

The Limitations of Traditional Retail Enterprises' Self-built Logistics System——A Case Study of Walmart

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ABSTRACT

With the rapid development of the mobile Internet and changes in consumer concepts, the current domestic consumer market and consumer behaviors show a significant trend of upgrading and upgrading, and consumers are more enjoying a convenient, fast, high-quality, and personalized shopping experience. Online and offline consumption boundaries are gradually blurred, shopping scenes are becoming more abundant, and retailers' ultra-omnichannel integration and development continue to accelerate. The booming development of e-commerce has promoted the rapid development of logistics systems, but the high cost of logistics has become the main factor restricting its rapid development. This paper takes Walmart as an example, firstly analyses the current situation of Walmart's logistics system, then combines it with the cost analysis of JD.com's logistics system. By researching the development mode of the combination of physical commerce and e-commerce in China, we explore the most feasible cooperation scheme between Walmart and JD.com by studying their strategic cooperation. It has certain reference significance for further construction improvement of the logistics system of domestic e-commerce enterprises.

Keywords: Walmart, traditional retail enterprises, self-built logistics system, JD.com.

1. INTRODUCTION

1.1. Background

The self-built distribution system is an important part of Walmart's cost leadership strategy. About 87% of Walmart's products go through the distribution center, while Walmart's competitors can only reach 50%. Since the distribution center can reduce logistics costs by about 50%, Walmart can provide cheaper products than other retailers. Walmart has established 12 distribution centers in China, located in the center of more than 100 retail stores. This allows one distribution center to meet the needs of more than 100 sales outlets in nearby cities, and its transportation radius is short and even. [1]

Since its 2014 revenue was severely hit by e-commerce, Walmart determined to close its loss-making stores from 2015 to 2019 and upgrade to an all-channel, online-offline, omni-channel compound enterprise.

Although Walmart has ended its early deployment of new retail, the gap in retail sales between offline and online businesses is still huge, and it is unable to bring excess returns to the company. In the Chinese retail market where online and offline retail is largely integrated, Walmart's current logistics system cannot adapt to Walmart's online sales system. At present, Walmart and JD.com share SKUs on the platform, and online store upgrades are beginning to explore cooperation in shared warehousing and logistics systems probability.

Our research is based on the background of Walmart's development of online retail, starting from the characteristics of Walmart's existing logistics system and combining Walmart's cooperation with JD.com, exploring the limitations of traditional retail companies' self-built logistics system.

1.2. Literature review

Previous literature studies the advantages of Walmart's logistics distribution system. Zhou and Guang study Walmart's complete logistics distribution system, efficient transportation capacity, advanced logistics data processing center, and scientific logistics distribution process. Large-scale retail enterprises must establish and improve modern logistics distribution centers. Another strand of research studies the predicament Walmart's logistics distribution system meets in China and the probability of cooperation between the traditional retail industry and e-commerce.[1] Zhang (2011) studies the advantages of Walmart's logistics system in the United States, analyzes the problems encountered in the operation of Walmart's logistics system in China, finds corresponding solutions and countermeasures.[2] Yang (2019) studies take the strategic cooperation between physical business Walmart and e-commerce platform JD as the starting point. From the perspective of cross-border strategic cooperation, they study the development method of combining physical business and e-commerce in my country. They find a business model suitable for my country's national conditions to provide a reference for developing commercial cooperation in various countries in the world. Some studies find the rapid development of e-commerce has become a major trend, and the logistics industry naturally needs to keep up with the pace of online e-commerce.[3] GeSi (2021) study the last mile electric business logistics distribution problem.[4] Gao and Su (2020) study the JD logistics, studies the development strategy of JD Logistics with the SWOT analysis method, analyzes the advantages, disadvantages, opportunities, and threats of JD Logistics, and finally puts forward three suggestions for the construction of logistics system of e-commerce enterprises in China.[5] Hu and Zhan (2020) study the logistics distribution mode taking JD Mall as an example. They also analyse the four logistics distribution modes of JD. The development trend of E-commerce enterprises' logistics is summarized. E-commerce enterprises will expand their business according to different business channels in their development process, and finally choose the appropriate logistics operation mode. [6]

2. INSTITUTIONAL BACKGROUND

2.1. Walmart Logistics System

Walmart Logistics System is mainly divided into two transfers: inbound logistics and outbound logistics. The supplier transports the goods to the designated distribution center (Hub)-the logistics process from the supplier to the distribution center is called "inbound logistics" (inbound logistics). Walmart uses its transportation team to deliver the goods concentrated in

the distribution center to various retail stores (Spoke)-the logistics process from the distribution center to the retail stores is called Outbound Logistics.

