

Integration of Logistics, Warehousing and Distribution in E-Commerce Based on "Internet +" Mode

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Abstract

The success of e-commerce logistics stems from the construction of efficient warehousing and distribution system. Based on the "Internet +" mode, this paper builds a warehouse allocation integration model, in which the cloud storage allocation system is the core of warehousing and distribution integration. The establishment of multiple e-commerce sub warehouses (or distribution centers) is the key to the integration of warehouses and distribution, and the optimization of business processes is the basis of warehousing and distribution integration. The integration of warehouse and distribution has essentially realized the improvement and efficiency of e-commerce logistics.

Keywords

E-commerce logistics warehouse distribution integration.

1. Introduction

In recent years, China's e-commerce industry has developed rapidly, with the emergence of Unicorns represented by Alibaba and Jingdong. The success of Alibaba and Jingdong comes from the support and guarantee of rookie logistics and Jingdong logistics. They have constructed efficient warehousing and distribution systems and basically realized the integration of warehousing and distribution.

2. The Characteristics of E-Commerce Warehousing

E-commerce warehousing is not a static state of storage. Compared with traditional warehousing, it has more liquidity. It has more perfect modern warehousing functions, such as commodity storage, warehousing, sorting, packaging, distribution and information processing. The difference between e-commerce warehousing and traditional warehousing lies mainly in the way of goods matching, types of warehousing goods, logistics equipment and technology. Traditional enterprise warehousing is characterized by mass warehousing and mass warehousing. Because of the diversity and individualization of demand, the characteristics of e-commerce warehousing are multi-batch and small-batch, that is, large-batch warehousing and small-batch warehousing. And picking accounts for 40-50% of the total work time in order processing center, and picking walking accounts for 50% of the picking time in picking operation. Optimizing picking routes can improve the efficiency by 10-20%. Therefore, it is very important to optimize the picking operation for electrical warehousing.

3. The Connotation of Integration of Warehouse and Distribution

Warehousing and distribution integration is not a simple "warehousing + distribution", but a deep integration of warehousing and distribution to achieve the integration and synchronization of warehousing and distribution. That is to say, e-commerce enterprises only need to throw orders to enterprises providing warehouse allocation services. The following tasks, such as contract, transcoding, warehouse operation, delivery and distribution, refusal to

return, and accounting clearance of upstream and downstream, are all undertaken by warehouse allocation enterprises. The integration of warehousing and distribution realizes the seamless connection between warehousing and distribution, eliminates the non-value-added operation process, improves the efficiency of logistics operation, enhances the coordination of logistics operation process, reduces logistics costs, and improves the profit of e-commerce logistics.

4. Necessity of Integration of Three Warehouses and Distribution in E-Commerce Logistics Operation

4.1. Improving the Efficiency of Logistics Transportation Must Require the Integrated Operation of Warehouse and Distribution

In recent years, the efficiency of transport logistics in China has been steadily increasing. The delivery time in 72 hours has been basically achieved in major cities of the country. Some cities can even reach the delivery time in 24 hours. The main reasons for the improvement of logistics efficiency are the enhancement of coordination of transport logistics and the continuous improvement of timeliness of transport logistics.

With the rapid development of e-commerce in China and the increasing number of customer orders, the timeliness of existing e-commerce logistics can no longer meet the needs of consumers. Consumers need shorter distribution time. "24-hour service nationwide and 72-hour service globally" is the benchmark of e-commerce logistics. Therefore, e-commerce logistics must improve transport efficiency, and integrated warehouse and distribution operation is the promotion. The key to the efficiency of flow transportation.

4.2. Reducing the Total Cost of Logistics Must Require the Integrated Operation of Warehouse and Distribution

The proportion of total logistics cost to GDP in China has been slowly decreasing, from 17.8% in 2010 to 14.6% in 2017, while the proportion of total logistics cost in European and American countries is 7%-8%. It can be seen that the proportion of total logistics cost in China is on the high side. In 2017, transportation cost, warehousing cost and management cost accounted for 54.7%, 32.4% and 12.9% of the total logistics cost in China. Transportation and warehousing cost accounted for more than 80% of the total logistics cost. The key to control the total logistics cost is to control transportation and warehousing cost. The integration of warehousing and distribution is the key to reduce the total logistics cost.

