

Technical Supply Chain Management Analysis

—Based on Jingdong's Case

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Abstract—Supply chain plays a more and more important role in the process of modern management of enterprises. With the advent of big data era, information flow and business flow speed up make the supply chain inevitably move towards technology and digitization. This paper analyzes Jingdong's supply chain technology. By using the method of separation and analysis on its framework of technology supply chain, we show the crucial role of technology-based supply chain in the transformation of logistics enterprises. For the first time, we analyzed the entire technological supply chain and profoundly reveal the characteristics of the modern supply chain.

Keywords—supply chain; technology; information system; Jingdong

I. INTRODUCTION

Jingdong, one of the most important e-commerce companies in China, offers a very good case of supply chain management. The enterprises, especially the listed enterprises have an extreme and harsh pursuit of net profit. For enterprises with large self-built logistics, supply chain management is mainly embodied in two key words[1], namely cost and inventory. These two words are the two most fundamental key to have a full control of the supply chain, or we can say they are the basis of the necessary existence of supply chain management. The cost refers to the purchasing cost in logistics enterprises. The most important employee performance index in the enterprise is the cost reduction. Even though enterprises still emphasize the four - in - one procurement strategy of quality, cost, delivery and service, the cost still has the most direct impact on purchasing. It is because that the cost reduction can be directly reflected in the financial statements of the enterprise, which is shown in the detailed form. And the cost reduction is the profit. When the cost of transportation, the cost of storage and the cost of customs clearance are reduced, the benefit of the logistics enterprises will certainly rise. The production management is related to the cost. The logistics enterprise does not produce products itself, so the production management is the purchase management. In the supply chain management, in order to control the cost, the inventory will be sacrificed sometimes. It is the core competition between the purchasing department and supply chain management department in logistics enterprise[2]. Then inventory is the next focus of the problem. In the process of actual operation, inventory has static meaning and dynamic meaning. One meaning is stock itself, which refers to stock

with goods, temporary stock and return stock. Dynamic meaning refers to the delivery of the stock itself, namely the timely transfer of the stock. The best state of the logistics enterprise is the zero inventory with rapid turnover. The final goal is to reduce the cost.

But Jingdong doesn't seem to be taking the unusual road. As an Internet company, Jingdong chooses to build logistics itself, thus increasing the cost and building the logistics itself and giving full play to the logistics. As for inventory, Jingdong chooses to speed up the turnover of inventory just like most enterprises. It just sets up emergency inventory to be ready to transfer inventory at any time. The most special thing is that no matter how much the amount of transferred inventory is, it does not affect the operation of the entire supply chain, which greatly relieves the contradictions mentioned earlier. To solve the contradiction, it is not enough to only rely on human intervention management. In the era of large data, the technical supply chain has become an inevitable choice.

II. TECHNICAL SUPPLY CHAIN OF JINGDONG

A. Strategic infrastructure construction of supply chain

Apart from enhancing the core competitiveness of products in marketing, how to make brand effect is also the great challenge of enterprise. So we can give definition for the start of supply chain. The enterprise brand must be set up to improve the supply chain level. Only when the strategic height of supply chain is enhanced, can the ability of obtaining resources be strengthened, and some unnecessary costs can be saved. Take the advertising cost of Jingdong as an example. At first, Jingdong cooperated with the community to post a banner, which is the most primitive marketing in traditional Chinese enterprises. When the Internet emerged, Jingdong chose to buy search engine advertising. The cost of manpower and material resources of the former way is very small, but it took much time with slow information circulation and low effect. The purchased search engine advertising solves the problem of information circulation. It can form consumption habits when users have higher repetition rate in the early stage of e-commerce consumption. But the advertising has a deadline. As time goes on, the ranking will decline. In the long run, it's not the permanent way to solve the problem of brand name. Therefore, to solve the problem of the beginning of supply chain, we must return to the enterprise itself. If the

system is public, the company can build its own search engine and optimize it for embedded development on the basis of a large number of related search entries, it can keep the retrieval volume relatively rank first. When the brand marketing is automatically formed, the advertising costs will be reduced. After Jingdong has many online users, the construction of the website is on the verge of collapse. In order to solve the problem of advertising, SEO[3] (Search engine optimization) is introduced. It improves the natural ranking by using the retrieval rules of the major search websites, which brings side effect to Jingdong's own website construction, including the decoration, structure optimization, customer traffic and information fault tolerance of its own website. In 2010, Jingdong changed its own system settings from "Net" to "Java", of which both can be used to build a website. Before 2010, Jingdong didn't have many customers and categories of goods, so the design of Net formula could satisfy the access needs of website. When the more product categories especially the sub-category are added, the single design requirement of the subweb page is reduced. The distributed management of web pages makes the Net can not play its own advantages, so Java replaced the Net. It can do distributed management and connect multiple data with the source data. In addition, the rich open source components make the web site extensible. On the other hand, in terms of the development cost, though Net language itself is free, the windows operating system and the programming language are charged. Jingdong has made a significant change on this issue in the domestic market. In addition, the capacity of the website is also a key problem. The e-commerce enterprise is developing rapidly, and the protection capacity will also show a geometric growth. To solve this problem, Jingdong adopts the "three -year ahead" strategy to predict customer capacity and then upgrade the system. Even so, the website crashed when the Jingdong promoted books in 2011. Moreover, the upgrading of the system can't affect the correct operation of the website, which is like "changing wheels for a high-speed rail that is flying fast, and changing the wings for an airplane that is flying at a height of twenty thousand meters". This is also the same as the exchange of the warehouse of Jingdong.

