Research on Optimization of E-commerce Supply Chain Management Process Based on Internet of Things Technology

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Abstract. With the development of information network technology, online shopping has become more and more accepted and chosen by people, the demand for logistics and express delivery industry is also increasing. In today's e-commerce era, the global logistics industry has a new development trend, called modern logistics. In modern logistics, the requirements for the important link of warehouse logistics and distribution are also increasing. The goal of supply chain management is to achieve maximum operational efficiency while minimizing capital investment, which is of great significance for e-logistics distribution. Based on this, this paper explores the application of Internet of Things technology in the supply chain management of e-logistics.

Keywords: Internet of Things Technology, Logistics Supply Chain Management, Application Exploration

1. Introduction

Supply chain management is very popular these years, many foreign Fortune 500 companies as well as large state-owned enterprises have created their own global procurement centers to build resource platforms and capture market opportunities. The function of procurement has also been derived from a single function to an important part of supply chain management. For example, Jingdong's intelligent supply chain combines the new technologies of artificial intelligence, block chain, Internet of Things, has advantages in forecasting, product selection, pricing, realizing online and offline, multi-platform, omni-channel, integrated solutions [1]. With the development of the times, many BAT companies have also shined an olive branch on the management of supply chain. In the era of e-commerce, Internet of Things technology is an essential technical tool for e-logistics supply chain management.

2. Electronic supply chain management

There are three main aspects in supply chain management: information flow, logistics and capital flow, involving operational aspects such as procurement, production, distribution and capital operation. The competition of modern enterprises requires them to improve efficiency through integration in production and procurement, avoid stagnation of overall production due to problems in specific parts of the supply chain, optimize production rhythm [2]. Logistics and distribution directly face customers, are an important part of the market to enhance the experience, the success of which will directly lead to the
success or failure of the core market competition; capital operation is related to the efficiency of the use of materials related to the supply chain, to improve the efficiency of capital flow. Along with the emerging business model, the emergence of electronic supply chain is particularly necessary.

E-supply chain from procurement - logistics - warehousing - distribution - traceability, the establishment of a complete electronic ground of the entire life cycle of goods refinement of data-based forecasting, management and monitoring, through the Internet technology to achieve efficient, convenient and low-cost rapid flow of goods, information and capital [3].

3. Opportunities for electronic supply chain management

3.1. National background

On January 14, 2015, the State Council Standing Committee meeting deployed to accelerate the development of trade in services, to optimize the structure to expand the development space, proposed to innovate the model and use new technologies such as big data and Internet of Things to create a new network platform for trade in services.

The State Council in the "Made in China 2025" notice again stressed: "to create a green supply chain, accelerate the establishment of resource-saving, environment-friendly procurement, production, marketing, recycling and logistics system, the implementation of the extended producer responsibility system." "Accurate supply chain management, total life cycle management, e-commerce. are reshaping the industrial value chain system." "Accelerate the promotion and application of total product life cycle management, customer relationship management, supply chain management systems, promote the integration of key links such as group control, design and manufacturing, integration of production, supply and marketing, business and financial convergence."

The emergence of a new network platform for new service trade must require supply chain management to meet the development of new services, Internet of Things information processing technology, applied to electronic supply chain management, to meet the country's thoughts on industrial upgrading, reform from the supply side [4].

3.2. Technology upgrade

![Diagram](image)

**Figure 1. Technology upgrade**

The "Internet of Things technology" is a network technology that extends and expands on the basis of Internet of Things information technology; its user side extends and expands to any item and between items for information exchange and communication. IOT technology connects any item to the Internet.
for information exchange and communication to achieve electronic identification, location, tracking, monitoring and management, which is the basis of electronic supply chain logistics.

Big data prediction technology, based on a large amount of historical data, uses effective new information processing technology to make predictions for future indicators or demand and effectively guide production.

Big data recommendation technology uses big data recommendation technology, in precipitating user usage data, for the user's needs to make relevant recommendations, changing passive to active, so that the electronic properties in the supply chain management can be given full play [5-7]. It is in the national background of strong support to promote a variety of technical upgrades to make the application of electronic supply chain information technology needs to be achieved, can be achieved, bringing increased social value.

4. Advantages and characteristics of Internet of Things technology in e-logistics supply chain management

Due to the diversification of supply chain management objectives, it makes the modern logistics supply chain management objectives relatively complex; there are very high requirements in terms of time, cost and method, Internet of Things technology can cross the geographical and spatial restrictions to closely combine information processing with modern digital communication technology, which provides strong technical support for the exchange of modern logistics information, making the management of logistics supply chain more scientific, more optimal distribution, Effectively shorten the market response time, reduce the deviation of demand forecast, expand the management field of view, truly achieve the barrier-free communication of information, so as to further enhance the profit margin of enterprises and strengthen their ability to control the market.

5. The direction of application of Internet of Things technology for electronic supply chain

5.1. Organizational coordination is the basis of management

Supply chain management requires each enterprise to innovate in organizational structure, eliminate the barriers between departments, functions and enterprises, carry out interdepartmental, cross-functional and cross-enterprise management and coordination, that is, business process reorganization. Through the effective management of the electronic supply chain in the organization and coordination, the supply chain is flattened and the path of goods from the procurement plan to the organization of production and then to the consumer is shortened [8]. The traditional supply chain links are drastically reduced and the previous complex supply and demand chain delivery model is broken. The flattening of the supply chain makes the supply cycle and cost significantly reduced and the efficiency of the supply chain greatly improved.