4.3. Enhancing E-commerce Logistics Profit Must Require Integrative Operation of Warehouse and Distribution

China's social logistics has maintained steady growth, with a total of 252.8 trillion yuan in 2017 and 229.7 trillion yuan in 2016, representing a growth rate of 6.1% at comparable prices. With the rapid development of e-commerce logistics, the number of express parcels is increasing year by year, and the revenue of e-commerce logistics is increasing. In recent years, with the wide application of high-tech in e-commerce logistics, the proportion of total logistics cost to total logistics has shown a downward trend, the cost of logistics unit is gradually decreasing, and the profit level of e-commerce logistics has also been improved. High-tech realizes the efficient operation of warehouse and distribution integration, and increases the profit of e-commerce logistics.

4.4. Consumers' Demands for Safety, Fast and Low Price of E-Commerce Logistics

Safety is the first demand of consumers for online shopping, and can not be lost, delayed or damaged in the process of e-commerce logistics distribution; consumers' demand for fast

service is getting higher and higher, and 24-hour service is the most satisfying to consumers; low-end logistics represented by "four links and one access" basically has the same speed-to-price ratio, while high-end logistics represented by Beijing East and Shunfeng are basically the same as high-end logistics represented by "four links and one access". With the same price-to-speed ratio, consumers' ideal is low price and high speed.

5. Based on the "Internet +" Mode of E-Commerce Logistics Warehouse Allocation Integrated Operation Model Construction

5.1. Characteristics of E-commerce Logistics

E-commerce logistics presents the following characteristics: First, express packages are multi-variety and few batches. Consumers tend to shop online with more varieties and fewer batches, and the types of goods can span many categories, such as mother and child, home, clothing, medicine, etc. The products they buy are often dominated by fewer batches, or even single products. Secondly, the timeliness of customer requirements for distribution is short. Distribution area of express package may be one or two developed cities, three or four developed cities or rural areas; Distribution distance may be longer or shorter. Consumers, regardless of the size of distribution area and distance, appeal to the shorter and better timeliness of distribution is to remain the same center, coordinate the relationship between consumers, e-commerce enterprises and suppliers, and realize warehousing and storage. The integration and synchronization of sorting, packaging, sorting and distribution. In practice, warehousing and distribution integration is not simply "warehousing + distribution". Based on the "Internet +" mode, the integration of e-commerce logistics warehouses must build a cloud storage system to fundamentally coordinate the relationship between consumers, e-commerce enterprises and suppliers, achieve the coordination and synchronicity of the entire supply chain, and promote the quality and efficiency of e-commerce logistics in essence. Several key points of building integrated warehouse allocation model.

Firstly, the construction of cloud warehouse distribution system is the core of warehouse distribution integration. Cloud warehouse allocation system aims at sharing all data and logistics resources. The core of cloud warehouse allocation is data, that is, all data of supply chain stakeholders (consumers, e-commerce enterprises, suppliers) are cloud and shared. Providers of e-commerce enterprises can directly access data (real-time POS data) in the cloud, and on this basis, analyze and forecast, calculate the optimal production plan, and truly achieve on-demand production; through rational production, optimize inventory control, reduce resource waste, and improve capital turnover. E-commerce enterprises adjust marketing strategies according to customer needs, optimize product mix, enhance express business volume, and maximize benefits. Logistics enterprises analyze and forecast customer demand through large data, optimize warehousing strategy and transit transportation in distribution centers, etc.

Establishing sales forecasting model in demand forecasting system is the most important first step in e-commerce supply chain. Establishing sales forecasting model by investing resources in front-end and applying sales forecasting model can bring great help to back-end inventory management.

Secondly, the establishment of multiple e-commerce warehouses (or distribution centers) is the key to the integration of warehousing and distribution.

Effective warehousing is the core competitiveness of e-commerce enterprises, and is the key for e-commerce enterprises to pursue unlimited logistics service experience. The distribution center layout determines the efficiency and availability of order fulfillment. For e-commerce enterprises, customers are all over the country, single point and single warehouse can not meet the further development of e-commerce logistics. Multi-point layout, close service and rapid

response require e-commerce enterprises to configure multiple warehouses (or distribution centers), each warehouse (or distribution center) to form an effective radiation distance, so that customers can enter warehouses close to the warehouse, reduce cargo damage rate, distribution costs and so on. Distribution time, in order to achieve the timeliness and economy of distribution. National multi-warehousing (or distribution center) +integrated distribution has become the basis and key of warehousing and distribution integration of e-commerce enterprises.