B. Extension of the technical supply chain

1) Website retrieval design

After the foundation is built, it is the website supporting facilities that should be constructed, which is not difficult for any e-commerce enterprise. But as an important part of the technical supply chain, how to design a unique link in accordance with its own characteristics is a big challenge. With the rapid expansion and growth of traditional supply chain, products information circulation becomes jumbled. Either the client or the enterprise itself can't timely determine which link causes the problem if there is problem in the product. "Order tracking" is the necessary product of this period. From the customer's making order online to the warehousing, the sorting time, delivery time, and the information of the courier are all presented in front of all interested parties. Once a problem arises, each link will be investigated for liability, thus greatly improving the efficiency of solving the problem. The simple display of these information is achieved through the distributed management

system of "Java", which links all information all every link in the supply chain, including order, warehousing, sorting, distribution, site management, distribution information. The supply chain is controlled by the network technology, rather than the human investigation on various links.[4]

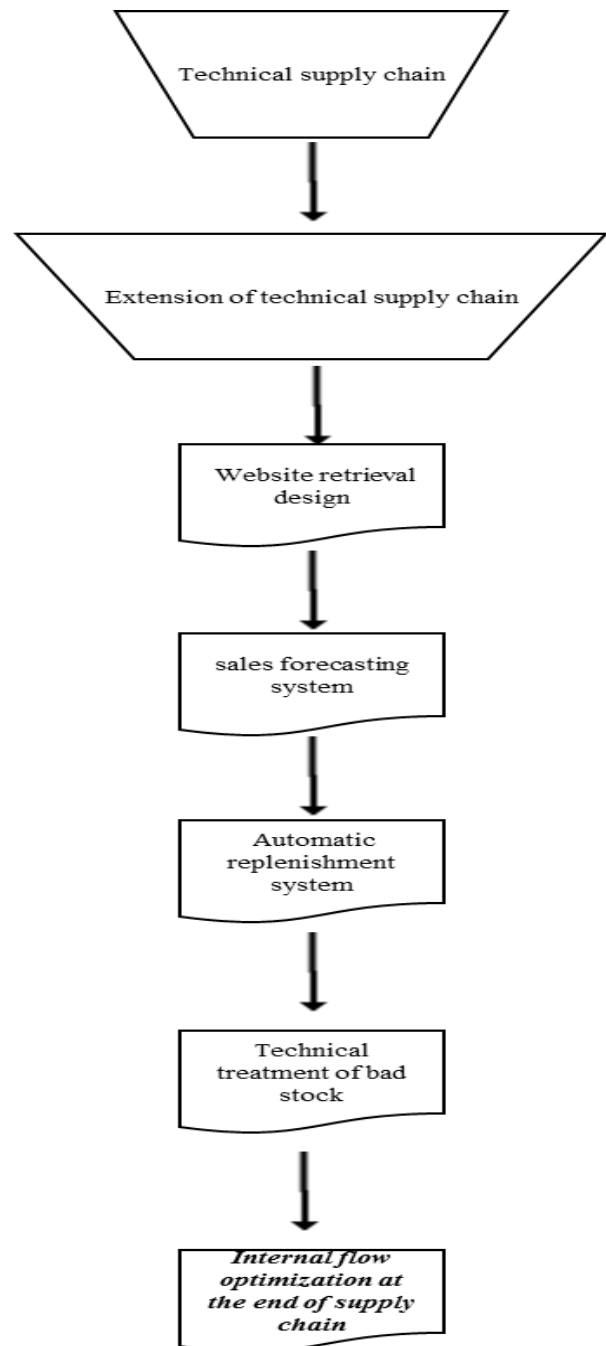


Fig. 1. Technical supply chain flow chart

At the same time, the workload of customer service at the end of the supply chain is greatly reduced due to the technical order process. The efficiency of the whole supply chain is maximized and the distribution is reasonable. When the information on the whole supply chain is synchronized, the forecast will be carried out to make the supply chain intelligent. In this way, each link can be prejudged in advance,

so as to speed up the circulation of each link and minimized the cost.