2.2. The supermarket industry

The development process of China's supermarkets has gone through four stages.[7] In the first stage, the international supermarkets of Carrefour, Walmart, and Metro entered the Chinese market in the late 1990s, and domestic supermarkets rose rapidly. To the second stage, the rise of e-commerce convenience stores, the traditional growth rate of retail formats has slowed down, and the scale of e-commerce has exploded. The changes in the demographic structure of the third stage have given rise to the rapid development of O2O instant convenience for consumers; the development of the integration of online and offline omni-channels under the support of the perfection of the retail infrastructure in the fourth stage. The purely offline retail business model is no longer suitable for the current Internet era. While many department stores are either withdrawing from the Chinese market or closing their doors, many traditional retail companies seek e-commerce brand cooperation.

2.3. Appeals for online business

The expansion of the retail industry has increased the demand for distribution. The storage center is a capital-intensive high-tech building specially designed for online retail. It is responsible for selecting, sorting, and transporting a small number of different types of products and delivering the products to home or business addresses. On the contrary, the logistics center sends a large number of a few types of products to a certain number of shopping malls. However, for the logistics model that relies on the e-commerce model from the distribution center to the customer end, Walmart's existing traditional warehouses that serve bulk commodities cannot directly replace new logistics needs.

3. LIMITATION

3.1. Limitations of Walmart's characteristics to the development of 2C business

Since the distribution center can reduce logistics costs by about 50%, Walmart can provide customers with cheaper products than other retailers. The logistics distribution center of Walmart in the United States is generally set up in the central location of more than 100 chain stores. It allows a distribution center to meet the needs of more than 100 sales outlets in nearby surrounding cities, making the transportation radius

relatively short and relatively uniform. The Walmart Distribution Center in the United States has built a distribution Center with a business district of 320 kilometers, with a loading platform at one end and an unloading platform at the other end. 800 employees work shifts 24 hours a day for loading, unloading, handling, and distribution, and the products stay in the distribution center for no more than 48 hours. Each store delivers goods once a day (competitors once every 5 days). Delivery at least once a day means that you can reduce inventory in stores or retail stores. About 87% of the products sold by Walmart in the United States pass through distribution centers, while competitors can only reach 50%. [2]

As shown in Table 1, at present, Walmart has 416 stores in 24 provinces, cities, and autonomous regions in mainland China, including 334 Walmart shopping malls, 26 Sam's Club stores, and 56 stores with many brands. As shown in Figure 1 and Figure 2, Walmart China's stores are densely distributed in the southern region, especially in Guangdong, Sichuan, Hubei, Yunnan, Fujian, and Jiangsu, Zhejiang, and Shanghai. The number of stores in the north and northeast are small and scattered, and there are no stores in the northwest.[8]

Table 1. Statistics on the number of Walmart stores in China.

Province	Total number of stores	Number of Walmart Shopping Plaza Stores	Number of Sam's Club Stores	Number of Haoyouduo stores
Guangdong	99	76	5	18
Sichuan	40	30	1	9
Hubei	33	32	1	
Yunnan	33	32		1
Fujian	32	24	2	6
Zhejiang	23	17	2	4
Hunan	18	17	1	
Jiangxi	17	15	1	1
Jiangsu	16	7	5	4
Shanghai	14	9	2	3
Guangxi	12	12		
Liaoning	12	7	2	3
Chongqing	11	8		3
Beijing	10	4	3	3
Guizhou	10	10		
Shanxi	7	7		
Hebei	5	5		
Henan	5	5		
Anhui	4	4		
Jilin	4	4		
Shaanxi	4	3		1
Inner Mongolia	3	3		
Tianjin	3	2	1	

