

Research on Logistics Management Information System Based on Internet of Things

Bin Wang

Shandong Vocational College of Light Industry, Zibo, Shandong, China

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Abstract: With the increasing maturity of the application of Internet of Things technology in my country, logistics management has entered the information age. Based on the analysis of the operation principle and structure of the Internet of Things, the main problems in the development of logistics management information system are elaborated. The technical application of logistics management information system and the optimization of system function modules are studied. Proposed relevant policy recommendations.

1. Introduction

For a long time, the problem of the unsynchronization of the flow of goods and information in logistics has troubled managers, and it often takes a lot of energy to ensure the accuracy and real-time nature of information, but even so, it can only achieve logistics and information at logistics nodes. The flow is synchronized, but it is powerless in operation. However, in actual logistics operations, many items need to be monitored in real time, and their storage conditions and transportation paths are critical to the quality and safety of items, such as pharmaceutical logistics and valuable material logistics. The emergence of the Internet of Things provides convenient conditions for solving these problems. It can automatically acquire, transmit, summarize, and check the information of various links in logistics in real time, which truly solves the problem of unsynchronized logistics and information flow. New information technology often plays an important role as a promoter in process reengineering. The use of information technology to transform key processes, such as the emergence of the Internet of Things technology, provides opportunities for data collection, processing, and transmission process optimization in logistics operations, which can greatly improve operation efficiency. And data accuracy, while reducing operating costs. Due to the development of information technology and Internet of Things technology, the existing logistics management information system has failed to meet the management requirements. The application of Internet of Things technology is imperative to transform and upgrade the logistics management information system. Using IoT technology to rebuild logistics management information systems, improve logistics operation efficiency, and gain competitive advantage will be another new opportunity for Chinese logistics companies and a new challenge for logistics companies in the era of IoT.

2. The Operating Principle and Architecture of the Internet of Things

It is generally believed that the Internet of Things is an integrated network of things and things based on the Internet, through the fusion of sensing technology, communication and network technology, radio frequency identification technology, intelligent computing technology and other technologies. Specifically, it is to embed a chip with perceptive capabilities in the item, and automatically read the information in the chip through a series of devices and software, so that the item can express itself "intelligently". After the items are "intelligent", they can be connected with the Internet, allowing the items and items to "dialogue" and "exchange" to realize the information interaction between the items, the items and people, the items and the network, and finally achieve efficient identification, unified management, real-time The purpose of monitoring. In terms of logical functions, the Internet of Things is mainly divided into three-layer architecture, namely the

perception layer, network layer and application layer. Among them, the perception layer is at the bottom of the architecture, and is mainly responsible for the collection, conversion and collection of item attribute information. The components of the perception layer include: perception tools, perception transmission network, and physical touch terminals; the key technologies of the perception layer include: sensor technology, radio frequency identification (RFID) technology, GPS technology, two-dimensional code technology, wireless sensor network technology, wireless communication Technology, etc.; the network layer is in the middle layer of the architecture and is mainly responsible for the transmission, recall, storage, and processing of the collection of item attribute information. The network layer is composed of the access unit and the access network. Its key technologies include: mobile data communication (3G/4G) technology, wired network transmission technology, wireless network transmission technology, etc.; the application layer is at the top layer of the architecture and is mainly responsible for the control and application of all information and data transmitted. The application layer is mainly composed of IoT middleware and application platforms. Its key technologies include: M2M (machine-to-machine communication) technology, artificial intelligence technology, cloud computing technology, data mining technology, IoT middleware technology, etc.