2) sales forecasting system

After 2010, Internet companies are facing the impact of large data. While Jingdong is expanding business at a high speed, its suppliers are increasing as its reputation rises. In order to adhere to the concept of “users’ experience comes first”, Jingdong must attach great importance to quality. In order to obtain a certain number of products of which the quality is first class and the price is lower than the market price on the basis of refined time, it is necessary to use big data for calculation. Data analysis can drive the whole supply chain. Sales forecasting is the source link on the basis of strategy, and its accuracy directly affects every link in supply chain, including automatic replenishment, temporary inventory adjustment and the time of purchase and shipment. Obviously, after driven by the data analysis, the predicted system is needed as the support of the whole large system. At first, Jingdong used the primary key of SKU+ distribution center + time to save the data, and the SKU system records the information of each product including the production date, color, and size. The associated data management system needed to read a large amount of data in the execution of the primary key operation, which was slow. After the upgrading, the SKU system only saves the large field data. The amount of data becomes small, and the speed of reading the data becomes faster. At the end of the data analysis, the Map reduces call prediction model is used for prediction, which saves five times of the time than that of the SKU forecast. The efficiency is greatly improved.

3) Automatic replenishment system

Automatic replenishment is a kind of replenishment system, which is the same as sales forecast. The sales forecast is to facilitate the purchase department to replenish the goods, and the automatic replenishment system is an essential part of the book department in the process of production and operation. In 2011, the SKU of book department was over 1 million. It is unrealistic to rely solely on artificial replenishment in such large number of data. Although there are mature international books automatic replenishment system, such as Amazon and WAL-MART. Taking the Amazon which is highly intellectualized and technicalized as example, even the source of procurement has adopted the driving system which is independently developed by amazon itself. But the related data is never open to public. It is unrealistic for Jingdong to spend a lot of money on staff communication. So ingdong has to develop on its own. Although it costs too much, it is undoubtedly a technical adjustment for the whole supply chain of Jingdong, which will have huge impact on the development of supply chain in the coming years. After the automatic replenishment system was launched, it began to promote the whole product line. With the complete establishment of EDI, Jingdong set up complete automatic order, so that the order can be directly sent to suppliers after the analysis and processing of data. [5]

4) Technical treatment of bad stock

In the financial statements, there are always bad debts. It is the same with the inventory where bad inventory exists. It is because in the early operation period, the operation is not

standard, there are frequent violent sorting, return and replacement. In order to strengthen the control of logistics, bad inventory excluded in the logistics must be dealt with. At first, Jingdong only improved the process of return and replacement, and it didn't regulate the subsequent behavior. Bad inventory is placed in a disorder way, which causes difficulty not only for the sorting itself, but also for normal inventory. The bad inventory of Jingdong was initially processed by manual labor. The whole process of manual input, manual picking and manual return lasted for 30 days or even 50 days before technicalization. In addition to the huge cost of this turnover, it also has an impact on the reputation of the enterprise. Therefore, it is necessary to separate the disposal of bad inventory from the normal inventory to carry out one-way management. Equipped with information system, the returnable and non refundable order have been returned , so as to maximize the cash return and minimize the bad debts. The significant effect was that the cost of bad inventory in 2012 was 100 million yuan lower than that in the previous year.

5) Internal flow optimization at the end of supply chain

At the end of the main business, the customer service department is a security institution. The problems that may arise in the management of the supply chain will be directly reported to the department, which is the most objective and the most efficient. Most staff with low comprehensive quality in the branch office located in Suqian, Jiangsu are from the surrounding rural areas. In the process of internal optimization, it is necessary to improve the quality of employees and serve them. To improve the quality of employees can promote customer satisfaction, and to serve the employees can increase the happiness of employees[6], which is counterproductive to the former. As a service industry, the best service is not to create service demand for customers but to make customers have no demand for customer service. The problems summarized by customer service is what enterprises should optimize. In Jingdong, customer service not only find the problem, but also summarize the problem , solve the problem and draw lessons for the experience. When a similar event occurs, they can directly teach the former experience, so as yo avoid making the same mistake again. To sum up, all service and user experience are always the ultimate goal of each link. Under the condition that the answering rate of call center is limited, the online customer service of Jingdong has become the inevitable choice to share the pressure. There is a two-way cost for telephone answering and the telephone calls cost too much. However, the online customer service can bring more network traffic. In addition, online users choose online shopping to avoid unnecessary interference, which causes a decline in shopping experience. They are more willing to solve problems independently or with customer service, which greatly reduces the pressure of customer service, increase the shopping experience, reduce the cost and bring more network traffic. It embodies the efficient mechanism.

III. CONCLUSION

It should be pointed out that, along with the increasingly integration of the economy and the rapid development of the Internet of things, supply chain management has become the necessary supporting part in the economic and trade activities.

In recent years, the rapid development of various technologies has also greatly improved the efficiency of the supply chain management. The technical supply chain is the big trend of the times. Under the condition of the increasingly fierce market competition, the enterprises with precision technology will eventually lead the market and the development of the market.

Through the website search and design, sales forecasting system, automatic replenishment system, bad stock processing, and terminal optimization analysis, we can find that the supply chain technology can speed up the transfer of business and information flow, improve business efficiency and enhance Customer satisfaction enables businesses to operate efficiently in the era of big data.

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