The Application of Intelligent Technology in Logistics and Supply Chain Management

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Abstract: As a significant component of economic growth, modern logistics and supply chain management (SCM) are not only related to the growth of China's social economy, but also have a significant impact on the application of the Internet of Things (IoT). The supply chain (SC) of logistics is like a whole carriage, uniting enterprises and logistics through the use of various technologies and tools. With the growth of the economy and social progress, intelligent logistics SC is becoming more and more perfect, and logistics services are also widely developed throughout the country. The rise and continuous optimization and improvement of IoT technology have further enhanced the intelligent logistics SCM model. It can collect and record logistics information in real-time, promoting management effectiveness. As a significant component of IoT growth, SC mainly improves the SCM level of IoT through the combination of logistics wholesalers, manufacturers, and retailers, achieving the goal of win-win growth. In specific growth, it is necessary to strengthen the work of IoT intelligent logistics SCM, promote the growth of intelligent logistics chains, and further improve the level of intelligent logistics SC growth in China's IoT. This article studies the application of IoT technology in logistics and SCM.

1. Introduction

In recent years, with the continuous growth of China's computer technology and Internet technology, it has made great contributions to the overall growth of China's social economy [1]. With the continuous growth of science and technology, the competition between social economies has become increasingly fierce. The corresponding competition between entities has gradually become the competition between the Internet, modern logistics and SCM [2]. In order for enterprises to stand firm in the fierce market competition, in addition to enhancing their own soft power, they also need to keep up with the pace of the times and establish a modern business management model that is in line with growth. Logistics SC is one of them [3]. With the emergence and application of logistics network technologies such as logistics carriers and retailers, traditional logistics management models have been completely broken, promoting the comprehensive growth of logistics services [4].

The management technology of enterprise logistics SC focuses on business and products, forming an effective SCM system around products [5]. Logistics SCM technology is a SCM system centered around products or businesses, mainly referring to the establishment of logistics SCs based on product manufacturing, raw material supply, and distribution, and enabling each base point to complete corresponding tasks through management [6]. The rapid advancement and widespread application of IoT technology have had a significant impact on the SCM model of enterprise logistics distribution, and have greatly improved the automation level of enterprise logistics distribution SCM systems. Modern enterprise logistics distribution SCM systems have also been greatly improved. SC technology is mainly used to analyze the actual situation of customers themselves, in order to invest the least cost, apply corresponding scientific and technological means, and enable suppliers, manufacturers, distributors, retailers and all staff to serve this data. It is imperative to study the growth, innovation, and specific applications of SCM technology in order to fully utilize the effectiveness of management techniques [7].

The growth of IoT technology has driven modern logistics towards intelligence. Through reasonable SCM, SC data can be effectively analyzed, logistics can be monitored in real-time, and data information can be mastered in detail. For SC users, intelligent decision-making can be made, making logistics transportation work less complex [8]. IoT connects the information equipment department with the Internet, thus realizing the real-time exchange of internal information systems, controlling the whole logistics process, and optimizing SCM, which plays an important role in promoting the overall growth of SC. Enterprises need to improve the management technology of logistics SC, update and develop advanced technologies such as logistics management technology. While understanding the problems of their own SC, they should actively seek solutions to enhance their competitive strength. The use of IoT technology in logistics management by logistics enterprises is a reflection of the modern application of IoT, which can test the feasibility of IoT in business and effectively test IoT technology.

2. The Role of the IoT in Intelligent Logistics SC

2.1. Optimize Management Processes

The enterprise meets the needs of customers and consumers at the lowest cost, and relies on modern information technology, Internet communication technology, etc. to complete the whole process of commodity logistics, and carry out comprehensive control, coordination and management, so as to achieve the supervision of all subjects in the entire client. In the traditional logistics SCM process, the main reliance is on management personnel to transfer transportation information between goods, which makes it easy for human factors to affect the management process. By changing the mode, the management process is optimized, effectively avoiding work errors caused by human factors, resulting in poor performance of the entire SC and bringing impact and losses to intelligent logistics SCM; From another perspective, improving work efficiency and quality, improving logistics management, achieving accurate and secure delivery of goods, and achieving efficient delivery of logistics resources [9].
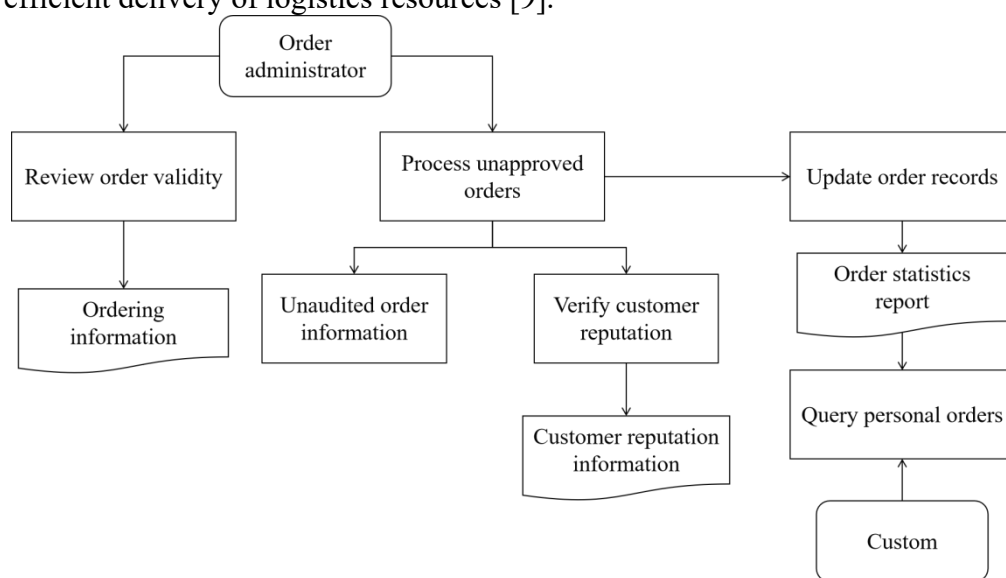
Figure 1 Business process diagram of logistics order management system

