Explore The Cost System of Logistics: Taking JD Logistics as An Example

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Abstract. In the process of economic globalization, market competition has become more and more fierce. Countless companies blindly reduce costs to reduce prices to increase their competitive advantage. However, because of their incomplete understanding of the cost system, cost control has been high. Among them, cost control plays a vital role in enterprise management. In the process of rapid development, logistics enterprises face external competitive pressure and their cost control system constraints. To fully cope with the fierce competition of the times, logistics companies must learn to control costs and improve enterprise management. This paper uses a case study method and combines data analysis methods to discuss JD.com's self-operated logistics cost system. It is compared with the systems of third-party logistics companies, such as SF Express, through comparative analysis. This article analyzes and compares the leasing costs, vehicle depreciation and replacement costs, fuel costs, investment costs, and insurance costs of JD Logistics, puts forward some of their problems, and finally gives some reasonable suggestions.

Keywords: Cost System; Logistics; JD Logistics.

1. Introduction

In the modern era of rapid economic development, information technology has triggered changes in business models, and the development of e-commerce in the past few years has set off a logistics boom. This logistics boom will continue to rise. E-commerce enterprises mainly rely on logistics to protect themselves. If the logistics can not support up, the development of e-commerce enterprises will be hindered. So e-commerce enterprises must build their own and the same scope of the field touched by the logistics platform so that through the corresponding way to reduce logistics costs to reduce their operating costs, solid in the industry's corresponding market share.

This paper uses a case study approach to explore the costly system of Jingdong's self-operated logistics. It compares it with the third-party logistics company, SF Express, through comparative analysis. Firstly, an introduction is given to Jingdong logistics as a whole. Then the corresponding data are analyzed for rent cost, cost of vehicle depreciation and replacement, fuel cost, investment cost, and insurance cost, and recommendations are given.

2. Literature Review

Cost management is not an end, but a means to support an organization in achieving its goals, such as increasing profits by actively reducing costs[1]. With the maturity of the logistics system, cost management has become a major problem for enterprises. Because a company wants to make more profits, reducing its operating costs is the key in addition to increasing revenue. Cost management plays a vital role in influencing the effectiveness of SCM activities and the behavior of those involved in procurement, supply, and logistics processes[2-4]. When discussing how to implement cost management in the supply chain, we need to understand that costs are not generated by the flow of materials and information in the supply chain, but by things related to the supply chain itself [5].

Wanger conducted an empirical analysis with 18 SCM-related cost management practices and analyzed whether industry-based enterprise size played a role in using these cost management practices [6]. But these theories and practices still need many practical cases to prove. Professors Li and Xu believe that traditional cost management methods are useless for cost control in the supply chain environment and should use the balanced supply chain management scorecard and activity-based costing to control more effectively [7].

According to the analysis of relevant literature at home and abroad, it can be obtained that the main research direction of today's scholars on logistics costs is the development environment in the field of e-commerce and logistics distribution methods and the cost control based on value chains. However, there is still a lack of research that analyzes the company's internal data to elicit how companies manage logistics costs.

This paper adopts the case analysis method and data analysis method, takes JD Logistics as a case, combines the current operating status of JD Logistics, analyzes the problems of cost control during the period, and proposes solutions to today's cost problems according to theoretical research.

3. Cost system analysis

3.1 Case discussion

JD Logistics is an essential branch of the JD Group. JD has been establishing its logistics since 2007 and is one of a kind in China. It now has seven first-tier logistics centers, including Beijing and Shanghai, and logistics centers in a number of second-tier cities and operates over 730 warehouses nationwide. Integrated supply chain logistics service is the core track of Jingdong Logistics. Currently, Jingdong Logistics focuses on six industries, including FMCG, apparel, home appliance, and furniture, 3C, automotive, and fresh food, to provide integrated supply chain solutions and logistics services to help customers optimize inventory management, reduce operating costs, allocate internal resources efficiently and achieve new growth [8].

