improve the mechanism of joint coordination between the national development and reform commission, the ministry of transport, the general administration of quality supervision, quarantine and
other departments, address major cross-sector and cross-sectoral problems in multimodal transport, further deepen supporting policies and measures, and encourage demonstration projects of container multimodal transport. We will give full play to the principal role of enterprises in the development of multimodal transport, and encourage railway, port, shipping, financial and information enterprises to establish linkage mechanisms to form synergy in their development.

We will improve the system of relevant regulations and standards for multimodal transport, dock relevant rules of international transport organizations, promote the development of multimodal transport, industry and trade linkages, and promote the facilitation of customs clearance. Priority should be given to the index of construction land to meet the needs of comprehensive hub land included in the national plan, and the approval procedures should be simplified. We will support the use of investment within the central budget, vehicle purchase tax and special construction funds to increase investment in container multimodal transport lines, hubs, information systems and other facilities and equipment. Local governments are encouraged to provide financial support to key multimodal transport enterprises and demonstration projects.

4.3 Take advantage of the advantages of multimodal transport
As the main body of multimodal transport, railway should optimize the organization and operations of schedules with fixed stations, fixed time, fixed routes, fixed prices and fixed standards to ensure that the railway transport capacity meets the requirements of multimodal transport, and optimize the “fixed price” electronic waybill and the process of delivery and distribution of goods. It should strengthen the docking with government departments. Railway departments are encouraged to speed up the completion of the national logistics node layout construction, and local governments are encouraged to participate in the construction of road matching around railway logistics nodes. Vigorously promote railway multimodal transport, rail-sea multimodal transport and Tie he intermodal transportation. Reduce barriers through the government and relevant departments to promote the rapid development of multimodal transport.

Railway logistics enterprises form strategic alliances with large transport enterprises, manufacturers and third-party logistics enterprises to form multimodal transport operators and enhance their service capabilities. One is to enhance the operational capacity of the main body of railway multimodal transport. We should give full play to the organizational and coordinating functions of Railways in different modes of transport, jointly formulate rules for multimodal transport, jointly promote business process supervision and jointly carry out multimodal transport. The second is to promote orderly convergence of multimodal transport business.

4.4 Promote open sharing of information
Relying on the railway logistics information platform, it connects the representative logistics information service platforms of highway, waterway and aviation, and constructs the "integrated" information platform of industry platform interconnection, sharing and independent operation. We will accelerate the application of 5G, cloud computing, big data, the Internet of things, RFID, EDI and other technologies. The standards of information sharing and data transmission and exchange for multimodal transport are studied. The formulation and application of container electronic data message standard should be strengthened. It is necessary to speed up the construction of the container hot metal water transport public information service platform and the whole cargo tracking information system. We should promote information sharing and railway container transportation transport ship and port operations information; establish an information sharing mechanism of molten iron combined transportation.

5. Conclusion
As China’s economy and society enter the new normal, the structure of freight demand presents new changes, and the contradiction between the demand for multimodal transport with high added value, high frequency, high timeliness and "door to door" and the lagging supply capacity is increasingly prominent. As a national infrastructure and major livelihood project, the railway should give full play
to its backbone role in the comprehensive transportation system. In view of the constraints and deficiencies in the development of railway multimodal transport, we will guide different modes of transport to work together, formulate new standards for multimodal transport, and create a new system for multimodal transport. The development of railway-led multimodal transport will help increase the railway market share, meet the transportation needs of high-quality economic and social development, and effectively reduce social logistics costs and serve economic and social development.

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