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Intelligent Logistics Enterprise Management System Based on Internet of Things



Abstract: - With the rapid development of Internet of Things (IoT) information technology, the traditional logistics industry has also begun to regain vitality, which requires enterprises to adopt relatively advanced logistics enterprise management technologies in modern logistics industry management and take the intelligent logistics enterprise management system as an important direction for their development. Therefore, its technical advantages should be fully exploited in practice to improve the level of modern logistics management and achieve a win-win situation, thereby laying a good technical foundation for developing the IoT intelligent logistics enterprise management system. This paper first discussed the core technologies and development advantages of the intelligent logistics supply chain based on the Internet of Things and designed a logistics enterprise management platform combining cloud computing and Internet of Things technology according to relevant research, which improves the operational efficiency of the logistics supply chain. Meanwhile, it elaborated on the application of intelligent logistics enterprise management of the Internet of Things in detail. Finally, based on the above analysis, it discussed the development trend of the intelligent logistics supply chain based on the Internet of Things..

Keywords: Internet of Things; Intelligent Logistics; Enterprise Management.

I. INTRODUCTION

The traditional logistics and supply chain system has always been the pillar of the development of e-commerce for a long period. However, with the continuous advancement of modern technology and the continuous development of e-commerce, its development mode is also gradually changing. Modern information technology, Internet of Things technology, and intelligent manufacturing technology are all the bases for improving the intelligent logistics supply chain system. Under the background of intelligent manufacturing, building an intelligent logistics supply chain system is an important means to promote China's economic and social development. Meanwhile, establishing and improving the intelligent logistics supply chain will also promote the development of intelligent manufacturing. The two complement each other[1].

II. CORE TECHNOLOGIES OF INTELLIGENT LOGISTICS SUPPLY CHAIN BASED ON INTERNET OF THINGS

The intelligent logistics supply chain refers to an intelligent new logistics service system that provides services for enterprises by integrating various technologies such as the Internet of Things, virtual reality, big data analysis, and artificial intelligence. With China's economy shifting from high-speed growth to high-quality development, constructing an intelligent logistics supply chain is an inevitable requirement for the development of the modern logistics industry. The development of modern logistics is inseparable from systematization, integration, and intelligence. For traditional logistics companies, by developing an intelligent logistics supply chain, the entire logistics process can be intelligentized and automated, thereby reducing the costs of personnel, logistics distribution and management, further improving the quality of logistics services, and also enhancing customer satisfaction. This is where their core competitiveness lies. The Intelligent Supply Chain Development Plan jointly launched by several international logistics giants points out that the intelligent supply chain consists of three core systems[2]:

Perception system. By using high-tech means such as radio frequency identification management technology (RFID), infrared sensing, and satellite positioning, logistics information is collected promptly and rapidly in various links such as warehousing, storage, sorting, and packaging, and data analysis is conducted to achieve the goals of tracking and positioning[3].

Decision-making system. It analyzes, sorts out, and extracts relevant information such as commodities, freight transportation and consumer demands on the supply chain by utilizing big data, and rationally allocates

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logistics resources to determine the priority order of logistics distribution paths and assist enterprises in making better decisions and specific deployments[4].

Feedback system. In the modern logistics supply chain, both the consignor and the consignee need more information to provide corresponding services to improve their operational efficiency. The intelligent distribution center adopts the information system to collect and process relevant information in various forms, including order management, goods tracking, transportation status monitoring, etc. The Internet of Things technology is utilized to realize real-time logistics tracking on mobile phones and timely update of distribution information, and provide effective feedback for the sender and the receiver[5-7].

III. DEVELOPMENT ADVANTAGES OF INTELLIGENT LOGISTICS ENTERPRISE MANAGEMENT BASED ON INTERNET OF THINGS

Information can be shared simultaneously. Intelligent logistics enterprise management based on the Internet of Things can effectively synchronize and share information among enterprises. In terms of intelligent logistics supply, tracking methods can be employed to track logistics data and provide logistics resource information to enterprises promptly in the logistics supply chain to ensure the accuracy of the information and avoid the distortion of logistics resource information. Based on the Internet of Things, the synchronous sharing of information has been realized, laying a solid foundation for developing the logistics industry. Therefore, it can better adapt to the market and better control the enterprise inventory.