JD Logistics creates efficient, accurate, and agile logistics services. Realize intelligent logistics systems through technological innovation. In 2017, Jingdong Logistics innovatively launched the cloud warehouse model, applying its management system, planning capabilities, operation standards, and industry experience to third-party warehouses, effectively increasing the utilization rate of idle warehouses by optimizing local warehouse resources so that small and medium-sized logistics enterprises can also make full use of Jingdong Logistics' technology, standards and brands to improve their service capabilities, and as of June 30, 2022, the number of cooperative cloud warehouses on the cloud warehouse ecological platform has exceeded 1,700.

3.2 Actual cost problem

3.2.1 Rent cost

JD Logistics needs a large number of its warehouses and distribution centers to take advantage of the speed, allowing it to exceed its counterparts' average level. The disadvantage of a high proportion of owned warehouses is the cost of consumption proportional to the speed of delivery. And to keep its edge, the proportion of owned warehouses continues increasing.

To figure out why it has such a high warehousing cost, it is necessary to assess the present inventory situation in the company. This paper compared the inventory turnover rate between JD Logistics and SF Express. The inventory turnover ratio represents the number of inventory turnovers in a year. The enterprises hope that the turnover rate to be higher because the turnover rate represents how many times the inventory in the warehouse helps the company do business in a year. The smaller the turnover ratio, the slower the flow of money occupied by inventory.

JD is the head of e-commerce which focuses on comprehensive retail. The SKUs are about 40.2 million per year. The huge number of SKUs requires enormous space for storage. Thus, whether the commodities can be turned over smoothly and quickly fundamentally affects JD's cost in

warehousing. The figure 1 illustrates that the turnover rate of JD Logistics is much lower than that of SF Express. It indicates that the ability to manage inventory in JD Logistics is not strong enough. Large numbers of goods lying in the warehouses statically and cannot participate in the flow of goods to help the company make money. The company needs abundant space, employees, facilities, etc., to place them.

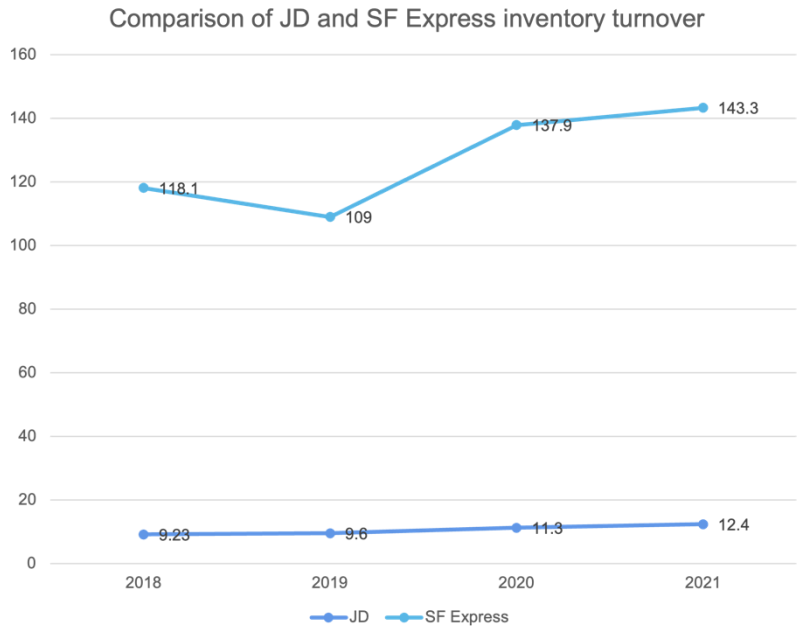


Fig. 1 Comparison of turnover rate

Then, the paper compares the warehouse areas between JD Logistics and SF Express, as shown in figure 2. The graph shows that JD Logistics owns 24 million square meters, almost 4 times larger than what it is in SF Express. Their massive warehousing system could be a burden for the company. It will be an enormous cost in warehousing management.

