Research on Smart Logistics Model Based on Internet of Things Technology

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ABSTRACT Logistics industry is an important part of national economic and social information. The construction of information platform based on the Internet of Things and cloud computing has become the goal and direction of the development of the smart logistics park. In view of the shortcomings of the current logistics system, this paper takes a logistics park as an example and puts forward the planning plan for the construction of the information platform of the intelligent logistics park. Based on the research on the current situation of information construction and the information needs of logistics park, the demand analysis and system framework design of intelligent logistics information system based on the Internet of Things are carried out. The design scheme realizes the functions of intelligent analysis, perception, optimization of decision-making and efficient execution of logistics park. Through the analysis of the system test and user trial feedback information, it is shown that the intelligent logistics information system based on the Internet of Things is designed to have good application effect.

INDEX TERMS Smart logistics, the Internet of Things, information platform, cloud computing.

I. INTRODUCTION

With the in-depth development of Internet technology, the attention of smart logistics has gradually increased, and has been regarded by the industry as one of the inevitable trends in the future development of logistics [1], [2]. Under the background of e-commerce and “Internet +”, traditional logistics companies and logistics parks have explored the road of intelligent transformation. The wisdom of the smart logistics model is mainly reflected in the wisdom of management and service methods, and the construction of a public information platform to meet the information needs of different users [3]. Therefore, the logistics information system cannot be isolated or static, but needs to dynamically participate in the information exchange of external systems to achieve data exchange and information sharing.

In recent years, researchers at home and abroad have carried out a large number of research and application discussions on logistics informatization, which has promoted the process of logistics informatization. Mats Ahrahams-on and other scholars described and defined the logistics information platform in the article “Improving Strategic Capabilities through Logistics Information Platform” [4]. Scholars such as Shoshanah Cohen pointed out that the logistics park information platform is mainly connected to the government service system after construction by the enterprise, and is divided into a public information platform, a logistics information platform and a logistics information technology service provider platform [5]. K.L.choy and other scholars studied and evaluated the overall construction and module functions of the logistics park information platform [6]. Andrzej and other scholars believe that the logistics park information platform can solve the dynamic routing problem more intelligently and provide accurate decision-making basis for logistics operators [7]. Scholars such as Bill Karakostas proposed an intelligent transportation tracking system based on the Internet of Things technology, and conducted a case study on its effectiveness [8]. Scholars such as Paulo proposed that the Internet of Things technology creates a practical platform for intelligent warehouse management, and pointed out that the focus of the construction of an information platform based on the Internet of Things technology is radio frequency identification, pervasive computing and multi-agent systems [9].

However, the existing logistics informatization system still has problems such as information islands. How to find a way to achieve information interconnection and interoperability, intelligent analysis, and intelligent decision-making functions in all aspects of logistics is a hotspot of current research [10], [11]. The concept of smart logistics park information
platform has been mentioned many times in the logistics industry, but there is little research on its dynamic planning and construction. Therefore, this paper takes a logistics park as the research object, promotes the construction of the intelligent logistics information system based on the Internet of Things, and explores the construction process of the intelligent logistics park supported by the Internet of Things.

II. RELATED TECHNOLOGY OVERVIEW

A. INTERNET OF THINGS

The Internet of Things (IOT) is an extension of the Internet. It includes all resources of the Internet and the Internet, and is compatible with all applications of the Internet [12]. The Internet of Things technology uses local network or Internet and other communication methods to connect sensors, controllers, machinery equipment, personnel and materials, etc. to form a connection between people and things, things and things, and realizes an information, remote management control and intelligence network of. The Internet of Things has two meanings: First, the core and foundation of the Internet of Things is still the Internet, but the expansion and extension of the Internet; Second, the user end of the Internet of Things is expanded to exchange and communication of information between any items [13]. In recent years, the Internet of Things has gained widespread attention in academia and industry. The academic research on the Internet of Things has been continuously deepened, and some new Internet of Things products and services have been introduced to the market.