Shandong	1	1		
Total	416	334	26	56

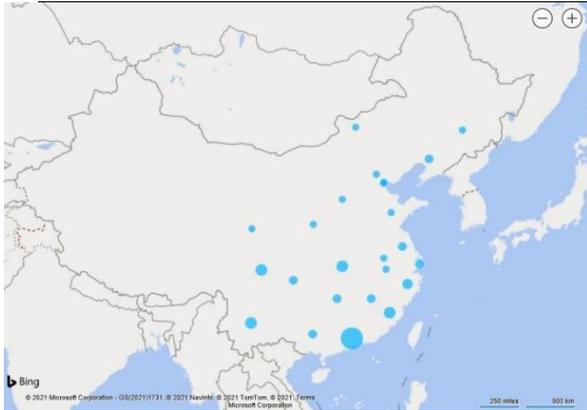


Fig. 1. Distribution map of Walmart stores in China.



Fig. 4. Distribution map of Walmart's fresh food distribution center.



Fig. 2. Distribution map of Walmart stores in China.

As shown in Figure 3, Walmart has five distribution centers in China, namely Tianjin, Shenzhen, Jiaying, Chengdu, and Kunming. In addition to five integrated distribution centers, As shown in Figure 4, Walmart has also established seven fresh food distribution centers in China, located in Shenyang, Beijing, Zhengzhou, Fuzhou, Kunming, Dongguan, and Guangzhou.



Fig. 3. Walmart Distribution Center Distribution Map.

Walmart's investment in the establishment of a large modern logistics center is around US\$80 million. However, even in the South, Southwest, and Yangtze River Delta regions where Walmart's stores in China are most densely distributed, one distribution center of Walmart China can serve fewer than 100 stores. The logistics cost saved by centralized distribution is far less than the construction cost of the distribution center. Walmart China's logistics system is only used to supply stores without cost advantages. When Walmart China transforms into online sales, the limited number of distribution centers and stores has also become a constraint in the transformation. Walmart's existing distribution system makes Walmart China's distribution only to stores, making logistics costs high. When Walmart's business expands to online retail, it is more fragmented than store distribution. The number of target users in China further increases the logistics cost pressure of Walmart China. The limited number of distribution centers and stores restricts Walmart China's ability to extend its services to the community. This has also become an important point of cooperation between Walmart China and JD.com.

3.2. Comparing JD.com and Walmart China's 2C-end delivery services

JD started to build its own logistics in 2007. After ten years of development, it has built a logistics network system covering more than 2,600 districts and counties. Seven first-level logistics centers have been formed, relying on Beijing, Shanghai, Guangzhou, Chengdu, Wuhan, Shenyang, and Xi'an, with a total area of more than 1 million square meters.

In addition, the secondary logistics centers located in 25 key cities, including Jinan, Nanjing, Dalian, Shenzhen, Shenyang, Hangzhou, etc., serve as the

supplement and connection of the 7 primary logistics centers. As shown in Figure 5, as a supplement to the secondary logistics center, JD.com provides distribution services to nearly 580 cities across the country. It has established about 7,000 distribution stations, self-pickup points, and self-pickup cabinets as tertiary logistics centers, with a total storage area of 5.5 million square meters. A first-level logistics system covering more than 2,600 districts and counties across the country and radiating across the country has been established. The core design of JD.com's self-built logistics is to reduce the frequency of cargo handling. Therefore, the establishment of numerous logistics centers and distribution sites is to achieve a point-to-point distribution relationship in each link, reduce the number of circulation of goods, and shorten the number of goods and consumers. In terms of distribution, JD Mall provides "Next Day Delivery" and "211 Limited Time Delivery" services to 150 cities and 26 cities. Such a powerful logistics network enables JD Mall to control all aspects of distribution, shortening the delivery time and ensuring the stability of the business.



Fig. 5. JD's Distribution Centers Distribution Map.

Compared with Walmart China, JD.com has established about 7,000 distribution stations, self-pickup points, and self-pickup cabinets in nearly 580 cities across the country as tertiary logistics centers, with a total storage area of 5.5 million square meters, covering 2,600 nationwide. [3] In many districts and counties, their distribution centers are closer to residential areas, and the distribution distance is short. The use of self-built logistics systems and staff also greatly reduces costs. The extension of JD's logistics terminal extends to the community. On the other hand, Walmart China's distribution centers and stores are very limited compared to JD.com. Most of the stores are located in urban fringe areas, far away from the city center and residential areas, used by three-level distribution centers. Compared with JD's complete three-level distribution system, Walmart has only a two-level distribution system, which is far inferior to JD.com in terms of size and convenience.