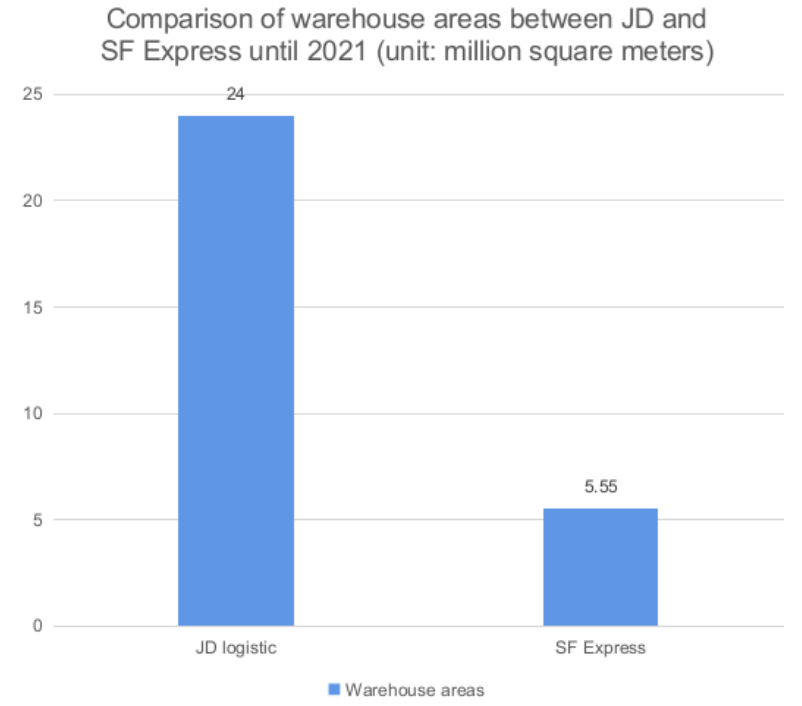


Fig. 2 Comparison of warehouse

The paper also compares the actual rental cost of the two companies, as shown in figure 3. Although JD Logistics had a lower rental cost in this diagram, according to the cost structure shown before, it accounted for a more significant part of the company's revenue compared with SF Express. For example, in 2018, the rent cost in SF Express was 4.9 billion RMB and took part 5.44% of the revenue. Rent cost in JD Logistics is 4.4 billion RMB but takes up 11.73%. Also, the rent cost of JD Logistics has kept increasing in the past 4 years and exceeded SF Express for 3.7 billion RMB last year, while rent cost in SF Express has declined. It reveals that there could be problems in the warehouse management of JD Logistics.

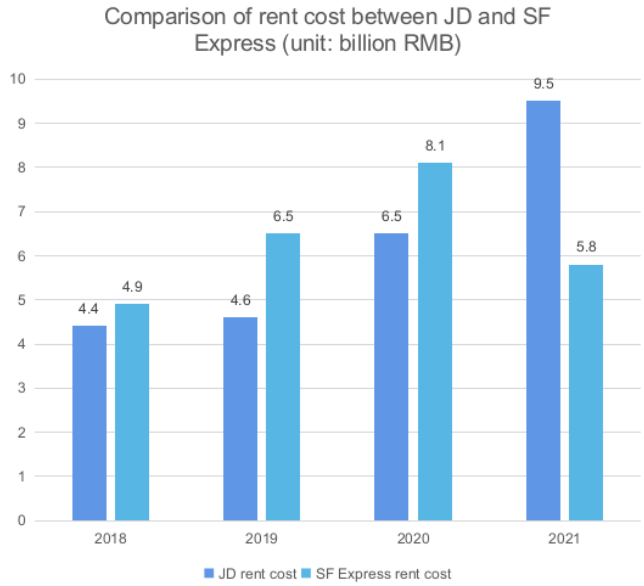


Fig. 3 Comparison of rental cost

Another possible reason for the high warehousing cost is the high return rate. The return rate is high. Returns represent twice as much in delivery costs, and JD's return rate is even up to 28%, one of the highest in the industry. This, coupled with the already high delivery fees of JD Logistics, further increased the cost of logistics. Returned goods frequently occurred during shopping festivals. JD Logistics has to manage returned and outgoing goods separately to reduce management difficulties, save time as much as possible, and transport returned goods in a unified manner. But it can only treat the symptoms but not the root cause. The high rate of returns is a problem that should be solved as soon as possible. The high return rate means that the sales efforts before consumers purchasing the product are not efficient, which in turn further increases service costs and increases the cost of reverse logistics. Suppose data analysis is not carried out promptly to prescribe the right remedy and allow returned goods to accumulate, which may result in a shortage of warehouses. Then the company has to expand the warehouses. They need more space and other elements to store or manage these goods. The higher warehousing cost will come after.