According to its function allocation, the logistics network can be divided into 5 layers: perception layer, access layer, network layer, support layer and application layer, as shown in Figure 1. The perception layer mainly completes data collection, generally including sensors, RFID tags, cameras and other equipment. The access layer mainly transfers the collected data to the transmission network, such as broadband cable network, satellite network, and some wireless networks such as 3G network, 4G network, WIFI network, etc. [14]. The network layer mainly completes the long-distance transmission of data, and is generally composed of various private networks, the Internet, or cloud computing platforms. The main task of the support layer is data processing. The application layer is the interface between the user and the Internet of Things. It has to serve the industry and meet the needs of the industry, and realize applications such as intelligent transportation, intelligent logistics, and intelligent environmental protection.

Radio frequency identification (Radio Frequency Identification, RFID) technology, also known as radio frequency identification technology, is a communication technology that can read data and identify it through radio signals without optical or mechanical contact with the target or system specific goals [15]. According to the frequency band, it can be divided into several technologies such as low frequency, high frequency, ultra-high frequency and microwave. Unlike barcode scanning, RFID uses frequency signals to transfer information from RFID tags to RFID readers. Radio frequency identification technology has the characteristics of fast scanning, miniaturization, diversified shapes, strong anti-pollution energy and durability, reusability, strong penetration and barrier-free reading, and large data memory capacity. Radio frequency identification technology has a wide range of applications in radio frequency access control, electronic traceability, food traceability and product anti-counterfeiting.

B. SMART LOGISTICS TECHNOLOGY

Smart logistics refers to a logistics distribution network system that integrates informatization, intelligence and systemization by using the Internet of Things technology and information technology. It mainly uses high-tech and modern management methods to achieve high efficiency and
low efficiency of the logistics distribution system. Intelligent operation of costs [16]. With the proposition of “smart earth” and the continuous deepening and development of “smart” concept research, wireless networks, radio frequency identification technology (RFID) and sensor technology, as well as high-tech technologies such as laser technology, coding technology and satellite positioning provide smart logistics Technical support and guarantee [17].

Smart logistics generally has functions such as perception, optimal decision-making and intelligent feedback [18]. (1) Sensing function, using high-tech technologies such as radio frequency identification, infrared and satellite positioning, to obtain and store data and information in various links in the packaging, warehousing, vehicle and logistics distribution processes in real time, to achieve tracking of target objects in the entire business process, Positioning and other perception functions have initially completed perception wisdom. (2) Decision-making function, applying data mining and information processing technology to logistics management and distribution systems, through data mining and analysis of logistics data, customer needs and commodity inventory and other information data to calculate and decide the optimal storage location and distribution path, To realize the intelligentization of logistics storage and distribution decisions [19]. (3) Feedback function. In the logistics business process, both the distribution system and the consignee need to know the distribution information such as the location and status of the goods in real time, and provide real-time logistics operation status to customers and managers through infrared, perception network and logistics management system. Information feedback to realize information feedback in every link of the intelligent logistics architecture system.

C. DATA PROCESSING ALGORITHM
Logistic Regression (LR) is a binary classification model widely used in the industrial field. On the basis of linear regression, a layer of Sigmoid function mapping is added to the mapping of features to results to predict the value. Limited to [0, 1], you can output probabilities of different categories. The probability \( p(y = 1|x, \theta) \) represents the probability that \( y \) belongs to 1 given the characteristic variable \( x \), and \( h_\theta(x) = p(y = 1|x, \theta) \), then there is a logistic regression model:

\[
h_\theta(x) = [1 + \exp(-\theta^T x)]^{-1} \tag{1}
\]

In which, \( \theta = \{\theta_0, \theta_1, \cdots, \theta_p\} \) represents the coefficient value corresponding to each feature, \( \theta \) value It can be obtained by solving the maximum likelihood estimation function. Assuming that each sample in the data set is independent of each other, the likelihood function:

\[
l(\theta) = \prod_{i=1}^n [h_\theta(x_i)]^{y_i} \cdot [1 - h_\theta(x_i)]^{1-y_i} \tag{2}
\]

Let \( x \) be the input n-dimensional feature variable, the set \( y \in \{c_1, c_2, \cdots, c_n\} \) is the input category, \( X \) is the random variable on the input space, \( Y \) is the random variable on the output space, the combination of \( X \) and \( Y \). The probability distribution is \( P(\chi, \gamma) \), and \( P(\chi, \gamma) \) independently and identically generates the training data set [29]:

\[
T = \{(x_1, y_1), (x_2, y_2), \cdots, (x_N, y_N)\} \tag{3}
\]