The intelligent management technology has optimized the management process and optimized the resources of the enterprise. The logistics SCM model has also been changed, and all aspects of logistics have been improved and enhanced. Management efficiency has also been enhanced, ensuring the quality of logistics management work [10]. The business process diagram of the logistics order management system is shown in Figure 1. Logistics order management is a crucial step in the logistics SCM process. How to efficiently and scientifically implement order management, improve customer satisfaction, and further increase the number of orders for the enterprise. Enterprises rely on modern information technology, computer network technology, and

data communication technology to supervise the entire process of commodity logistics, integrate and protect business information and resources on SC, and maximize the quality of logistics transactions. This not only meets customer needs reasonably, but also reduces the cost of SC systems, which is conducive to improving the social benefits of enterprises. Applying IoT technology to SC logistics can promote the automation of its production process, and through distributed computing and storage methods, maximize the operational efficiency and accuracy of enterprises, thereby promoting the growth of the entire logistics industry.

2.2. SC Information Synchronization and Visualization

IoT enterprises need to fully track and integrate logistics data and resources in logistics SCs, ensuring that the information in each link of logistics SCs is true, accurate, and timely, and avoiding negative impacts of information transmission errors on the integration effect of logistics SCs. The growth of IoT technology has the potential to propel the entire logistics industry towards intelligence, enabling more specialized logistics SCM. By leveraging IoT, the synchronization and sharing of information can be ensured, thereby facilitating the growth of the logistics industry. Additionally, accurate assessments of market demand can be made, and the inventory levels of various logistics enterprises can be effectively controlled. The most prominent advantage of logistics SC intelligent management under the growth of IoT technology is the analysis and integration of collected information, achieving synchronous information sharing.

With the continuous growth of IoT technology, the level of intelligent SCM is also constantly improving and moving towards visual management. In IoT based intelligent logistics SCM, visualization of logistics information transmission can be achieved. In actual operation, products in logistics can be marked, and product information and interoperability information can be viewed through labels, helping management personnel identify and understand resource management, truly achieving transparency, visualization, and openness in the supply management process. IoT technology in intelligent IoT supply management visualizes the transmission of logistics information and marks products during the logistics process. By scanning labels to query product information, it is beneficial for staff to further carry out work, fully understand resource mastery, achieve transparency in supply management, and achieve the visualization and openness of SC information. The visualization of the smart operations center is shown in Figure 2.
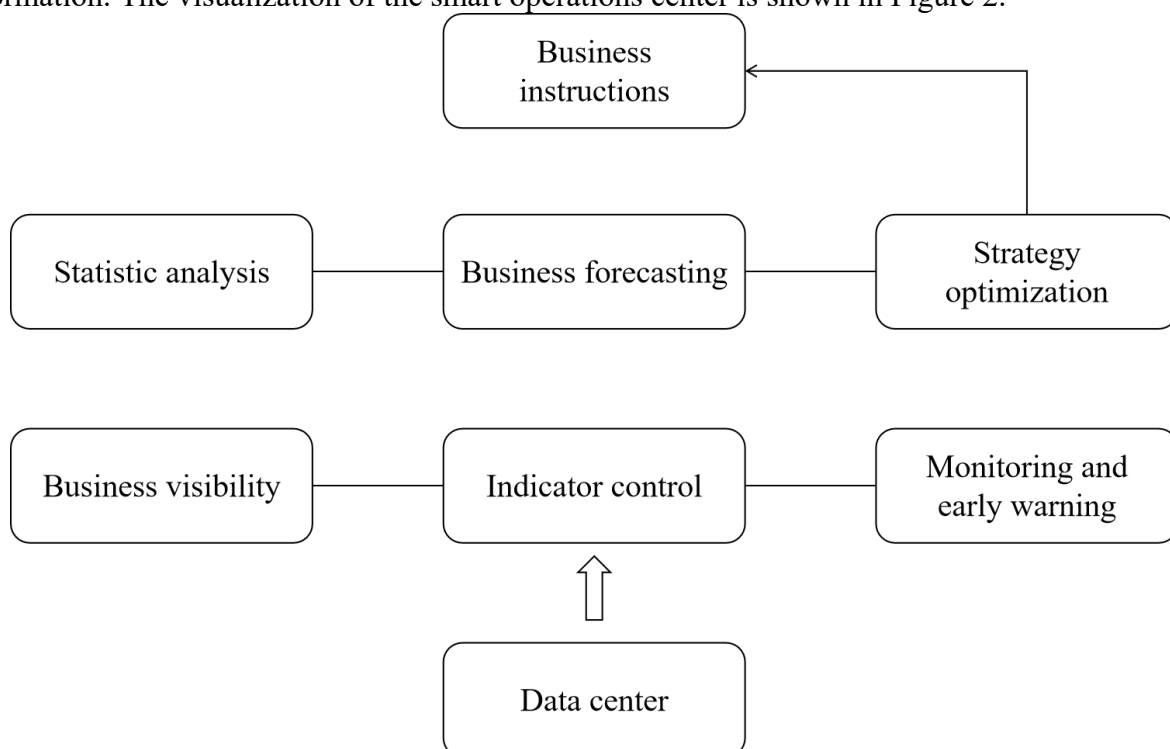
Figure 2 Visualization of smart operations center

