Research on the New Model of highway-railway combined transport under the Background of Car-Free Carrier

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Abstract: In recent years, the government strongly have supported the development of car-free carriers, gradually improves the regulations and standards of car-free carriers, encourages car-free carriers to innovate operational management models, and integrates decentralized logistics resources. This article analyzes the classification of domestic car-free carriers and the basic conditions for the implementation of public transport; The model of “car-free transport and highway railway transport” gives full play to the advantages of enterprises, reducing logistics costs and improving the competitiveness of enterprises. It also can effectively integrate logistics resources, achieve multi-stakeholder win-win and promote efficient and green development of the logistics industry.

1. Introduction
The car-free carrier is an extension of the NVOCC on land. A car-free carrier refers to a carrier without a car. It refers to an individual who does not own a vehicle and is engaged in cargo transportation. The car-free carrier has the right to integrate resources for cargo and capacity. A car-free carrier is a "carrier" relative to the cargo owner, while it is a shipper relative to the actual carrier. In the process of transportation organization, any mode of transportation can become its “actual carrier. Car-free carrier needs to bear double risks due to the special nature of dual identity. Moreover, the uncertainty of internal and external factors is also constantly increasing: from signing contracts with shippers and actual carriers, to all aspects of cargo transportation. There are risks which include the risk of transportation security and damage to goods, etc. Especially the risk of transportation security, that is, the need to take the risk of cargo transportation throughout the entire process, and direct compensation for the loss of goods.

2. Car carrier classification
2.1 platform class
Platform-type car-free carrier refers a system where the enterprise to establish a logistics information platform, combined with big data technology. Internet of Things technology can match the source pool and capacity pool and develop transportation routes for customers. Arranging transportation at a reasonable time and place, reducing the mileage of individual drivers and providing the return load rate is aimed to reduce the transportation cost.
2.2 Professional transportation
Professional transport car-free mode, which is characterized by "specialization." Through the platform to gather information to provide people various special logistics services, including urban distribution, special transportation and other services. It is a light asset-based operating model.

2.3 Heavy asset type
Compared with the previous two “light asset” car-free carrier models, the other is the “heavy asset-based operating model”. The “heavy assets” of such enterprises do not mean that they have huge fixed assets, and that their parent companies or the groups behind them are often relatively large traditional logistics enterprises. The “heavy asset type” car-free carrier is generally the resource that the parent company expects to share resources, and the responsibility of the car-free carrier is shown in Figure 1.

![Figure 1 The responsibility of the car-free carrier](image)

3. Analysis of the basic conditions for the implementation of public transport
The railway-railway transport refers to the transportation of domestic goods delivered by the whole-transport operator from the place where the goods are taken to the designated place according to a railway-rail transport contract. It is a combined transportation of two modes of transportation by road and rail. Usually, it is a container transport unit on the railway. Through one consignment, one payment, one bill, one insurance, the goods are completed by the road and railway section carriers.

(1) The advantages of railways and highways can be fully utilized, transportation can be arranged more reasonably, and resource utilization rate can be improved and logistics costs can be reduced.

(2) Improve transportation efficiency. The joint transportation of public railways is arranged by the intermodality operators to cooperate with roads and railways, arrange road transport vehicles, arrange railway transport container applications, etc., speed up the turnover efficiency of the vehicles and make the whole transport more reasonable. Improve the efficiency of transportation.

(3) Simplify the process and facilitate the owner. Carrying out container rail and rail transportation, the car-free carrier is responsible for the whole process of transportation. The cargo owner only needs to apply for one consignment, enter into a contract with the car-free carrier, pay the freight once, and avoid the current handling procedures and payment fees with the logistics company. The logistics company submits the application to the railway station, handles the complicated procedures such as procedures, and the information exchange of the railway and rail transport is shown in Figure 2.
Facilitating claims. If the goods are damaged or lost during the transportation process, the car-free carrier is responsible for the whole process of transportation. The shipper only needs to provide the contract signed with the car-free carrier, and then the claim can be made. The simple procedure of the claim also guarantees the owner. Got a certain degree of reinforcement.

### 4. Analysis of the mode of “car-free transport + highway-railway combined transport”

#### 4.1 Necessity analysis of the mode of “car-free transport + highway-railway combined transport”

The rapid development of modern logistics puts higher and higher requirements on comprehensive transportation. The emergence of car-free carriers has brought new opportunities for the rapid development of intermodality in China. The public railway transport is based on the universality of these two modes of transportation. It has received extensive attention from relevant researchers.