3.2.2 Cost of vehicle depreciation and replacement

As of December 31, 2021, JD Logistics' self-operated transportation fleet included more than 18,000 trucks and other vehicles. However, at the end of 2020, JD Logistics's self-operated transport vehicles only had 7500 trucks and other vehicles. This means that the number of self-operated vehicles in JD Logistics has grown rapidly in one year. However, the number of cars increases and the cost of management and the accrued depreciation expense will increase significantly. The 2021 JD annual financial report shows that JD Logistics rapidly expanded its cost in 2021, reaching 2.6 billion yuan in 2021, an increase of 800 million yuan over the previous year(figure 7). Through these data, it can be seen that JD Logistics has spent much cash on buying more vehicles in response to its own 211 time-limited delivery. Despite the increase in vehicles, vehicle depreciation is required each

year. It can be seen from the table 1 that the depreciation expense of JD Logistics has also increased compared with previous years.

Table 1. Three Scheme comparing

	2020	2021
Cost	1733655000	2615231000
Depreciation	999945000	1193097000
Carrying values	733710000	1422134000

At the same time, in response to the country's sustainable development plan, JD Logistics environment, social and governance Report illustrates that they will replace 4,960 old fuel distribution vehicles in 2021, and the number of new energy vehicles put into use in more than 50 cities across the country has reached 20,000. If we look at the data of JD Logistics, we analyze the price of 5 tons of light trucks on the market, the average price of a vehicle is 100,000 yuan, and the percentage of depreciation is 20%. According to the double-declining balance depreciation (DDB) method, assuming that each car is used for 5 years, and each year's depreciation is equal to 2 times straight-line depreciation percent multiplied by book value at the beginning of the period. The residual value of these vehicles after 5 years is 32,770 yuan. Currently, the average price of new energy 5-ton vans on the market is 150,000 yuan, and the replacement cost of the 4,960 old fuel delivery vehicles that JD Logistics needs to replace must pay 581.46 million yuan.

3.2.3 Fuel cost

The figure 4 shows the volatility of fuels in the past two years. It is illustrated that by the end of March 2022, in the past 14 months, gasoline prices had risen by about 38.7%, leading to an 11.6% increase in delivery cost. JD Logistics owns over 18000 vehicles. According to the statement in their annual report, the fluctuation in fuel price and supply is a risk for their operation. They provide transport services as part of their supply chain solutions and logistics services, for which they use heavy-duty trucks as their primary means of transport. As a result, truck fuel and tolls account for a portion of their costs. Their suppliers or themselves must purchase large quantities of fuel to meet vehicle demand. And the price and availability of fuel are subject to political, economic, and market factors beyond their control and are highly volatile. As the fuel prices increase significantly, their related costs could increase, and their gross profit could decrease if they cannot take effective cost control measures or pass on the increased costs to their customers through service surcharges.



Fig. 4 The volatility of fuels(Source: Trading Economics)

3.2.4 Investment cost

March 11, 2022, JD Logistics announced that it had spent nearly 9 billion yuan to acquire Deppon Logistics Co., Ltd. The announcement of this news illustrates that 9 billion yuan has become the maximum investment cost of JD Logistics this year. Deppon Logistics is a comprehensive express delivery with large-scale express delivery as the core business, involving express transportation, vehicle, warehousing, and supply chain. JD Logistics's acquisition of Deppon Logistics can help them provide more resources in third-party logistics to a certain extent, but because the internal management question of Deppon Logistics is still very serious. Therefore, the overall management cost of the acquisition of Deppon Logistics in the later stage is a severe problem.

