Research on Third Party Logistics Management Model and Information System Based on Supply Chain Management

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Abstract: Facing the new market competition environment, the traditional management mode has exposed various drawbacks, which seriously hinders the further development of the economy. With the increasing importance of enterprises in the supply chain to their own core competence building, more and more enterprises are willing to outsource non-core business to third-party logistics enterprises, and the role of third-party logistics enterprises in the operation of logistics supply chain is becoming increasingly prominent. In order to reduce costs effectively, enterprises must strengthen their core competitiveness, and outsource logistics and other businesses to manage and control efficiently, so as to achieve the optimal cost. An economical and practical logistics information system with advanced technology and perfect functions can help third-party logistics enterprises to realize information sharing among internal departments and enterprises in the supply chain. Considering the mode and purpose of supply chain integration, the third party logistics should be the driving force of supply chain integration. Based on the perspective of supply chain management, this paper analyzes the third party logistics management mode and its information system.

1. Introduction

Due to the continuous progress of science and technology and economic development, as well as the acceleration of the formation of global information networks and markets and technical support, enterprises are facing a new competitive environment [1]. As enterprises in the supply chain pay more and more attention to the construction of their own core capabilities, more and more enterprises are willing to outsource non-core business to third-party logistics enterprises, and the role of third-party logistics enterprises in the operation of the logistics supply chain is becoming increasingly prominent. Third-party logistics refers to the process in which logistics operators provide customized, specialized and serialized logistics services to logistics consumers at agreed prices at agreed time and space with the help of modern information technology. It is the most reasonable comprehensive service mode for modern logistics [2]. Supply chain management is a mode of joint cooperation and management between core enterprises and other enterprises in the supply chain. As a node enterprise in the supply chain, the third party logistics enterprise is an important component of the supply chain [3]. In order to effectively reduce costs, enterprises must strengthen their core competitiveness, and outsource logistics and other businesses to carry out efficient management and control, so as to achieve the best cost [4]. While fierce competition brings more products to the market, it also makes users' expectations and requirements higher and higher, and consumers' demands for products are diversified and personalized.

The rapid generation of a large amount of information and the increasing communication technology have forced companies to spend more energy to accurately filter and effectively use various information. Through the use of modern logistics technology and information technology, the third-party logistics system organically integrates all departments of the supply chain enterprise and all aspects of the logistics business, making logistics, information flow and capital flow highly integrated and maintaining efficient operation [5]. As far as the reality is concerned, the reasons for the formation of the new model have been basically satisfied, but we have not actually seen the supply chain model dominated by third-party logistics companies in the true sense [6]. With the increasingly fierce market competition, modern enterprises are gradually developing towards

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process control and refined management in the development process. An economical, practical, technologically advanced and fully functional logistics information system can help third-party logistics companies to share information between internal departments and enterprises in the supply chain to ensure smooth flow of business, logistics and capital [7]. As one of the important directions of modern logistics development, third-party logistics has technological advancement and economical savings [8]. Based on the perspective of supply chain management, this paper analyzes the third-party logistics management model and its information system.

2. Demand Analysis of Third Party Logistics Information System

2.1 Reconfigurability

Logistics information system is based on the actual needs of logistics activities such as improving transaction processing efficiency and operation efficiency, thus supporting the whole logistics activities. The third party logistics information system, as a supporting system independent of and acting on the enterprise information system, must make corresponding adjustments with the reorganization and changes of other links in the supply chain. The traditional mode can no longer adapt to the current manufacturing environment of rapid technological update, high investment cost and competitive globalization. The traditional mode of production and management has been slow and passive in responding to the drastic changes in the market and is no longer suitable for the new competitive environment. A distribution enterprise distributes to multiple users, that is, a distribution enterprise integrates the actual needs of multiple customers in a certain area, and arranges delivery time, times and distribution routes reasonably according to the needs of customers, so as to achieve comprehensive distribution. A complete e-commerce transaction process must pass through four streams. That is information flow, business flow, capital flow and logistics. Any first-class is indispensable and equally important to maintain the smooth flow of this process. When the supply chain changes, it responds dynamically to the change of information flow according to its role, and controls the logistics activities by controlling, integrating and making decisions on the changed information.