3. Main Problems in the Development of Logistics Management Information System

The logistics management information system should comprehensively include multiple information management system modules such as enterprise resource management, distribution demand management, warehousing management, transportation management and cargo distribution. Its essence is that multiple subsystem modules work together to provide services. At present, the logistics management of many enterprises is still at the level of office automation and warehousing management informatization, and the functions of other logistics management systems are not perfect. The main reason for this problem is that the logistics enterprises are not investing enough in the hardware and software facilities of information construction, and the concept of information management lags behind. The lagging construction of logistics management informatization directly leads to the fact that logistics item information cannot be updated timely and accurately, and item attribute information cannot be transmitted and shared in the first time. There are many intermediate links in China's logistics industry, the supply chain is long, and the informatization level of each link is uneven, which cannot meet the information resource sharing needs of suppliers, enterprises, and customers, reducing the overall level of logistics information system operation. .

At present, the collection of logistics data by logistics enterprises is mainly completed by manually entering the number of each logistics node or scanning the barcode of the opposite order. Due to the large error rate of the manually operated data, and the need to repeatedly collect data when items flow through each logistics node, the error rate is further amplified, which leads to the long-term unresolved problems of logistics item damage and loss. At present, most logistics systems are not equipped with real-time monitoring of items during transportation. Once an item leaves the previous logistics node, its transportation status, transportation environment, and transportation location after the transfer to the next logistics node cannot be monitored. For ordinary customers, the inability to query the flow information of goods in real time will bring many inconveniences; for some special goods such as chemicals and dangerous goods, if logistics companies cannot monitor their relevant conditions during transportation in real time, it will increase The insecurity of society will limit the scope of logistics goods service.

4. The Impact of the Internet of Things on the Logistics Information System

The electronic label is the unique identification of the item, through which any item can be monitored, and any detailed information of the item can be shared using network database technology, shared with members and links of the supply chain, through the Internet of Things, logistics enterprises It can accurately track the logistics information of items, and accurately grasp the market supply and demand of items, especially real-time inventory information, in-transit

information, etc., which is important for improving the accuracy of information and eliminating the bullwhip effect in the logistics system effect. The characteristics of the Internet of Things can enable all the information of the items in the logistics to be shared, with the characteristics of traceability and traceability, so the logistics information system based on the Internet of Things is more comprehensive than the information of the items that have ever been mastered. Logistics companies participate in all warehousing, distribution, processing, packaging and other links in the supply chain, which is the basis for comprehensive access to logistics information, and the emergence of the Internet of Things allows all processes of item circulation to be monitored, and this monitoring is It is based on a single item, so the logistics information of the item can be obtained comprehensively. One of the advantages of the Internet of Things is the timeliness of obtaining information. Through the Internet of Things technology, GPS, and future cloud computing, managers can always grasp the real-time information of the items in the logistics, providing a basis for effectively managing the supply chain. Faced with the volatile market situation today, companies need to pay close attention to changes in the market and keep abreast of product supply information, and the traditional logistics management model has limited help for this. Through the logistics information system based on the Internet of Things, companies can overcome the traditional information communication model Obstacles, reduce delays in the dissemination of information, and timely and accurately transfer logistics information to a network database to support decision-making.

5. Technical Application of Logistics Management Information System and System Function Module Optimization

Optimized storage management function module. When an item is put into the warehouse, it can store the complete attribute information of the item by embedding an RFID technology electronic tag on the item. After the attribute information is recognized by the reader, the whole process of data sharing is realized through the network technology, which effectively reduces the repeated operation process of data entry in the intermediate logistics link, and reduces the error rate caused by the traditional manual operation of the warehouse. In the process of implementing the storage function, the traditional bar code recognition technology requires that the recognizer and the bar code can be recognized under the condition of close distance and relatively static, and the FRID tag allows a large recognition distance range and can be used in the dynamic transportation of items. To complete the recognition task. The application of this technology greatly improves the work efficiency of the article storage process.