3.3. Cost analysis of JD logistics

JD logistics as a self-built logistics, the logistics cost includes: 1, delivery cost from the warehouse to the customer, 2, inventory cost of transfer and storage of raw materials in different sites, 3 transfer goods, supplier to local warehouse procurement costs, artificial activity 4, the whole logistics operation contains, management, sales, finance, and other expenses.

3.3.1. Distribution cost

According to JD's annual report, 80% of JD's self-run orders and some third-party merchants' orders are delivered through JD Logistics. In the case of orders delivered by JD, the average cost per order (annual order processing cost ÷ annual order volume) was calculated through the annual report. It can be seen that the average cost per order processing was 11.02 yuan in 2015 and as high as 13.20 yuan in 2016. In the following years, the cost was reduced and controlled at about 10 yuan until 2019. At present, JD logistics costs about 10 yuan, including electricity. Excluding everyone's electricity, such as consumer goods, daily necessities, small home appliances, and so on, the processing cost of each order is about 8 yuan. Under the current infrastructure level, JD's processing cost per order is still at a high level. In addition, the labor cost and logistics cost caused by the return and exchange of goods are relatively high because JD has not developed an effective control mechanism.

3.3.2. Warehousing costs

Warehousing cost is also a major component of logistics cost. We use inventory turnover days to simply analyze warehousing costs. The calculation shows that the inventory turnover days of JD are about 40 days (2015: 37.52days, 2016: 40.33days, 2017: 40.8days, 2018: 38.96 days, and the third quarter of 2019: 48 days). In contrast, Amazon's inventory turnover days are generally less than 30 days,[9] reflecting that JD has a high inventory occupation level, poor liquidity, and weak asset liquidity, so it should strengthen its inventory management ability. On the other hand, to occupy the market, JD needs to continue building warehouses, which needs to pay a huge amount of space rent and invest in high research and development expenses. In most cases, the cost will be too high, leading to the problem of capital shortage. At the same time, because the goods in JD are usually small, they are more inclined to manual processing, resulting in a low utilization rate of storage equipment, or even idle state, resulting in a serious waste of resources and huge storage costs.

3.3.3. Procurement cost

The purchase costs of JD are not separately listed in the financial statements. Its operating costs include two parts: 1. The cost of purchasing from suppliers. 2. Through calculation, it is found that the proportion of procurement cost in revenue of JD in the past five years is generally maintained at 86% (2015: 86.61%, 2016: 86.31%, 2017: 85.98%, 2018: 85.72%, and the third quarter of 2019: 85.13%). For Amazon, the world's largest online retailer of goods, purchasing costs as a percentage of revenue have dropped to less than 60% in recent years. Through this gap of more than 20%, it can be seen that JD has the problem of high procurement cost. In addition, JD initially focuses on 3C products, but when it focuses on other products, Gome, Suning, and Tmall will compete with them, so the bargaining power of JD may be lower than that of competitors in the same industry. In addition, the labor cost of JD procurement is higher, and some people do not do anything. All these will lead to higher procurement costs and lower profits.

3.3.4. Human cost

At present, the whole group of JD has nearly 200,000 people. From the perspective of the composition of its logistics system, 80% of them are couriers. Therefore, JD is a labor-intensive enterprise with a large number of employees and high salary and welfare costs. To build the automation of the logistics system, JD needs to recruit a large number of professionals, which leads to the increased cost pressure of human resources. And because of the rapid expansion of new employees, it is difficult for enterprises to systematically train all employees. If employees lack understanding of their work nature, work process, and division of responsibilities, it is bound to cause low efficiency and greatly damage the quality of service. The resulting complaints, returns and exchanges, wrong delivery, and other situations affect consumers' trust in the enterprise and increase the burden of logistics. Repeated logistics links will also cause an increase in logistics costs.

To sum up, we can know that while opening up a new logistics system, JD's self-established logistics also has the problem of high cost, which is also the reason why Walmart does not choose to establish a similar logistics distribution system.

