



# Research on Data Analysis and Optimization Based on Small Third-Party Logistics Companies in China

Yelan Zhu, Baohua Guo<sup>(✉)</sup>, Huihui Wang, Qingwen Guo, and Zhe Meng

School of Energy Science and Engineering, Henan Polytechnic University, Jiaozuo, Henan,  
China

{212002020051, 212002020054, 212002020058,  
212002020053}@home.hpu.edu.cn, guobaohua@139.com

**Abstract.** With the continuous development of global economic integration and science and technology, the level of development of modern transportation has become one of the standards for measuring a country's economic strength. The process of trade transportation has promoted the improvement of the logistics transportation system and the emergence and development of the third-party logistics industry. Modern logistics enterprises must not only have a complete service system, but also a good logistics transportation system, so as to ensure that logistics enterprises can adapt to current market demands. Based on the transportation status of my country's small third-party logistics companies, this article uses structural system analysis and comparative analysis to analyze the data of henan WF company as an example, summarizes and finds the problems of my country's small third-party logistics companies, and finally puts forward some optimize strategies to help such companies further enhance their competitiveness.

**Keywords:** Third-Party Logistics · Road Transport · Transportation Management · Problems and Countermeasures

## 1 Introduction

Logistics transportation is a chain that promotes global trade and international trade exchanges. In order to effectively ensure the stability and healthy development of China's economy, we need to constantly develop China's transportation industry, and actively optimize the current transportation facilities to improve the management level of China's transport-related enterprises [5]. Due to the late start of China's logistics industry and the rapid development since the reform and opening up, now China's logistics industry has achieved a certain development, also formed a set of its own logistics system, but compared with some developed countries, the system is still not perfect. However, the professional and large-scale benefits brought by the emerging third-party logistics enterprises play a very important role in saving logistics costs, improving the competitiveness and customer service level of transportation business, and making the whole industry quickly become active [6]. Therefore, the core competitiveness of the enterprise can be

enhanced greatly by having a relatively perfect logistics and transportation management system [2]. Third party logistics enterprises should pay more attention to their transportation management and realize the scientific and balanced logistics cost, which is the inevitable requirement of their own development.

According to statistics, there are more than 300,000 logistics related enterprises in China, most of which are small transportation or storage enterprises. In addition, there are about 60,000 third-party logistics enterprises in China, 90% of which are small private enterprises. Although the third-party logistics industry has a great prospect market, they are studying effective measures to reduce logistics costs and achieve greater benefits, which makes the third-party logistics industry obtain unprecedented development opportunities, but also must face the severe challenges of market competition [3].

Ye Huaizhen [7] pointed out that more and more Chinese and foreign enterprises require logistics outsourcing to reduce transportation costs through a third party. Gao Congshuo [1] pointed out that China's large and medium-sized logistics enterprises are developing rapidly and have a large market, such as DE, SF, JD. The small third-party logistics enterprises occupy a large proportion, their development has been challenged due to their small scales. Ning Kai, Xu Xiaojun [4] pointed out that they must enhance competitiveness at a strategic height, and seek common development with large and medium sized logistics enterprises. Zhu Qiaoyun [8] pointed out that China's small third-party logistics is constantly growing, but there are also problems such as fewer logistics personnel, backward facilities and equipment, improper management, low level of service mode, unreasonable route planning.

On July 30, 2019, the formulation of the 14th five-year Comprehensive Transportation Development Plan (referred to as the 14th Five-year Plan) was launched in an all-round way, to indicate the development direction for modern logistics enterprises, provide high-quality logistics services, constantly improve the service level, and implement innovative and leading strategies to strengthen the competitiveness of logistics enterprises. The reasonable improvement of logistics and transportation system can improve the convenience of our work and life, give full play to the social and economic benefits of transportation management, and speed up the process of building a moderately prosperous society in all respects.

## 2 Problems in Small Third-Party Logistics Enterprises in China

### 2.1 Backward Infrastructure and Low Level of Service

Logistics machinery transportation facilities are one of the main operating tools of modern enterprises and the basis of reasonable organization of bulk transportation and mechanized flow operations. For third-party logistics enterprises, logistics transportation equipment is the material and technical basis for organizing logistics activities, which reflects the size of the enterprise's logistics capacity. At the same time, the advanced and backward transportation infrastructure determines the efficiency of the enterprise.