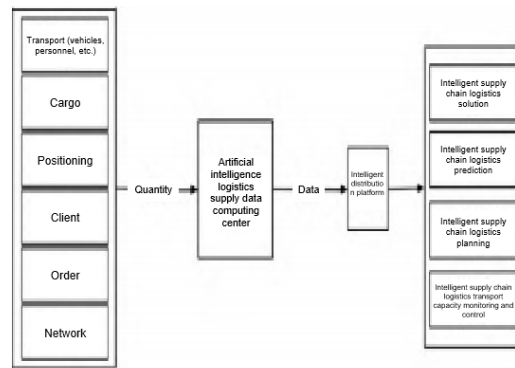


Figure 1 Intelligent Logistics Supply Chain System

Effectively optimize the management process. Strengthening logistics management through intelligent means can more deeply optimize the enterprise resource supply chain, fundamentally transform the traditional logistics management model, improve and enhance each link in logistics, thereby further improving management efficiency, effectively guaranteeing work quality, reducing interference caused by human factors, enhancing the management effect of enterprises, promoting the intelligent process of logistics management, and avoiding unnecessary losses. Meanwhile, it can also significantly improve work efficiency, further enhance the level of logistics management, realize the rapid delivery of goods and ensure its accuracy, thereby ensuring the timely and effective delivery of logistics resources. As shown in Figure 1, taking the logistics cold chain as an example, with the support of artificial intelligence technology, when constructing the intelligent logistics supply chain, the best distribution method can be selected and the optimal distribution route can be formulated according to relevant requirements such as product type, logistics transportation mode, and insurance time limit.

Visualize the supply chain. Using Internet of Things technology in intelligent IoT supply management can visualize the transmitted logistics information. In practice, it can effectively identify the related products in the logistics process, query the relevant information and interaction information of the products according to the corresponding labels, and assist employees in identifying them quickly and accurately, thus achieving visualization and openness.

Seamless network. As time goes by, consumer demands are constantly changing, and personalized characteristics are becoming more and more prominent, which has significantly promoted the development of seamless networks. Besides, to better meet customers' individualized needs, it is necessary to ensure the timeliness of resource provision and make it more flexible, which is also an important issue to be solved at present. However, to ensure the rapid supply of resources, the cost must be increased accordingly. Therefore, the advantages of the

intelligent supply network should be fully exploited, all fields should be deeply explored, and the path of supply resources should be scientifically and reasonably optimized to greatly reduce enterprise inventories, improve the efficiency of commodity transportation, and reorganize logistics resources.

IV. DESIGN OF INTELLIGENT LOGISTICS ENTERPRISE MANAGEMENT PLATFORM BASED ON INTERNET OF THINGS

With the rapid development of information technology and network technology as well as the increasing demands for the logistics industry from people, the competition among enterprises mainly focuses on logistics enterprise management. Therefore, the informatization process of enterprise logistics should be accelerated to enable core logistics enterprises to give full play to their comprehensive strength, and logistics information chains should be established to share logistics information resources in various regions and industries. In recent years, with the development of Internet of Things technology, the cloud computing framework has gradually been paid much attention to. The cloud computing framework can provide enterprises with efficient data management and processing services and improve the efficiency of enterprise management in the logistics enterprise management platform. Meanwhile, the Internet of Things technology can integrate resources such as information, data and applications to achieve more efficient and accurate information interaction. Combining these two technologies with the logistics enterprise management platform can greatly improve the operational efficiency of the logistics supply chain. The architecture of the intelligent logistics enterprise management platform system consists of five parts, providing support for the application expansion of the system and meeting the information needs of customers, as shown in Figure 2.

