

# Research on Optimization of Logistics Management Information System Based on Internet of Things

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**Abstract:** With the further rapid development of social economy and the proposal of the development goal of modern industry 4.0, China's social development and industrial innovation have entered a new round of competition upsurge. China is one of the world's leading manufacturing and trading powers, which needs a strong logistics industry to support its massive manufacturing and trading system. Technological innovation of logistics industry also plays a crucial role in the transformation and development of related fields and industries. At present, the logistics industry is faced with many disadvantages, such as asymmetric information, unequal status, inconsistent standards and substandard environmental protection, which are difficult to eliminate, making the plight of the traditional logistics industry seriously, hindering its own healthy development [1]. Therefore, it is urgent to optimize and upgrade the existing logistics management information system.

## 1. Architecture and operation principle of the Internet of things

### 1.1 Architecture of the Internet of things

At present, the complete IOT system has not yet been formed, so it is urgent to promote the application of one or more industries and set a demonstration. Only after attracting more industries to adopt iot technology, can a relatively complete iot system be formed. In spite of this, the basic prototype of the Internet of things system has been formed through the efforts of various social forces. The Internet of things system is a system with obvious hierarchical structure. Generally speaking, a complete Internet of things system has the following three hierarchical structure functions:

#### 1.1.1 Perception and identification layer

As the core technology in the Internet of things, perception and recognition is the bridge between the real world and the information world. The sensing and identification layer is generally composed of hardware devices, including various types of wireless sensor networks, radio frequency identification (RFID), ZigBee self-organizing multi-hop network and other information automatic acquisition equipment, and also assisted by artificial intelligence information acquisition. Radio frequency identification (RFID) is a technology to realize the self-speaking of items: the RFID tag contains both normative and universal information, which is automatically collected into the central information system by connecting with the corresponding wireless communication network to realize the identification and supervision of items [2].

#### 1.1.2 Network transmission layer

The main function of the network transport layer is to connect the relevant system equipment of the perception and identification layer, form a complete data transmission link, and provide services for the topmost comprehensive application layer. The existing Internet or even the next generation Internet is the basic network of the Internet of things, while the various types of wireless networks on the edge provide network access services anytime and anywhere. Coordination among various networks is the prerequisite for information exchange and transmission in the Internet of things.

### **1.1.3 Comprehensive application layer**

At the very beginning, the design goal of the Internet was to realize the information transmission between computers. With the continuous update and iteration of computer technology, the Internet is moving towards the goal of interconnection of things, except for human being as the main user. With the advent of the Internet of everything era, network applications have also undergone fundamental changes. From the early data service as the main characteristics of data transmission, E-mail, to user-centered applications, such as the Internet, E-mail, online video, online games, network culture, etc., in the development of goods positioning, environmental awareness, intelligent community, intelligent campus. The number of network applications is increasing exponentially, showing the characteristics of diversification of forms, industry scale and field industrialization.

In a word, the relationship between the three-layer architecture of the Internet of things is as inseparable as the human body structure.

## **1.2 Operation principle of the Internet of things**

### **1.2.1 M2M technology**

At present, the industry generally believes that M2M technology is the key to the realization of the Internet of things. The original meaning of M2M technology is the abbreviation of machine-to-machine communication, which refers to all the technologies and means to establish communication connection between people, machines and systems. In a broad sense, it also refers to the connection and communication between people and machines, machine-to-person and mobile network.

M2M is the integration of wireless communication and information technology and is used for two-way communication. Therefore, it is widely used. It can be combined with GSM, GPRS, UMTS and other long-distance communication technologies, WLAN, bluetooth, ZigBee, RFID and other short-range communication technologies.

### **1.2.2 Wireless perception is a technology that connects things**

Wireless perception is a technology that connects things. In other words, the Internet of things can comprehensively perceive objects through the coordination and fusion of multiple sensors of different types. Although this communication technology is called sensor network, its key influence and value is neither the network itself nor the sensing unit, but the object to object perception technology which can achieve a variety of ways of synthesis and judgment.

## **2. IOT (internet of things) technology application of logistics management information system**

Under the tide of industrial informatization and industrial structure adjustment, the traditional logistics management information system has been unable to meet the market demand. The application of IOT technology in logistics industry has its natural attribute advantage and plays an indispensable role in the industrial upgrading of logistics management information system. The relevant technical applications of the Internet of things in the logistics industry are as follows:

### **2.1 Radio frequency identification (RFID) technology**

Radio frequency identification (RFID) technology USES radio frequency signals to realize contactless information transmission through spatial coupling (alternating magnetic field or electromagnetic field) and achieve the purpose of automatic identification through the transmitted information. RFID technology started late, so there is still no unified international standards, but RFID technology will greatly improve the efficiency and accuracy of information processing because of its strong advantages, it is a revolution for automatic identification technology.