At present, the infrastructure of some high-end logistics enterprises in China is relatively complete in terms of mechanization and integration. For example, JD and other enterprises have introduced robots to help manual operation. However, the backward

infrastructure in the logistics and transportation system is an important factor restricting the operation efficiency of small third-party logistics enterprises in China.

Small third-party logistics enterprises have small scale, large quantity of goods and chaotic management. In the process of cargo loading and unloading in the transportation system, such enterprises still mainly deal with manual loading and unloading, and only a few forklifts, trailers and other auxiliary operations, which waste a lot of time. Compared with large logistics enterprises, small enterprises are short of mechanical forklifts, such as forward forklifts and balanced heavy forklifts. The delay of manual operation seriously affects the punctuality of departure in transportation, thus reducing the service level of transportation system.

At the same time, transportation vehicles are mostly relatively old, in the transportation process depreciation, the repair of these vehicles, maintenance costs will be greatly increased, resulting in the increase of enterprise transportation costs. At the same time, the kinds of shelves and pallets in the enterprise are too few, and the quality is poor, and large and heavy goods are not suitable for use. These backward problems of infrastructure weigh on the enterprise's profitability, making it difficult for the enterprise to achieve efficient operation.

## **2.2 Low Level of Informatization**

The improvement of the transportation information system of modern large logistics enterprises can timely collect and sort out the latest logistics information for real-time tracking. However, the information technology in the transportation process of small third-party logistics enterprises include two-dimensional code technology and electronic data exchange technology. When an enterprise receives a customer's goods, it should fill the detailed information of the goods into the computer system to form electronic data firstly, then bar code should be affixed to the package of the goods for transportation. Upon arrival at the destination, the workers at the receiving point can obtain the details of the goods, exchange electronic data from the two-dimensional code on the goods by a scanner, and then confirm receipt. It takes a long time for staff to scan the goods, and the delivery takes a long time. The electronic data exchange system used in the transportation process cannot meet the requirements of real-time tracking of goods by customers due to the lack of public information exchange platform.

Of course, the route needed in the transportation process cannot be updated in real time, which will lead to the delay of transportation time, increase the transportation cost and reduce the level of transportation service. Due to the imperfect service network and information system, the problems of inventory squeeze, slow transportation response, long transit time, large losses on the way, high transportation costs, poor convenience and low service quality are caused.

## **2.3 Unreasonable Transportation Form and Low Transportation Efficiency**

At present, China's logistics industry mostly adopts a number of transportation enterprises to cooperate with each other in the form of transportation. For example, "four connections and one arrival" and other enterprises adopt combined mode of transportation by transferring from air to railway to highway, which can save costs and make up

**Table 1.** Henan WF Logistics Regional Waybill Statistics in 2019

| Region        | First quarter | Second quarter | Third quarter | Fourth quarter | Aggregate |
|---------------|---------------|----------------|---------------|----------------|-----------|
| Northwest     | 1345          | 1096           | 1856          | 1909           | 6206      |
| Northeast     | 6186          | 6021           | 5866          | 6123           | 24196     |
| Southwest     | 2890          | 3059           | 3128          | 2564           | 11641     |
| East China    | 13723         | 11956          | 11577         | 12216          | 49472     |
| North China   | 10956         | 11543          | 11569         | 10316          | 44384     |
| Central China | 9063          | 8962           | 10546         | 9622           | 38193     |
| South China   | 4283          | 3952           | 4165          | 4006           | 16406     |
| Total         |               |                |               |                | 190498    |

the shortage of their logistics resources. However, small third-party logistics enterprises in China mostly adopt road transportation, which is in the form of part-load vehicle transfer and sub-shipment. In the transportation process, the goods are not delivered to the consignee directly, so they need the assistance of local transfer stations. Therefore, this kind of transportation mode with limited segmentation will lead to the appearance of repeated transport.

Henan Round-trip Logistics company is a small third-party logistics enterprise which distributes to all parts of China with Zhengzhou as the center. The waybill volume of all parts of the company in 2019 is shown in Table 1.