2.2 Openness and Extensibility

Supply chain logistics enterprises are facing a rapidly changing market. Entrepreneurs have to adjust and change the existing business models and business processes at any time. In order to reduce the impact of city logistics on the environment and improve the transportation efficiency of logistics companies. Logistics enterprises, customers, suppliers and retailers can jointly contribute to purchase distribution machinery and set up distribution centers. This distribution method is efficient and timely, and the distribution center can select users nearby for distribution. The impact of logistics on the environment can be minimized. Logistics is the guarantee of production if an enterprise wants to survive. In order to strive for a larger market, production enterprises have started to use door-to-door sales promotion. Market competition is becoming increasingly fierce. For multi-variety and multi-customer production enterprises, in order to meet the needs of different customers, the enterprises must make corresponding inventories, distribute goods according to the requirements of customers for variety and quantity, and deliver them to the designated place at the designated time [9]. Supply chain management is an integrated management idea and method. It implements the planning and control functions from supplier to end user in the supply chain. It is a brand new management philosophy. The function model of the third party logistics enterprises supporting supply chain should have good openness and expansibility, allow the upstream and downstream of the supply chain to share information in various ways, and satisfy the business operation mode that is constantly adjusted to adapt to the market.

In the conceptual model of e-commerce, e-commerce entity refers to the objective object that can engage in e-commerce. It can be an enterprise, bank, shop, government agency or individual. Electronic market refers to the place where e-commerce entities engage in the exchange of goods and services. It has a variety of business participants, using a variety of communication equipment,

connecting into a unified whole through the network. Fig. 1 is the conceptual model of e-commerce and urban logistics system.

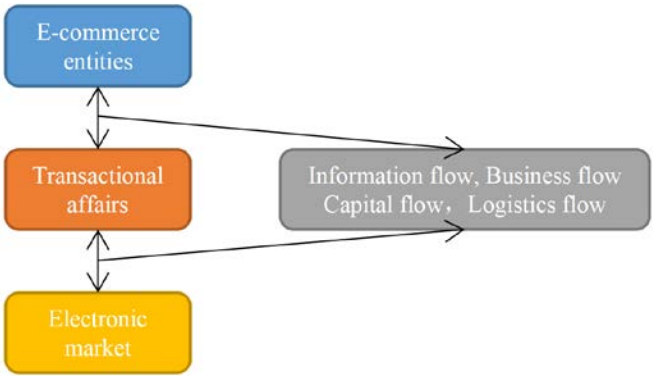

Figure 1 Conceptual model of e-commerce and urban logistics system

3. Third Party Logistics E-commerce Information System in Supply Chain Environment

Modern enterprises should pay more attention to high-value production mode, and pay more attention to speed, expertise, flexibility and innovation. Product manufacturing enterprises transport goods from outside the city to the logistics center for storage, and forward the goods to the designated distribution center according to the needs of users. After picking and assembling are completed in the distribution center, they are transported to each sales terminal on the logistics distribution network. With the development of logistics informatization, barcode technology, database technology, electronic ordering system, effective customer response and other technologies have been widely used in the field of logistics. Traditional enterprises either expand their own scale or take shares in supplier enterprises due to the demand for possession of manufacturing resources and the need for direct control of the production process [10]. In the traditional supply chain, a series of logistics processes from raw material procurement, product production to product sales are separated. This will easily lead to overstock of products, disjunction between production and demand, and ineffective capital turnover. The networking of modern logistics links the logistics center with enterprises and customers into a close information sharing body. Through the shared information network, the allocation of transportation means, the reasonable arrangement of logistics activities and the real-time inquiry of goods in transit are realized. Supply chain management emphasizes the combination of powerful enterprises and value-added services, and emphasizes efficiency and efficiency.