In JD.com Logistics' 2021 annual report, as of December 31, 2021, they operated 43 Large-scale Intelligent Warehouses in Asia No. 1 in 33 cities across China, of which 11 new ones will be added in 2021 in Nanning, Haikou, Zhengzhou, Deyang, Yiwu and other 11 cities. In JD Logistics' 2021 annual report, as of December 31, 2021, they operated 43 large-scale smart warehouses in Asia No. 1 in 33 cities across China, of which 11 new ones will be set up in Nanning, Haikou, Zhengzhou, Deyang, Yiwu and other 11 cities in 2021. And they will raise 55% of the funds raised to enhance and expand their logistics network once to maintain their competitive edge. This illustrates that the cost of JD Logistics investing in warehouse construction is also very huge.

3.2.5 Insurance cost

JD Logistics built its direct logistics system. So, JD Logistics needs much more workers than other counterparts to deal with the design and has a higher proportion of its employees. As shown in figure 5, by the end of 2021, JD Logistics will own 316382 employees, almost two times that of SF Express. Also, with the expansion of their logistic system, to let it work properly, JD Logistics needs more and more employees.

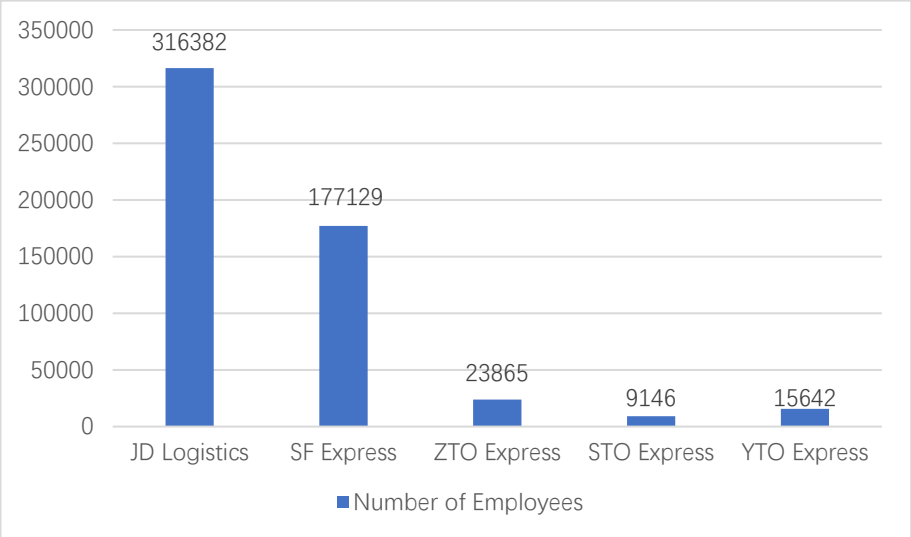


Fig. 5 Numbers of Employees in 5 Major Logistic Company in China(Source: JD Logistics, Inc. Annual Report 2021)

The high labor costs of JD Logistics are mainly due to its large number of own employees and better welfare in the industry. As a model of a compassionate company, JD Logistics' salary and bonus commission for its employees are higher than the average in the whole industry. And these generous benefits are paid out of sales profits. To make its own logistics system more stable and high-end, JD Logistics needs to retain the core employees of the system, so it treats its employees well not only in terms of salary but also in terms of social security and housing, providing employees with insurance and housing fund. The JD Logistics prospectus disclosed that it purchased social security insurance for its employees, including pension insurance, unemployment insurance, work injury insurance, maternity insurance, and medical insurance, as well as group accident insurance for all

delivery staff, which is a huge cost for such a labor-intensive industry. The CEO of JD also announced in 2018 that they had to spend 6 billion RMB on the employee's insurance and housing fund. If not, they could earn at least 5 billion RMB per year.

Another reason for high insurance costs is the brain drain within the company. Although JD Logistics has generous employee welfare, the resignation rate of senior staffs is high, and some senior staff cannot cope with the high intensity of work and choose to resign. The company has to recruit or train a new senior team, which undoubtedly increases the insurance cost as there is a much-repeated outlay.