Thirdly, optimizing business process is the basis of warehousing and distribution integration. E-commerce logistics enterprises should improve the efficiency of distribution on the premise of ensuring the safety of goods, and make the whole distribution business process more concise and smooth. E-commerce enterprises often use sub-warehouse (or distribution center) delivery, so that suppliers can deliver part of the goods to regional sub-warehouse (or distribution center), by sub-warehouse (or distribution center) to complete the near distribution to consumers. This distribution business model improves the timeliness and efficiency of distribution, meets the demand of consumers'timeliness, and improves the value of consumers' shopping experience.

5.2. Measures for Implementing Integration of Logistics Warehouse and Distribution in E-commerce

5.2.1. Reasonable Warehouse Layout

The layout of warehouse is to design and plan the functions of all facilities and places of warehouse according to the needs of warehouse production and management, to divide production operation area, auxiliary production area and administrative living area, to determine the distribution of warehouse, operation, road and door guard, and to distinguish and mark all kinds of facilities and buildings, such as warehouse number, road name, office area identification, etc. So that the overall rational layout of the warehouse. In order to make e-commerce warehousing more efficient, the first thing is to make a reasonable layout of e-commerce warehouse. According to the characteristics of e-commerce warehouse and the need of operation process, the functional areas of warehouse are generally divided into: receiving area, storage/picking area, checking and packaging area, collecting area, returning area, etc. It also includes auxiliary functional areas, such as forklift charging room, equipment storage area, consumables storage area, office, etc.

Storage area and picking area are the two most important functional areas occupying the whole storage area. The scale of e-commerce warehouse is different, the function area of large-scale warehouse is more comprehensive, the division of general area of small-scale is relatively vague, and the boundary is not clear. In the actual operation process, the warehousing function of modern e-commerce surpasses the traditional storage function, and more production and operation functions are integrated into it and play an important role.

Shelf layout planning to meet the refined requirements of e-commerce customer logistics management level, the planning plan should be repeated communication and demonstration, such as new shelves should be placed in the forefront, best-selling goods shelves second, general sales of goods shelves later, unsalable goods in the farthest shelves. In order to facilitate rapid access, when shelves are idle or occupied in large quantities, how to adjust the storage location of goods to ensure efficient warehousing needs detailed planning. Fully consider the warehousing operation volume and management process of e-commerce enterprises, as far as possible to make the main and secondary passages of shelves unimpeded, to ensure the correct circulation of goods, to ensure that large warehousing operations will not cause blockage.

Common e-commerce warehouses need a lot of manpower to change shelves. The lower cost way to improve old warehouses is to change the way and route of picking goods and gradually adjust the position of goods. In electrical warehouse goods, due to large sales volume or large

volume of sales promotion in a certain period of time, it is suitable to place near the shelf, such as near the exit or entrance of the warehouse, and the middle golden position of the shelf. This is conducive to rapid picking and warehousing operations. On the contrary, small or unsalable goods should be placed on the bottom or top of the innermost shelf. Of course, the specific layout of the warehouse and the placement of goods also need to consider the characteristics and requirements of the order, but it needs to be clear that it must be placed in a reasonable and clear position.

5.2.2. Optimizing Picking Strategy

Warehousing operators analyze and classify orders, and formulate corresponding picking strategies instead of generalizing them. This can effectively avoid duplication of work, improve overall efficiency, and make the operation orderly. Picking strategy is the key to affect the efficiency of picking operations, including partition, order segmentation, order batching, classification. These four factors interact to produce multiple picking strategies.

(1) Storage Location Moving Line Planning

To optimize the picking strategy, we can start with the warehouse location moving line planning. There are two common picking moving lines, S-type and U-type.

① S-shaped picking moving line. The picker picks the goods in the whole picking area by a large S-shaped path, and then picks the goods by a Z-shaped or S-shaped route after entering the roadway. This picking line is more suitable for the warehouse of the middle partition shelf and can realize the shortest picking path.

② U-shaped picking line. Pickers use U-shaped moving lines to pick up goods in the whole shelf periphery and roadway, which are more suitable for high-level three-dimensional shelf area with wide roadway width. Specific use according to the actual scenario of e-commerce warehousing to choose.

(2) Picking Method

There are three main picking methods: picking by order, picking by fruit, collecting and sowing by picking.

① Picking by order. When picking goods, they are placed in different basket according to the order, and then sent to the packing place.

② Collecting and picking goods. It is that the goods are not divided into baskets on the way of picking, which are sent directly to the packing place and then packed by the packer according to the order.