It can be seen from Table 1 that most of the company's transportation orders in 2019 come from East China, Central China and North China. The geographical location of the southwest and northwest is relatively far, and the order volume is relatively small. The company sent 10 vehicles per month to the southwest and 5 vehicles per month to the northwest, and transportation cost and transportation profit is not proportional for their too far transportation distance. At the same time, due to the backward level of transportation information technology, the information of transportation orders and transportation lines cannot be updated in time, leading to repeated transportation and convective transportation, which increases the logistics transportation cost and reduces the transportation efficiency.

## 2.4 Nonstandard Personnel and Vehicle Management

The transportation vehicles of China's small third-party logistics enterprises mostly adopt the mode of assignment. The business process of the transportation department of such enterprises is shown in Fig. 1.

The supervision system of the enterprise is not sound, the company does not have the detailed information of the dispatched vehicles and drivers, the mismatch between personnel and vehicles is extremely high, and the privately replaced vehicles may have faults, resulting in higher transportation costs for the enterprise. At the same time, transportation personnel also have the problem of substitution. If there is a mistake in the

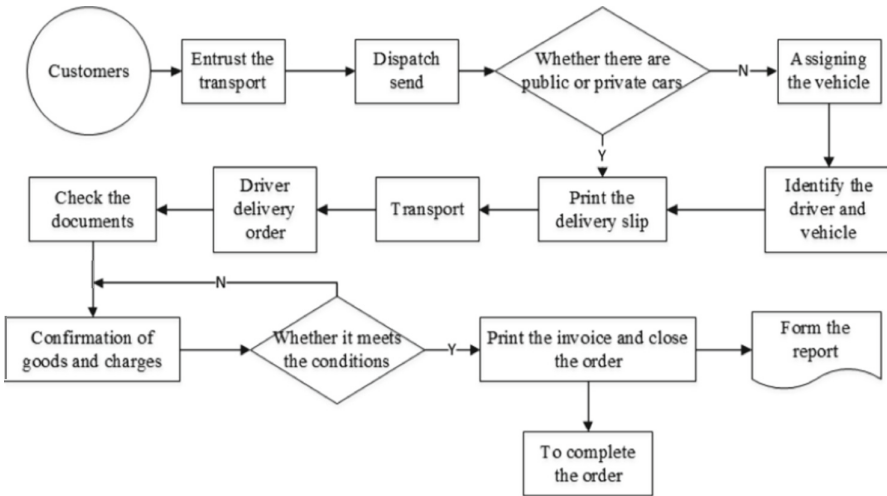


Fig. 1. Transportation department business flow chart

transportation process, the loss will not only increase the transportation cost of the enterprise, but also affect the enterprise image.

### 3 Countermeasures and Suggestions for the Problems Existing in Small Third-Party Logistics Enterprises in China

#### 3.1 The Introduction of High-Tech Equipment, Improve the Level of Service

In the 14th Five-year Plan, enterprises are encouraged to introduce high-end technical facilities, so as to make the transportation process more mechanized and integrated, thus to ensure the improvement of transportation time, transportation cost and transportation efficiency.

Small logistics enterprises can purchase some forward forklifts, side forklifts, balanced forklifts, etc. to replace wheelbarrows and manual forklifts, so as to ensure time-saving, convenient and efficient loading and unloading of goods, and the service level. Since most enterprises use dispatched vehicles, the quality problems of the dispatched vehicles should be checked, and relatively new vehicles should be selected to reduce the unexpected costs of the enterprises. Enterprises should buy more metal pallets and some better-material wooden pallets to reduce the depreciation rate of pallets and reduce enterprise transportation costs. To obtain better development opportunities and achieve efficient operation, small third part logistics enterprises should purchase high-tech facilities and equipment, improve logistics and transportation conditions, reduce transportation costs, and enhance the level of service.

#### 3.2 To Build and Improve Information System

The 14th Five-year Plan points out that enterprises should improve the infrastructure network and improve the efficiency of the comprehensive transportation network. With

the rapid development of big data, logistics information system is the key to develop the third-party logistics industry. As long as logistics information system is realized, it can realize customer-centered in a true sense, be highly unified in logistics, information flow and capital flow, complete the integration of logistics resources and integrated supply chain management, quickly respond to the needs of logistics customers, and reduce logistics costs. The improvement of logistics and transportation information system can timely collect and sort out the latest logistics information, promote the automation and integration of logistics business, and realize the scientificity and rationality of logistics and transportation process. The third-party logistics enterprises should use electronic positioning scanner for automatic scanning to improve the speed of logistics operations.