5.2. Electronic attributes are the core of supply chain management

Electronic supply chain from procurement -> logistics -> warehousing -> distribution -> traceability, the establishment of electronic land complete commodity whole life cycle big data refinement of forecasting, management and monitoring, through the Internet technology efficient and convenient low cost to achieve the rapid flow of goods, information and capital.

In procurement, on the one hand, through the algorithm of big data accurate prediction and analysis, in real time, through the sales forecast module to predict the future sales of each commodity, combined with the existing inventory information to propose inventory warning, through the electronic algorithm to propose an economic and effective replenishment plan. On the other hand, based on the existing multi-attribute distribution structure of goods and the ideal multi-attribute distribution structure of goods predicted by the system, we make a comparison and judgment, propose the replenishment demand for certain combination of products with certain attributes, propose the selection plan electronically, guide the purchasing decision.
For the user, once the user places an order, the system can automatically review the order according to the information such as inventory arrival, directly through the electronic sub-store module, automatically find the economic and fast goods, warehouse with the distribution method. Through the logistics network system, each outgoing goods above the QR code information is stored to the mall platform, can accurately ship and record all relevant information [9]. Through the electronic distribution module, the distribution of distributed warehousing, directly to the relevant warehouse to issue the order to depot, to a large extent to ensure that users receive the goods uniformly and quickly.

After the users receive the goods, through the commodity traceability system, the supplier, shipping, customs, warehouse and distribution information of each commodity can effectively carry out anti-counterfeit identification to ensure that the goods are truly imported from the original bottle to each user [10].

5.3. Future characteristics of electronic supply chain information application

![Figure 2. Future characteristics of electronic supply chain information application](image)

The new electronic supply chain management, undertake is the manufacturer or supplier to the business to the end of the user, in the end to reach the customer before all the links are facing the market risk, but also only the entire supply chain of effective business enterprises are well served, to protect their interests, it is possible to make a multi-win positive feedback accumulation. In the entire electronic supply chain, it is also necessary to uphold the principle of "risk sharing, benefit sharing", through technical means to protect the interests of upstream and downstream businesses [11].

In the whole e-supply chain, it involves demand forecast synergy, production planning synergy, sales service system system, procurement synergy, logistics synergy and inventory synergy [12]. Only through a fast and effective e-supply chain management system, all levels of synergy at the strategic level can be taken into account to form a fast flow and value-added for logistics, information flow and capital flow.

All data processing can be built on cloud services, the standardization of information collection, storage and transmission can be executed through the big data platform on cloud services to build a unified platform and a framework for electronic processing to ensure data security while also unifying data standards for more rapid expansion and upgrading [13].

6. Application of Internet of Things-based technology in supply chain management of e-logistics

6.1. Application of electronic data interchange technology in logistics supply chain management

EDI is an effective means of information management, making full use of modern Internet of Things network resources to exchange and automatically process data between electronic Internet of Things systems of trading partners through the transmission of communication networks, so as to effectively operate the information flow in the supply chain and improve the communication efficiency among trading partners, commonly known as "paperless trade" [14]. "Software, hardware, communication network and data standardization are the main elements of EDI system; EDI standards are mainly divided into: basic standards, code standards, message standards, document standards, management
standards, application standards, communication standards and security standards; the application of data exchange technology in logistics supply chain through EDI can quicken customs clearance and inspection, more economical use of transportation resources, so as to better reduce the waste of space, cost and time in trade transportation; JIT instant response to reduce the amount of inventory and production line standby time, reducing production costs; QR rapid response to establish a material distribution system to complete the production, storage, transportation and marketing of integrated supply line management; EFT electronic fund transfer system to reduce the financial units and their relationship with each other. Through EFT electronic fund transfer system, the time of transportation between financial institutions and their users and the risk of cash flow are reduced, the processing time required for fund flow is shortened to improve the flexibility of fund dispatching for users, in terms of inter-bank services, users can enjoy the services provided by different financial institutions to improve the service quality and projects in the financial industry [15].

6.2. Application of GPS intelligent transportation system in logistics supply chain management
Through the GPS positioning and navigation system to collect the latest road information in real time, for the driver to choose the best route to shorten the transport time; through the network transmission of data communication technology, sensor technology, electronic control technology and other integrated use of logistics transport can strengthen the vehicle, road, the user between the three links; through the monitoring center information can be real-time control of the entire road trains, vehicles, containers and goods transported from the starting point to the end. The information of the monitoring center can grasp the whole dynamic process of the trains, vehicles, containers and goods transported from the starting point to the end point in real time, understand the running condition of the trucks in time, such as the vehicles in the process of transportation accidents or failures can be the first time to dispatch emergency rescue vehicles, the dynamic situation of the goods can be tracked, scheduling management, so that the vehicles and goods can get the maximum security, forming a comprehensive transportation system of timing, accuracy and efficiency, to provide cargo owners with more high quality service.

7. Conclusion
Internet of Things are the buzzword of the day, supply chain management is a strategic direction for the logistics industry. At the same time, the close combination of Internet of Things technology and supply chain management has triggered many changes in e-logistics. The author believes that along with the development of Internet of Things technology, it will be a major trend to promote the traditional supply chain management to achieve a breakthrough. Create a supply chain ecosystem, help enterprises to play their own core competitiveness, in the overall optimization of their own optimal configuration. Internet of Things technology will continue to bring uninterrupted impact to the supply chain management of e-logistics.

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