The logistics service collaboration studied in the article effectively integrates customers, suppliers, road transportation departments and railway transportation departments. Provide high-quality logistics services to achieve the overall goal of quickly responding to transportation market services, reducing logistics costs, and improving overall efficiency. Car-free carriers undertake transportation business, organize transportation methods to discuss cooperation with public and iron transportation enterprises, and reach cooperation intentions with public and iron transportation enterprises with preferential agreements, and the railway transportation enterprises actually complete transportation tasks. With the participation of car-free carriers, the entities involved in the actual transportation are coordinated with...
each other. In the transshipment process, seamless integration is achieved without the help of customers.

4.2 Conditional analysis of the “car-free transport + highway-railway combined transport” model

While improving the construction of information platform, it cooperates with railway freight transport enterprises to carry out information docking and carry out “car-free transport + highway-railway combined transport” business, which provides customers with various logistics solutions and reduces long-distance trunk transportation costs. For the development of “car-free transport + highway-railway combined transport”, enterprises should have the following conditions:

1) National policy supports the development of car-free transport and intermodality.

Car-free carrier and intermodality are the key support targets in the national logistics law called “13th Five-Year Plan”, and intermodality is listed as the first of the 12 key projects. In 2016, the General Office of the State Council issued the “Implementation Plan for Creating a Market Environment to Promote the Integration of Transportation and Logistics Development”. It is planned to introduce railways into 80% of major ports and large-scale logistics parks nationwide by 2019 to promote the development of logistics integration.

2) The railway freight rate system and technical conditions are gradually maturing.

With the rapid development of high-speed rail, a large part of the passenger flow on the original railway is diverted to the high-speed rail, and the railway has more capacity for cargo transportation. In December 2017, the National Development and Reform Commission decided to expand the scope of the railway freight to balance market, and it can simplify the freight rate structure and improve the freight rate system.

3) Jingbo logistics strength gradually developed and expanded.

After more than ten years of development, Jingbo Logistics has continuously expanded from a single warehousing logistics to a combination of warehousing and loading-unloading, vehicle transportation and less-than-truck distribution. Domestic and international logistics are compatible, logistics base construction and logistics practice are equally important. Modern integrated logistics enterprise. The strength of the company has gradually grown and developed, and it has the ability to expand the business of “car-free transport + highway-railway combined transport”.

4.3 Conception of the "car-free transport + highway-railway combined transport" model

Taking the cargo transportation between Jingbo in East China and North China can been regarded as an example. Jingbo is headquartered in Shandong and has a branch office in Hebei. The company's cargo transportation between East China and North China can be collected and evacuated in Jinan and Shijiazhuang.

After the customers place an order on the Jingbo car-free carrier platform, Jingbo provides transportation plans such as road transportation and highway-railway combined transportation according to the customer's cargo transportation information and related requirements, which are selected by the customer.

Compared with Long-distance cargo transportation, in the case of a large amount of goods and high timeliness requirements, railway transportation is generally more cost-effective. If the customers choose the highway-railway combined transport plan, Jingbo can transfer the feeder line between the customer's location and Jinan and the feeder line from Shijiazhuang to the cargo destination through the car-free carrier information platform and hand it over to the appropriate carriers.
Figure 3 Preliminary design of the business process of “car-free transport + highway-railway combined transport”

The trunk line transportation from Jinan to Shijiazhuang is negotiated with the railway department and is handed over to the railway. When the actual carrier transports the goods to Jinan, if it is a complete vehicle, it will be directly loaded into the railway freight container and sent to the station after inspection. If it is a LTL, it will be combined with other orders and then sent to the station. After the handover to the station, carriers will pay the fee. When the railway freight transport arrives in Shijiazhuang, the local carrier and branch staff inspect the cargo and return the railway container, which is transported by the carrier to the destination of the goods by road transport. The preliminary design of the business process of “car-free transport + highway-railway combined transport” is shown in Figure 3 above.

5. Conclusion
The logistics mode of “car-free transport + highway-railway combined transport” has a great impetus to promote the integration of logistics resources and the innovation and development of the industry. For the cargo owner, you can choose a more cost-effective logistics service; for the actual road carrier, you can reduce the safety risk of long-distance transportation; for the railway department, you can increase the railway supply and cultivate more highway-railway combined transport operators. For car-free carriers, it is possible to expand new business, improve service levels, and enhance corporate competitiveness. Although this paper puts forward a new model of “car-free transport + highway-railway combined transport”, the research is relatively simple. The model only proposes preliminary ideas and simple business process design. In the future, more in-depth research is needed in combination with specific practices.

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