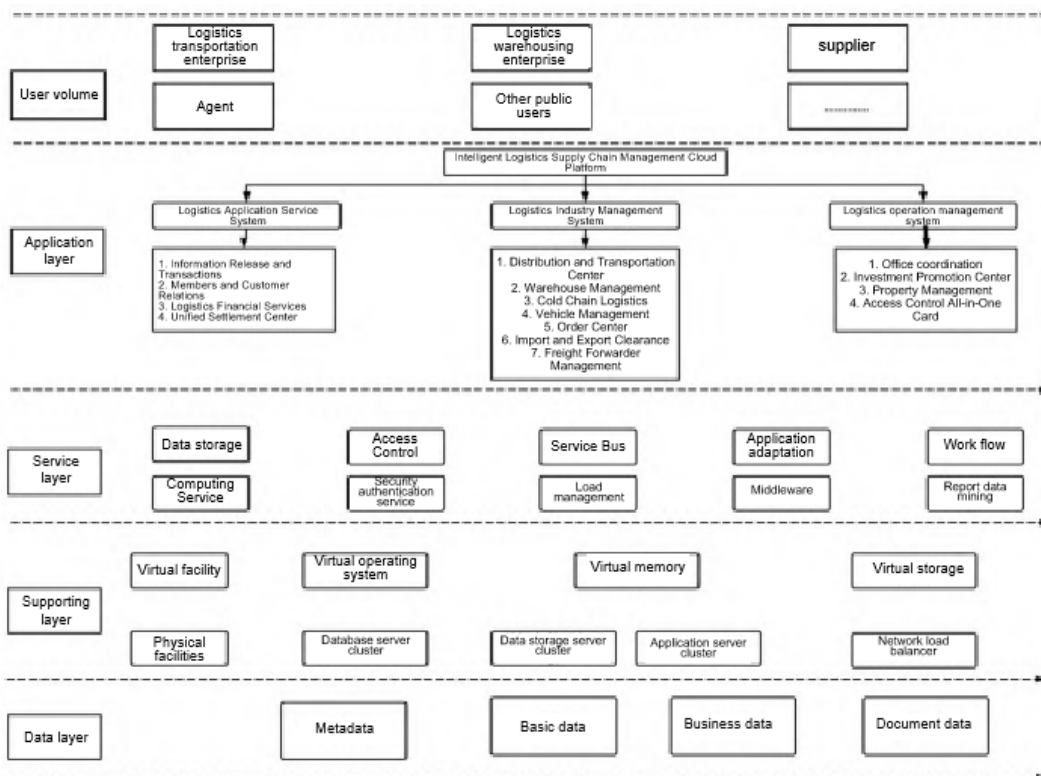


Figure 2 Architecture of Intelligent Logistics Enterprise Management Platform

V. APPLICATION ANALYSIS OF INTELLIGENT LOGISTICS ENTERPRISE MANAGEMENT BASED ON INTERNET OF THINGS

A. Production and Procurement Management Analysis

Although logistics companies could integrate various logistics data and information in real time in the past work, it was very difficult to extract the information they needed from the massive amount of data and information, which was also one of the main reasons for the low production and operation efficiency of the company. However, after reasonably applying Internet of Things technology, it can not only significantly improve the overall production efficiency and production cycle of the supply chain but also achieve the fine management of various production

and operation activities during the growth of the enterprise. Using modern Internet and information technology, production and procurement links can be effectively managed, thus avoiding manual operation deviations that were prone to occur in the past. Moreover, enterprises can also timely discover the defects existing in the production process, and by correcting these defects, the core competitiveness of the enterprise can be further improved

B. Sales Management Analysis

In the past working mode, salespeople usually met and communicated with customers. However, the intelligent logistics supply chain established by using Internet of Things technology has a strong overall marketing ability and can manage different marketing channels well. Meanwhile, it can accurately and promptly convey the circulation of goods on the supply chain to users. In this way, the time consumers spend searching and waiting can be shortened and users can acquire the most product information, such as price, function, shelf life, etc., in the shortest time. When actually selling goods, enterprises can view various types of information in logistics and the supply chain in real time on the information system platform and understand the needs of users more accurately. In this way, the products and raw materials required by the company can be supplied quickly, and consumers will not have to wait for a long time, which greatly improves consumers' satisfaction with the goods. Moreover, enterprises can also manage inventory scientifically and improve economic benefits.