③ Sowing while picking. It combines the characteristics of picking picking and sowing picking, such as: putting multiple picking boxes on the same picking truck, one box and one order, pre-order or post-order, intelligent picking with PDA in warehouse according to the content of the order, packing and placing on the conveyor belt after re-examination, and completing the delivery process.

It should be pointed out that different picking methods have their own advantages and disadvantages: picking by order is easy for packers to operate, and can save the time of summary calculation, but it may increase the number of pickers' operations and the time of each operation. Summarizing picking can shorten the picking time of the pickers. The picking process is divided into two steps. First, the pickers select the goods from the warehouse, then the packers do the final screening. The picking workload is divided into two steps. Rational planning and management of picking operations have a decisive impact on improving the efficiency of distribution centers.

Optimizing picking strategy is mainly to change the original picking mode, highly intelligent picking scheme, diversified picking process, adjust and optimize real-time according to different orders to avoid waste of picking operation; centralized warehousing management,

improve picking efficiency, shorten picking path, optimize picking path, and do not go back. In order to ensure the accuracy of picking, the pickers themselves should be careful and conscientious in their work. At the same time, it is necessary for each group to perform their duties well and lay a good foundation for the accurate completion of picking.

5.2.3. Upgrading Warehousing Technology Level

E-commerce warehousing operation can not rely solely on manual operation, which has high cost, low efficiency and high error rate. The competitive advantage of e-commerce warehousing lies in the rapid response to customer needs. Therefore, warehousing operations should be more standardized, mechanized, informationized and intelligent, such as the judgment and analysis of warehousing order types, the determination of picking methods and the issuance of picking tasks, and the selection of checking methods can be completed by WMS system. WMS system can judge automatically according to pre-set rules and instruct operators to perform corresponding operations. This can avoid the error of manual judgment, reduce the pressure of operators, and greatly improve the efficiency of operations. Operators only need to complete simple operations according to the instructions of the system.

The space utilization rate of warehouse and the factors such as goods access, sorting and turnover affect the order processing speed of e-commerce enterprises and the satisfaction degree of consumers to their logistics services. Considering the characteristics of e-commerce warehouse, such as variety, weight and size of goods, the storage methods used are also different. Choose appropriate storage equipment according to the requirements of storage items. For e-commerce warehouse, because of its business characteristics, there are only two kinds of storage modes: storage area (also known as whole storage area/large cargo area) and picking area (also known as picking area/single goods area). For storage area devices, as long as the main storage mode is the pallet (also known as pallet) of unit load (Unit Load), pallet storage mode of e-commerce warehouse can adopt floor stack and pallet shelf. For the equipment in the pick-up area, light shelves are mainly used. Some standard packaged goods that need first-in-first-out management may use fluent shelves. Of course, the selection of shelves is essentially related to the physical space of warehouse, business model, operation type, commodity, storage capacity requirements and so on, such as manual warehouse, and semi-automated, automated warehouse, the selection of shelves is very different.

5.2.4. Measures to Improve the Efficiency of Logistics Transportation

In order to realize the integration of warehouse and distribution, we must improve the efficiency of logistics transportation, which is often the decisive factor of the timeliness of distribution. The measures to improve transport efficiency are as follows: first, to enhance the coordination of transport logistics. We must ensure the interconnection and interoperability of various modes of transport, accelerate the development of multimodal transport, suspension transport and direct transport, maintain the continuous high-level operation of railway transport, ensure the increase of air cargo and postal traffic, and maintain the steady growth of water transport, port cargo and container throughput. Secondly, the timeliness of transport logistics has been continuously improved. The construction of logistics informatization and transportation infrastructure will be synchronized to ensure that the timeliness of transportation links will continue to improve.

5.2.5. Optimizing the Construction of Warehousing Network

If we want to realize the integrated operation of warehousing and distribution, we should first plan the network of warehousing facilities, including the number of warehousing (or distribution center) centers in different regions, the geographical location of warehousing (or distribution center) centers at all levels, and the scale of warehousing (or distribution center) at all levels. Storage facility network aims to optimize the effective radiation range of sub-warehouse (or distribution center) and enhance distribution. Thirdly, customers' service ability

to e-commerce logistics is getting higher and higher. Customers need not only basic logistics services, but also more value-added logistics services to meet the personalized needs of consumers. Customers are increasingly demanding the service capabilities of e-commerce logistics.