At the same time, the GPS positioning function should be added, and a public information exchange platform should be established to realize real-time tracking and monitoring of goods in the transportation process. GPS positioning function can also help enterprises to carry out dynamic scheduling, timely update the latest information of transportation routes, optimize routes, reduce transportation costs, reduce inventory squeeze, reduce transportation time, and improve logistics transportation convenience and service level.

### **3.3 Transportation Rationalization, Improve Transportation Efficiency**

In the 14th Five-year Plan, it is pointed out that we should deepen the supply-side structural reform of transportation and promote the “cost reduction and efficiency increase” of logistics. However, since small logistics enterprises mostly adopt the mode of transfer and sub-shipment of LCL vehicles, the goods need the assistance of the transit station for transportation, so there is no need for a special region for transportation. For example, trucks in Henan Round-trip Logistics company going to south China can load goods in central China to reduce repeated transportation. Due to the geographical distance of northwest and southwest, vehicles in this region can be appropriately reduced to avoid excessive transportation, so as to adjust the balance between transportation cost and transportation profit.

When the existing logistics functions of small logistics enterprises cannot meet the business needs, they can use the alliance strength to complete the business. In this way, small logistics enterprises can make up for the lack of a single service to provide multi-functional services to the logistics market. At the same time, small logistics enterprises should improve the technical level of the transportation system, update the information of the transportation lines and orders in time to avoid repeated transportation and convection transportation, reduce the transportation goods loss, improve the transportation goods quality, save transportation costs and transportation labor, improve transportation efficiency.

### **3.4 To Formulate a Management System for Transportation Personnel and Vehicles**

According to the 14th Five-year Plan, small logistics enterprises should deepen the construction of safe transportation, improve the capacity of emergency safety support, and provide strong support for high-quality economic and social development. As the supervision system of logistics companies is not perfect in China yet, the management system of personnel and vehicles of third-party logistics enterprises should be ensured and the perfection of the management system is related to the evaluation of the transportation service level. To improve the enthusiasm of employees, small logistics enterprises should carry out professional training for transportation personnel, implement real-name face-brushing certification for them, strengthen the quality of transportation personnel to constantly improve, constantly learn and apply advanced technologies and methods, formulate incentive system, welfare and reward, etc.

For the dispatched vehicles of small logistics enterprises, the management mode of “one to many” should be adopted, that is, one person manages the deployment of multiple vehicles by sticking electronic tags on the vehicles. GPS and ITS should be adopted to preliminarily realize the monitoring and positioning of vehicles, and assign individual responsibility to stimulate the responsibility sense of enterprise employees. The above measures can greatly improve the company’s work efficiency, and improve operational efficiency.

## **4 Conclusion**

Through the research, it is found that the benchmark enterprises in China’s logistics industry are developing steadily. With the changes in the demand of the logistics market, the transportation management of small third-party logistics enterprises in China is playing an increasingly important role in the social development. In the increasingly fierce competition environment, logistics enterprises need to enhance the consciousness of the logistics management and reduce logistics cost for survive and development. Additionally, they need find some effective ways to expand the logistics enterprises profit space, make the logistics become the third-party profit source of the manufacturing enterprise, rather than a bottleneck for the further development of manufacturing enterprises, so as to better realize enterprise operation cost minimization and profit maximization. Therefore, small third-party logistics enterprises in China should combine their own characteristics, consider the impact of various factors, and correctly analyze the advantages and disadvantages of enterprises, so as to make use of advantages, avoid disadvantages, and actively play their role in manufacturing enterprises development.

Reducing transportation costs is very important in logistics transportation management, and the effective control of transportation costs is a very complex problem, and is also a dynamic problem in a certain period. By improving the facilities equipment in logistics transportation management system, the problems existing in the small third-party logistics enterprises in China will be gradually improved and solved, these small logistics enterprises in China can make progress with large and medium logistics enterprises to improve the economic efficiency of the logistics industry and provide better service to the society.

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