C. Logistics Equipment Management Analysis

To better manage the intelligent logistics supply chain, it is necessary to continuously improve and optimize the Internet of Things technology adopted by the company, invest corresponding resources in the fields of logistics facilities and equipment, and continuously introduce high-quality technicians into the intelligent logistics supply chain system to ensure the efficient and high-standard operation and management of the enterprise. For example, barcode technology can be introduced into the management of logistics enterprises. In this way, commodities can be quickly identified and tracked, and managed throughout the process, significantly reducing the workload of initial staff and improving their work efficiency. Many advanced electronic information technologies can largely simplify the workflow of logistics management and improve its work efficiency. After purchasing the corresponding intelligent logistics facilities at one time, enterprises no longer need to invest too much capital. In general, the operating costs of enterprises continue to decrease, thereby achieving higher economic benefits.

D. Transportation Management Analysis

In the new era, people have higher and higher requirements for the performance of products. To better meet these requirements, companies need to provide users with data and information related to their products more quickly and accurately. This problem can be effectively solved by combining radio frequency identification management technology with Internet of Things technology. The help of radio frequency identification management technology can be used to capture the relevant codes of various products and the corresponding SAVANT system in time, and these product codes can be transmitted to the outside world, and the information related to logistics transportation and the specific information of commodities can be accurately searched on the PLM server. Meanwhile, an information platform can be created within the enterprise, or information can be searched through a computer and then managed automatically. By using these technologies, the specific workflow can be simplified. RFID information-receiving devices can be installed on the corresponding transportation routes to promptly receive this information with the support of advanced electronic communication technology, and then label the commodities, respectively. In this way, different transport vehicles can be accurately located and tracked, their working positions can be monitored in real time, and the delivery time can also be well grasped.

E. Inventory Management Analysis

The actual efficiency of enterprise management has been greatly improved with the upgrade and development of Internet of Things technology. At the same time, product inventory management has truly achieved "seamlessness" and "advancement". Integrating the Internet of Things technology into the specific inventory management work can timely and accurately transmit commodities' inbound and outbound information to the system so that enterprises can conduct inventory checks more accurately and grasp the inventory information of goods promptly. In the case of insufficient goods inventory, this system can notify the company to replenish the goods at the first time. By using this technology, the company can fully understand the entire logistics process of the goods and deliver the goods to customers in the shortest time, thereby avoiding disputes caused by untimely goods transportation. In this way, the economic benefits of the enterprise can be better guaranteed. Furthermore,

with the aid of computer information systems, the enterprise's inventory goods can be managed more intelligently and automatically, which better guarantees the overall utilization efficiency of the enterprise's warehouse, reduces the actual work intensity and workload of warehouse staff, and saves labor costs for the enterprise. Meanwhile, this system can also effectively solve problems such as omissions, damages, and losses that were prone to occur during previous manual inventory counts

VI. DEVELOPMENT TRENDS OF INTELLIGENT LOGISTICS SUPPLY CHAIN BASED ON INTERNET OF THINGS

Through the information dissemination of the Internet of Things, people, objects and information are effectively connected to form an interconnected, information-sharing, fast and efficient intelligent logistics supply chain system, which can realize rapid and effective communication between people and objects, and people and information. Meanwhile, each node on the logistics supply chain can track, control and manage the information, thereby achieving information tracking and management of the entire logistics supply chain. Based on this, it can effectively reduce human operation errors and improve the overall operational quality of the enterprise.

VII. CONCLUSION

With the rise and development of Internet of Things technology, the management mode of intelligent logistics enterprises will be further developed. In the management of intelligent logistics enterprises, an important function of Internet of Things technology in the logistics supply chain is to promote information integration, sharing, and intelligent decision-making among enterprises in the upstream and downstream of the logistics supply chain. To reduce losses brought on by inadequate information transmission, transmission latency, and communication distortion, integrated, visualized, and intelligent enterprise management is implemented using Internet of Things technology. This allows for the timely tracking of commodities in the supply chain. Ultimately, as a result of the Internet of Things, intelligent logistics enterprise management will undoubtedly contribute more to future advancements in integrated innovation, intelligent interconnection, and collaborative development.

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