(1) the connotation of "Internet +"

The so-called "Internet +" refers to the process of diffusion, application and deep integration of the new generation of Internet based information technology (including mobile Internet, cloud computing, Internet of things, big data, etc.) in various sectors of the economic and social life. With the rapid development of Internet technology, e-commerce logistics has achieved rapid development. E-commerce logistics has also achieved a certain degree of quality improvement and synergy under the help of "Internet +", which obviously can not meet the demands of the rapid development of e-commerce logistics. In order to improve the quality and efficiency of e-business logistics, we must take the "Internet +" as an opportunity to build an e-business logistics warehousing and distribution integration mode based on "Internet +".

(2) based on the "Internet +" model of e-commerce logistics warehouse allocation integration model.

Its integrated model of building e-commerce warehouse distribution is designed as follows: building cloud warehouse distribution system and the timeliness and economy of e-commerce distribution.

Secondly, storage area planning and operation planning of warehousing operation management are also the contents of warehousing operation design. Storage area planning is to achieve warehousing (or distribution center) according to the type and nature of goods set up different storage areas, through temperature, humidity, ventilation and other control, to maximize the quality of goods. Warehousing operation management and operation planning includes warehousing management, warehousing management and warehousing management. It involves warehousing, storage, sorting, packaging, picking, shipment and other operation processes, including loading and unloading, handling, packaging and other logistics operations. Warehousing operation management and operation planning aims at integrating warehousing management resources, realizing the intensive allocation and synchronization of the process; Path, reduce ineffective logistics operations, improve the efficiency of logistics operations. The order characteristics of BTOC and CTOC modes in e-commerce are high order frequency, large number of orders, warehousing in and out of warehouse. E-commerce logistics enterprises must enhance the scientific and technological content of logistics facilities and equipment, shorten the picking time and improve the picking accuracy.

5.2.6. Optimizing the Construction of Distribution Network

E-commerce logistics can adopt self-owned logistics (such as Amazon, Jingdong, Suning Easy-to-buy, Merchandise Club, etc.) or third-party logistics (such as rookie logistics, Zhongtong, Yuantong, etc.) to complete the distribution business to customers. The greatest advantage of self-operated logistics is that it can effectively control the logistics. There are many distribution points in the logistics warehouse, which can form an effective regional coverage, and the distribution efficiency is high, which can better meet the requirements of customers for timeliness. In large-scale e-commerce enterprises in China, this self-operated logistics model is often adopted. With the rapid development of e-commerce in China, express parcels are increasing year by year. E-commerce logistics is also expanding the distribution network, improving the distribution efficiency, reducing the damage rate of parcels in the distribution process, and improving customer experience value in the process of online shopping.

5.2.7. Other Aspects

In addition to the above optimization measures, e-commerce enterprises can also improve from other aspects. Such as making full use of warehouse space and formulating reasonable and

efficient warehouse management methods/standards; establishing full-time tallying/warehouse personnel/ clear responsibilities for operator's concept training; being responsible for adjusting the warehouse location by a special person; achieving better control and strict supervision; distinguishing rewards and penalties according to assessment indicators and actual completion; strict planning process, training/management+system, about In order to reduce the proportion of errors, the delivery location and receiving location should be set reasonably in the system, so as to improve the level of inventory accuracy management, ensure smooth picking and avoid deductions due to inaccurate inventory as far as possible. It is suggested that e-commerce enterprises should implement 5S management so as to make the picking site work orderly, reduce the error rate of picking, and improve the efficiency of picking and delivery.

How to save cost, improve efficiency, reduce personnel ratio and improve accuracy in e-commerce warehousing is a problem worthy of consideration by enterprises. Warehousing operators should sum up their experience in warehousing practice, strive to find ways to optimize picking operations, improve the efficiency of warehousing and picking operations, and then reduce warehousing costs and improve customer satisfaction.

6. Conclusion

In recent years, the rapid development of e-commerce in China, the express parcel increases year by year, e-commerce logistics to meet customer safety, fast, low price logistics needs, we must build a "warehouse + distribution" integrated system based on the "Internet +" mode. Building a cloud warehouse distribution system is the core of warehouse distribution integration. Building multiple e-commerce warehouses (or distribution centers) is the key to warehouse distribution integration. Optimizing business processes is the basis of warehouse distribution integration. Warehouse distribution integration essentially realizes the quality and efficiency of e-commerce logistics, and also improves customer satisfaction and experience value in the process of shopping.

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