3. Development and Innovation of Logistics SCM Technology

3.1. Technological Innovation to Meet Customer Needs

The current logistics organization is developing towards integration, which is to concentrate various aspects of logistics management into one organization, rather than distinguishing these logistics functions. The market competition is becoming increasingly fierce, and whether enterprises can timely meet various customer needs can affect their core competitiveness. Traditional enterprises often struggle with low efficiency and an inability to seamlessly conduct logistics activities across functional departments and different enterprises. To overcome these limitations, it becomes necessary to establish a customer-centric and process-oriented logistics organization. This organization must ensure that AI technology is effectively utilized to provide the necessary technological support. Furthermore, with SC logistics technology exhibiting a continuous growth trend on a global scale, this approach enables the achievement of cross-industry exchange of logistics and SC resources, leading to enhanced efficiency and collaboration.

In the field of SC logistics, we should continue to increase the use of technology to ensure the company's innovative thinking. By obtaining certain information through SCM, various enterprises in SC can utilize IoT to effectively utilize more resources. The current goal of enterprises should be to narrow down management and channels for information sharing and communication, reduce logistics costs, improve service quality and delivery and transportation time. Further reducing cost expenditures and meeting customer needs can enhance competitiveness. Chinese logistics companies should overcome numerous operational misconceptions, establish logistics strategic alliances, seek cooperation with other manufacturers and suppliers, and establish long-term stable cooperative relationships. They should fully utilize the overall advantages of SC, improve their market competitiveness, and expand their market share.

3.2. Informatization and Facilitation

IoT information technology can facilitate scientific integration between companies and enterprises. In recent years, innovation in logistics facilities and equipment has to some extent led to innovation in the management technology of enterprises. Based on the actual operation of automation, it is possible to monitor and process the production situation, timely replenish according to the production plan, achieve stability on the production line, continuously optimize and develop production work, and further make the work less complex and more convenient. The foundation of management technology innovation is the support of network and e-commerce. Give full play to the role of computer, Internet and information technology to coordinate, control and manage the whole process of product logistics.

Any issues related to product production are closely related to product quality. The application of IoT in SCM enables enterprises to strengthen real-time monitoring and tracking of product quality, ensuring that product quality meets standards. While managing inventory reasonably, logistics SC needs to do a good job in transportation management to improve logistics transportation speed and safety. Therefore, enterprises need to develop scientific and reasonable transportation plans based on the transportation needs of core management objects, and complete transportation tasks through logistics management. At present, enterprises have achieved widespread application of barcode, electronic data exchange, electronic automatic ordering system, satellite positioning system, and geographic information system technology, providing technical support for the growth of logistics enterprises. The shortcomings of logistics enterprises have been partially compensated.

4. Conclusions

Driven by the Internet, e-commerce has achieved rapid growth. The scale of e-commerce has also been further expanded. The number of commercial enterprises is also increasing, which has led to the growth of logistics and SC. With the growth and continuous optimization and improvement of IoT information technology, smart logistics SCM will also be gradually improved. Chinese logistics companies should use intelligent technology to improve the effectiveness of commodity

circulation, in order to meet market demand and improve customer satisfaction. With the growth of science and technology, promoting the innovation and exploration of IoT technology has received attention from various fields of the country and society. IoT technology is vigorously promoted, and intelligent logistics SCM is also constantly developing and advancing. Its growth model will continue to improve and mature, achieving intelligent management. By using IoT information technology to track the information of goods in SC, the information integration, visualization, and intelligent control of goods SC can be achieved, in order to minimize the risks caused by information flow obstruction, transmission delay, and information loss during transmission. In the face of fierce market competition, in order for enterprises to stand firm, in addition to improving their comprehensive strength, they should also improve logistics SCM technology and management quality, promote the application of high-tech, fully understand the market and customer needs, and cultivate logistics talents on a large scale. Only in this way can enterprises understand market demand, enhance their comprehensive competitive strength, and promote their own long-term growth.

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