The total cost of the system does not consider the storage cost of the warehouse, but only the fixed warehouse construction cost and transportation cost. Based on the above assumptions, the mathematical model of the logistics distribution center is as follows:

$$\Delta w_i = -\eta \frac{\partial E}{\partial w_i} = \eta \left(t_i - o_i\right)\left(1 - o_i\right) x_i \tag{1}$$

Capacity limit for distribution centers:

$$F(x) = 1/\sum (x_i - x_i^0)^2 \tag{2}$$

Distribution center supply constraints:

$$E(w) = \frac{1}{2}\sum_{d=1}^{D} \left(t_d - o_d\right)^2 \tag{3}$$

Find the amount of transportation from the distribution center to the demand point:

$$Y_i = \alpha + \sum_{j=1}^{k} \beta_j \cdot X_{ji} \tag{4}$$

From the perspective of production enterprises, the reconstruction or optimization of the logistics system often means the relocation and optimization of the sales system. There are many kinds of energy consumption and pollution emissions, and the quality of fuel, local road conditions, load and other factors have greater uncertainty. Among the fuels used for transportation vehicles, hydrocarbons, CO2, CO, and PM2.5 have a greater impact on the urban environment. As shown in Table 1, the main energy consumption and emissions involved in the urban logistics distribution system are given.

Table 1 Main energy consumption and emissions of urban logistics distribution

Operation flow	Energy consumption	Emissions
Transit transport link	Gasoline, diesel	HC, CO_2, CO, PM2.5, SO_2
Store	Electric power	None
Scanning, sorting and packaging	Electricity, resin, polystyrene	Arsenic, benzene, formaldehyde, CO2, CO
Leopard print, drying and ventilation	Natural gas, liquefied petroleum gas	CO_2, CO, PM2.5
Intelligent cargo management	Natural gas	CO_2, CO, PM2.5

Domestic excellent enterprises must have the basic ability to serve end customers, and a certain range of customer service networks should be established. Products may have different differentiation or cost advantages, but the product may not be strong enough due to the value problem, while the logistics company has a strong brand effect, and the product has considerable dependence on logistics. Only the domestic excellent enterprises have experienced the process of centralized logistics management, and the logistics center can provide low-cost, reliable and standardized logistics services to the business. If the traditional business process is not changed, even if advanced information technology is adopted, it will not be of fundamental help to the work and will only lead to more and more advanced information technology on the one hand. Supply chain management is not only concerned with the flow of materials and products in the supply chain, but also includes strategic suppliers and user partner relationship management besides the transportation problems and physical distribution within and between enterprises. When applied to different enterprises' supply chains, different constraints can be established according to the characteristics of enterprises' supply chains to optimize the reorganization of logistics functions and generate a logistics information system supporting customers' supply chains.

4. Conclusion

As a result of the change in the management ideology of logistics enterprises, traditional logistics management is facing various difficulties in order to ensure the synchronization and parallelism of operations among supply chain enterprises and realize the ability to respond to the market quickly, which is highlighted by the ability to respond to the market quickly. The core content of enterprise supply chain management is to strictly screen the third-party logistics companies, establish the relationship with them and carry out strict, scientific and quantitative management. This paper analyzes the characteristics of the third-party logistics information system supporting supply chain management, and proposes a design method of logistics information system based on software component technology. The logistics information system can be constructed according to the business processes of different enterprises/The goal pursued by enterprise supply chain management is the necessary management activities carried out around the two management activities of enterprise with high efficiency and low cost. The urban management authorities should guide the development of urban logistics towards joint distribution based on third-party logistics. At the same time, reasonable planning of public logistics distribution facilities, rational arrangement and utilization of urban road resources and standardization of logistics vehicles should be carried out. As well as more positive policy guidance and planning to encourage the use of clean energy.

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