4. STRATEGIC COOPERATION WITH LOGISTICS COMPANIES

Walmart's consistent international expansion strategy is to achieve its goals as quickly as possible by seeking cooperation with companies with experience in this field. In China, retail companies and e-commerce

companies have been caught in the investment shopping of distribution centers. It will slow down the capital turnover of commercial companies and slow down the expansion of the main business. It may have a capital chain in the low commercial sales of economic fluctuations. Therefore, since 2016, Walmart has officially started to invest in JD to start local cooperation in logistics.

4.1. Cooperation progress and results

In June 2016, Walmart (NYSE: WMT) and China's largest self-operated e-commerce company JD.com (NASDAQ: JD), signed a cooperation agreement. Walmart received 144,952,250 Class A shares newly issued by JD.com. Shares, approximately 5% of the total issued share capital of JD.com. The purpose is to integrate the huge advantages of both parties in e-commerce and retail to provide Chinese consumers with better products and services.

In 2016, Walmart's strategic investment in "DaDa" US\$50 million, which is equivalent to RMB 336 million. After that, it has increased its investment by approximately US\$320 million. The new investment is an extension of the business cooperation agreement between the two parties and further strengthens Walmart's omni-channel services in China.

In February 2020, the "Walmart Home" service was upgraded and iterated, and the store self-pickup service was launched. As of the end of October, it has opened in more than 370 stores nationwide. When placing an order at "Walmart Home" from 9 am to 3 pm every day, customers can go to the nearest Walmart store to pick up the merchandise within one hour.

In August 2020, all Walmart stores nationwide will provide a one-hour "fast delivery" home delivery service for consumers in the surrounding area of 3 to 5 kilometers. When consumers are located 3 kilometers away from the store, they can also enjoy more than 10,000 Walmart hypermarkets. The next day delivery service for this kind of goods. In August, Walmart has fully integrated the "Walmart Daojia" and "JD Daojia" platforms in more than 400 hypermarkets and community stores across the country. Its sales have increased by more than 1.5 times compared with 2019. The whole city distribution' has successfully covered 83 cities across the country.[7]

4.2. Evaluation of current results

This business cooperation is currently evaluated as just helping JD Daojia's platform expand. Walmart is not the only cooperation option with JD Daojia. In addition, it has acquired Yonghui Supermarket. Many supermarket chains such as Bailian Group, Jingkelong, and Xintiandi Supermarket have also entered JD Daojia.

In other words, as far as the progress of cooperation is concerned, Walmart appears to be just a customer of JD.

In fact, Walmart and JD.com have also tried to share warehouses. As early as 2018, Walmart and JD.com started the stock exchange. Whether consumers place orders at JD's direct stores or Walmart's stores, delivery personnel will use the nearest line to the user. Pick up from the store to improve efficiency and inventory turnover. However, due to the influence of the executive power discount of both parties during the cooperation process, this project could not be further deepened. It is understood that the main business model of JD Daojia is that the platform invites supermarket stores to settle on the platform, and the delivery staff pick up the goods at the store and deliver them to the consumer after shopping. Returning to the cooperation between Walmart and JD Daojia, in this model, JD Daojia assumes the role of online drainage and offline delivery. JD Daojia has not broken through the traditional delivery-centric thinking in the traditional home service, only through JD Dada's delivery service realizes the home delivery service of Walmart China.

4.3. Reasons for cooperation

According to the research report on consumers by Nielsen and McKinsey, as of 2019, 5% of Chinese consumers are accustomed to online inspections and purchases, 79% of consumers are accustomed to online inspections and physical store purchases, and 16% of consumers are online inspections and purchases in physical stores. Under investigation and purchase. It can be found that most consumers prefer to combine online and offline omni-channel consumption. Combined with the interviews conducted by iResearch with various participants of instant consumption in October 2018, for the majority of daily necessities and food products, consumers visit familiar Walmart stores to enhance their understanding and trust in product quality and cultivate long-term brand awareness. The preference of JD Daojia is delivered within one hour, which greatly facilitates the consumption process and effectively increases the online sales of Walmart stores.