#### **2.1.1 Radio frequency identification (RFID) system elements**

Generally speaking, RFID system consists of five components, including transmitter, receiver, microprocessor, antenna and tag. Among them, the transmitter, receiver and microprocessor are

usually packaged together, also known as the collective reader. RFID's working mode is similar to that of radar. Firstly, the reader broadcasts electronic signals through the antenna, and then the tag receives the signals and sends out the internal stored identification information. Then the reader receives and recognizes the information sent back by the tag through the antenna, and finally the reader sends the identification information to the server to complete a working dialogue.

### **2.1.2 Collaboration between RFID technology and logistics management information system**

Warehouse management system as an important subsystem of logistics management information system, with the integration of RFID technology, its informatization, automation level has been constantly improved, the efficiency of operations has also been greatly improved.

RFID technology as a new generation of bar code technology after recognition technology are profoundly affecting the logistics management with characteristics of quick scan, barrier-free reading, reusable, large capacity, high security and so on. It also can realize standardized and highly efficient logistics warehouse operation with its rapid, real-time, accurate information acquisition and processing. The application of RFID in the existing warehouse management is the acceptance of the arrival of the goods, such as inventory, mobile, dispatch operation of goods, quantity, location, carrier and so on the real-time automatic collection and processing of information, and through the information interaction with WMS, the next step at the scene of the operation of the operating instructions and execution effect check, so as to improve the efficiency and accuracy of line operation, realize intelligent, automated management of logistics warehousing.

Through the application of RFID technology, in the logistics management information system can achieve the following goals: (1) visual management of goods, shelves and handling tools in the warehouse to accelerate the process of enterprise informatization and improve customer service level. (2) To achieve storage, storage, inventory, picking transportation and other links of complete automation, reduce the inventory level, improve the inventory management ability. (3) increase the visualization of the supply chain, improve the adaptability of the supply chain.

### **2.2 Wireless sensor network (WSN) technology**

Wireless sensor network is a network formed by a large number of low-cost sensor nodes with sensing, data processing and wireless communication capabilities through self-organization. It is independent of the base station or mobile router and other infrastructure communication, through the distributed protocol network. Wireless sensor network integrated sensor technology, embedded technology, distributed information processing technology, through all kinds of integrated micro sensor collaboration to real-time monitor, sense and collect all kinds of environmental or monitoring object information, the information is sent by wireless way, and with the group more jump way of network transmission to the user terminal, so as to realize the physical world and information world and human society three yuan the connected world.

### **2.3 Wireless network communication technology**

All kinds of sensing technology, communication technology, wireless technology and network technology jointly constitute the intelligent network with the Internet of things as the core. Wireless communication network technology is an important part of supporting the operation of the Internet of things and the key to the development of iot applications.

Classification of wireless communication networks

Kinds of the wireless communication network division, in the process of using different classification based on and finally get the result is a certain difference, the division of one of the most common way is by it's based on the difference of transmission distance, the existing wireless communication network can be divided into four categories, respectively: wide area network, metropolitan area network, a domain network, local area network (LAN). Different networks have their own merits and different application scenarios. Appropriate deployment modes should be selected according to the application requirements in order to achieve the optimization of network utilization.

### **3. Countermeasures for optimization of logistics management information system**

#### **3.1 Increase the information construction of logistics management information system**

Logistics informatization refers to that logistics enterprises which are based on business process reorganization, it widely use modern logistics information technology, control and integrate all the information of logistics activities, therefore, realizing the sharing and effective use of internal and external information resources, and improve the economic benefits and core competitiveness of enterprises. Logistics informatization is manifested as: logistics information commercialization, logistics information collection database and code, logistics information processing electronics, logistics information transmission network, standardization and real-time, logistics storage digitalization [5].

#### **3.2 Strengthen the standardization construction of logistics management information system**

Logistics standardization is the foundation of logistics modernization. Logistics standardization is also the plan of logistics to develop for hundred years which has great practical significance and far-reaching historical significance. Drawing on the successful experience of developed countries and combining with the reality of China's logistics, this paper puts forward the logistics operation norms that meet China's actual needs and guides and promotes the development of China's logistics industry in a standard form.

#### **3.3 Strengthen the information security construction of logistics management information system**

Logistics enterprises should also attach great importance to the security of information. It is suggested that logistics enterprises should construct complete RFID technology encryption transmission function, data communication dynamic authentication function, upper data transmission encryption technology function and so on, and adopt special system security measures in different workflow and logistics links. The information security of Internet of things technology has been a hot topic for scientists.

### **4. Conclusion**

As the internet of things has developed rapidly in the world, our country is carry out the layout of the internet of things after realising it can be a huge industry chain and cluster, what's more, it also provides an ideal condition for its practice in the policy tilt and favorable fiscal tax subsidies for internet company and research institutes, this means that the industrialization of China's Internet of Things will be on the right track. At the same time, as the largest logistics system among all countries and regions in the world, China has laid a more solid foundation for China's logistics and trade power with the full integration of Internet of things technology and modern logistics.

In a word, nothing cannot be accomplished overnight. We should look at emerging things with the perspective of development. The integration of iot technology and logistics management information system is the only way for the sustainable development of logistics industry. The development of science and technology is changing with each passing day, and the technical problems will be solved with the progress of science and technology someday which cannot be solved before.

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