Optimized storage management function module. In the warehouse management function module, through the integration of the Internet of Things technology and the original warehouse management module, intelligent warehouse management can be achieved. According to the FRID reader, the warehouse management information system selects the article storage area and location number according to the principles of automatic classification and automatic matching of the scanned article attribute information, and the freight management personnel can directly place the articles according to the system prompts. By allocating storage addresses systematically, it can effectively increase the utilization of storage space, reduce enterprise hardware investment, and increase enterprise logistics throughput. In addition, in the entire storage space, a storage sensor network formed by omnidirectional camera devices, temperature sensors, and humidity sensors can effectively monitor the situation in any corner of the storage space. If an emergency is found, the system will automatically alarm and handle, to ensure the safety of warehousing goods.

Outbound management function module optimization. In the outbound management function module, the existing logistics management information system has been able to automatically generate a delivery plan based on the delivery time and delivery purpose of the item. Since the logistics information system “intelligently” processed the storage location of the items in the early storage and storage, the picking operation was diluted in the outbound management module, which effectively saved human resources expenses. At the same time, on the basis of the Internet of Things technology, on the one hand, the outbound management can further scientifically and

efficiently automatically generate distribution plans based on more detailed item information; on the other hand, the FRID technology is used to quickly identify the item information when out of the warehouse, and improve the outbound work effectiveness.

Optimized transportation management function module. In the traditional logistics management system, the item information in transit cannot be returned to the logistics information system in time. In the optimized transportation management function module, the system will optimize the arrangement of vehicles according to the transportation needs of the goods. Before the departure of the truck, configure the vehicle with a GPS positioning device to track and monitor the real-time position and path of the goods during the transportation process. Customers need to query each truck's trajectory synchronously; combined with the skynet camera distribution network constructed by the municipal government, it can even realize video monitoring of each truck to ensure the standardization of the operation of the staff throughout the transportation process. The optimized transport management function module can greatly increase customers' trust in logistics services and improve the transparency of transport management.

Through RFID technology, EPC technology and Savant system, we provide special logistics (storage environment, transportation vehicles, transportation technology environment, GPS overall positioning) services for special items, we can provide close monitoring of external environments such as temperature and humidity for special items. The monitoring data and the background server data are updated synchronously. When the external environment is abnormal, the background server will turn on the temperature and humidity adjustment functions in the transportation auxiliary equipment to meet the environmental requirements of special items.

6. Conclusion

The development of technologies related to the Internet of Things is an important measure for my country's development strategy for emerging industries and industrial structure adjustment. The promulgation of the State Council's "Logistics Industry Adjustment and Revitalization Plan" provides important policy support for the development of logistics informatization. Therefore, the use of Internet of Things technology to upgrade and rebuild logistics information systems has become a national strategy. China's logistics informatization has ushered in a golden development period. The development of the Internet of Things has provided technical conditions and rare opportunities for the reconstruction and upgrading of logistics information systems. It has integrated advanced technologies of the Internet of Things into the new logistics management information system to overcome traditional information systems the weaknesses of the Internet of Things, taking advantage of the Internet of Things, can make logistics more efficient, lower cost, and significantly improve the service level. In the future, the logistics information system based on the Internet of Things will provide enterprises with more scientific logistics and supply chain management and provide important support for the development of my country's modern logistics industry.

References

- [1] Yan Fang, Liu Jun, Yang Xi. Research on my country's logistics informatization development strategy under the Internet of Things environment. *Business Era*, no. 4, pp. 30-31, 2011.
- [2] Zuo Bin, Yao Yao. Barriers. Influences and strategies of the Internet of Things in the logistics industry. *China Logistics and Procurement*, no. 9, pp. 68-69, 2010.
- [3] Shi Qijuan, Yu Tianyi. The new technology of EPC based on RFID leads the development of the supply chain. *Logistics Engineering and Management*, vol. 31, no. 2, pp. 71-73, 2009.
- [4] Dai Dingyi. Internet of Things and Intelligent Logistics. *China Logistics and Procurement*, no. 8, pp. 34-36, 2010.
- [5] Dai Dingyi. Talking about the Internet of Things and Intelligent Logistics. *China Logistics and Purchasing*, no. 23, pp. 36-38, 2010.