For JD.com, Walmart is undoubtedly a high-quality platform merchant and partner. However, the online marketing scale of a company still has a lot of room for development in the huge retail market of China. As far as competitors in the same category are concerned, Alibaba's Tmall Supermarket is a purely online shopping mall, which provides online one-stop shopping services for life and department stores for online consumption. Its main advantage is the next-day delivery service. In the logistics network of Alibaba's Cainiao Network, the automated sorting conveyor line also ensures that many SKUs and decentralized and fragmented orders can run smoothly at a high speed, which is difficult for Walmart to start from scratch and

catch up quickly. Therefore, choosing "Jingdong", the only online retail brand in China second only to Tmall supermarkets, is a matter of course.

The chain expansion of the retail industry has increased the demand for distribution centers. At the same time, the development of third- and fourth-tier cities and the rise of e-commerce depend on the development of distribution centers. International experience shows that distribution centers are mostly incubated by retail companies or manufacturing companies. However, with the expansion of scale, the demand for distribution centers has increased exponentially, and the funds deposited for this purpose are increasing. At this time, retail companies urgently need to focus on assets. Freed from the shackles of the company, realizing the expansion of lighter assets, the specialization of distribution centers has become the development trend of the retail industry in recent years, and three-quarters of Walmart's international distribution centers are also leased.

Although in terms of capital and scale, JD.com is at a disadvantage compared to Tmall Supermarket, the agency sales model (without the right to goods), self-operated JD.com is usually direct sourcing, which is more in line with Walmart's business model. Although part of the risk is increased, it also provides services such as warehouse logistics to merchants. For suppliers, it is more convenient for suppliers to deliver goods to JD.com's Bacang than more than 30 warehouses on Tmall.

Therefore, after using JD's platform, finding new solutions for cloud storage and logistics has become Walmart's next goal.

5. EXPLORATION OF COOPERATION SCHEMES

5.1. Reason for improvement

Instant consumption is the most widely used in the food delivery industry in China, but the retailer super format is similar and different from the food delivery industry. There is no problem with picking in the food delivery, and the goods of the retailer super are not necessarily processed through the secondary processing of the store. Sales. Up to now, Walmart's online business has mainly focused on increasing store sales. The current logistics service has not yet realized fully automatic picking, mainly relying on the employees in the store to sort in the warehouse and setting up a special picking area in the store to improve the efficiency of picking. However, compared with the automated sorting conveyor line of Tmall Supermarket, the labor cost is much higher, increasing the store's inventory demand.

5.2. Feasible cooperation method

We believe that Walmart's next feasible plan to improve omni-channel logistics is to use the JD cloud warehouse equipped with a fully automatic sorting system to separate Walmart's assembly line. The Walmart distribution center (traditional warehouse) in the outbound logistics link not only stores but also transports to cloud warehouse District.

Cloud warehouse plans to open in areas not covered by Walmart stores. The distribution center will directly replenish the cloud warehouse's supply and warehouse management. Dada will provide cloud warehouse consumers with a one-hour delivery service.

5.3. Effect prediction

There is no need to set up a manual sorting area for Walmart stores to handle online business. It can also reduce storage pressure and rental costs and focus on quality services. For Walmart customers who place an online order, the cloud warehouse assembly line will directly pack and ship the goods, improving delivery efficiency and increasing satisfaction.

For JD Dada, the establishment of the cloud warehouse platform needs the number of merchants to increase utilization rate, which is conducive to speeding up the return of early investment. The location of the cloud warehouse is more densely distributed. With the support of JD's information management system, from cloud warehouse to the cost of logistics for consumers from Walmart stores to consumers is lower, and it is also more conducive to management.

6. CONCLUSION

The early stage focused on the location distribution of Walmart's logistics system and found that Walmart no longer has advantages in terms of logistics volume and convenience. This makes it unable to adapt to the needs of the combination of e-commerce and offline stores quickly. The cost analysis of JD's self-built logistics shows that the initial investment and implementation costs of developing e-commerce logistics channels are high. Walmart's self-built logistics should not achieve the same level of distribution with a low return on investment.

At present, the strategic cooperation between Walmart and JD.com has achieved initial results, but there is still a lot of room for development. Using cloud warehouses to transfer the distribution pressure of online business from stores will likely help traditional retail companies such as Walmart in the new era. It is also very inspiring for the problem of corporate boundaries arising from the transformation of traditional enterprises.

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