3.3 Suggestions

3.3.1 Cooperation

At present, Jingdong Mall's customers are mainly concentrated in the first-tier developed cities in China, such as Beijing, Shanghai, and Guangzhou. Jingdong Logistics also focuses on establishing first-tier logistics centers in these central cities. With the deepening of the application of the Internet era, online shopping has been extended to more small towns and even remote towns without network signals. In the case of online shopping showing a surge, Jingdong not only wants to fight for more customers but also wants to establish its own logistics center in these areas, and the logistics center is not built overnight. It is a site that needs to be finalized after careful consideration before establishing the logistics center. How does Jingdong respond. China's third-party logistics network is well developed, and many logistics networks have been extended to various regions of China. Jingdong can cooperate with these third-party logistics companies to complete the distribution of goods.

At the same time, for some large goods distribution, you can cooperate with the corresponding manufacturers, manufacturers have their own connected cooperation logistics company, so that not only from the human and material resources, etc., in the most efficient way to achieve the method of maximum benefit distribution[9].

There are many cooperation models, but it depends on how each enterprise handles it and how to achieve the maximum benefit optimally.

3.3.2 Implement Vendor Managed Inventory (VMI) mode

JD Logistics can implement the VMI model by strengthening cooperation with suppliers. The VMI model emphasizes the collaboration and interoperability between supply chain enterprises, which must share information and ensure the smooth transmission of information[4]. Once the VMI model is established, JD Logistics can integrate distribution data into suppliers. The supplier then customizes the marketing scheme through the delivery data's delivery location, scope, and SKU of the goods. Then, the supplier can integrate these marketplace solutions and make a fixed-point and quantitative distribution plan for JD Logistics. According to this distribution plan, JD Logistics can reasonably arrange vehicle and personnel scheduling through the size of road conditions and cargo volume and customize the optimal driving route of vehicles. In this way, it is possible to reduce the driver's fuel costs due to unfamiliarity with the delivery route and the loss due to the increase in the vehicle's mileage. At the same time, because there is a plan in advance for the delivery plan, the working time of the personnel can be reasonably arranged, thereby reducing the additional overtime.

VMI is a demand-driven inventory management strategy[10]. The supplier is the decision maker in the supply chain system, and the downstream distributor is the auxiliary. Suppliers must make correct and reasonable decisions to ensure that the supply chain runs well. Because the dominant player in inventory is the supplier, the personnel arrangement of JD Logistics in inventory management can be appropriately reduced. At the same time, because the goods are stored in the supplier's warehouse, almost all the goods are delivered according to the order, so JD Logistics can reduce their transit locations' and sorting personnel' needs. This can significantly reduce the cost of premises and the insurance costs they bear.

4. Conclusion

Cost control plays an important part in the management of enterprises. Logistics companies face external competitive pressure and are restricted by their cost control system during rapid development. There are difficulties in the overall development. To be fully prepared for the fierce competition, logistics enterprises must learn to control costs and improve enterprise management levels.

This paper combines relevant theoretical research to analyze the current situation of cost control in JD logistics. The paper discusses the pertinent problems of the logistics cost management of the enterprise. It puts forward possible suggestions for the cost control of the enterprise based on the case study. However, the paper is still not perfect in terms of writing. Firstly, due to the professional level and research ability limitations, the paper cannot collect comprehensive information and interpret data to be thoroughly professional. And there are deficiencies in analyzing problems and causes, which may result in the imperfection of the theory. There could be thin views, expressions that are not precise enough, etc. Secondly, as most enterprises' cost data have confidentiality, some domestic and foreign cutting-edge information data will be somewhat not accessible. In this paper, we have used enterprises' publicly disclosed data and information to the greatest extent to study cost control issues. There are certain limitations in the summary and induction.

Lastly, there isn't an effective method to deal with the high warehousing cost. Intelligent storage is a new orientation. The warehousing industry's development includes five stages: manual warehousing, mechanized warehousing, automated warehousing, integrated automated warehousing, and intelligent warehousing. The overall development of China's warehousing industry is in the computerized warehousing stage. However, niche areas such as e-commerce, pharmaceuticals, and other parts of the advanced enterprise warehousing management have entered the application of intelligent warehousing implementation stage. We hope the research findings and results will help and advise researchers in the same field. We hope that my research findings and results will help to suggest to researchers in the same area and attract more scholars to pay attention and focus on the further development of intelligent storage to deal with the cost control problems in warehousing.

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