So available:

\[
P(\gamma = c_k|x) = \frac{P(\chi = x|\gamma = c_k)P(\gamma = c_k)}{\sum_{k=1}^K P(\chi = x|\gamma = c_k)P(\gamma = c_k)} \tag{4}
\]

The conditional probability has made the construction of conditional independence, namely:

\[
P(\chi = x|\gamma = c_k) = \prod_{j=1}^n P(\chi^{(j)} = x^{(j)}|\gamma = c_k) \tag{5}
\]

Bring Equation 6 into Equation 5 to get the basic formula, which means the probability of the output category \( \gamma \) given the instance \( x \).

\[
P(\gamma = c_k|\chi = x) = \frac{\prod_{i=1}^n P(\chi^{(i)} = x^{(i)}|\gamma = c_k)P(\gamma = c_k)}{\sum_{k=1}^K P(\chi = x|\gamma = c_k)\prod_{i=1}^n P(\chi^{(i)} = x^{(i)}|\gamma = c_k)} \tag{6}
\]

In practical application, when classifying feature instances, we choose the one with the largest probability value as the final category, which can be formalized as formula 4.

\[
y = f(x)
\]

\[
y = \arg\max \frac{\prod_{i=1}^n P(\chi^{(i)} = x^{(i)}|\gamma = c_k)P(\gamma = c_k)}{\sum_{k=1}^K P(\chi = x|\gamma = c_k)\prod_{i=1}^n P(\chi^{(i)} = x^{(i)}|\gamma = c_k)} \tag{7}
\]

III. DEMAND ANALYSIS OF INTELLIGENT LOGISTICS INFORMATION SYSTEM

A. USER STRUCTURE ANALYSIS OF SMART LOGISTICS INFORMATION SYSTEM

The construction of smart logistics information platform should comprehensively consider the needs of users at different levels, continuously expand the coverage of the information platform, and build it into a public information service platform. Through investigation and analysis, the user structure of the intelligent logistics information system is as shown in Figure 2.

B. ANALYSIS OF FUNCTIONAL REQUIREMENTS OF SMART LOGISTICS INFORMATION SYSTEM

The purpose of the construction of the logistics park platform at this stage is to make better use of advanced technologies such as the Internet of Things, big data, and cloud computing. Accumulate data through the platform, promote the intelligent transformation and upgrading of the logistics park, and finally form a big data system to support the park’s decision-making [20]. According to the analysis of the needs of different service objects for the information platform, the logistics park platform is mainly composed of two parts:
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FIGURE 2. User structure of smart logistics information system.

park internal control management and public information service platform.

Park internal control management platform: the logistics park internal management information platform is for customers who are internal managers of the logistics park, and its service departments include asset management, financial management, enterprise management, warehousing center, distribution center, park property, community property, information center, Human resources management and other park management departments. Public information service platform: The main function of the public information service platform is to provide an information communication bridge for all parties involved in the operation of the park through the module function system to solve the problem of information asymmetry.

Its business segment includes two major parts: business common modules and public information services. Common business modules include: TMS, WMS, order management module; public information services include: customer registration, contract signing, contract management, online payment, park distribution map query, advertising release module, government services, property services, financial services, Insurance processing and other value-added services [21]. The park’s internal control platform and public information service complement each other. The internal control platform supports the normal operation of the public information service platform. The public service platform provides business data and decision support for the park’s internal control platform, and together forms a public information service platform. The functions are divided into three levels: basic functions, core functions, and extended functions. The schematic diagram is shown in Figure 3.

1) BASIC FUNCTIONS
Information service for park-resident customers. The public information platform can provide integrated services for park-resident customers including member registration, qualification review, contract signing and management, online payment, property management, infrastructure repair and service feedback, etc. The basic needs for settlement ensure humanized management.

Information release function. This function is mainly used for the platform’s public information service. It includes information such as industry policies, industry dynamics, logistics indicators, industry conference dynamics, logistics bidding, and adaptive decision-making schemes. It can also release dynamic scrolling information such as investment advertisements and company introductions for registered members.

Security monitoring function. Integrate the existing monitoring system on the platform, optimize the monitoring algorithm, and realize the dynamic and intelligent monitoring of movable property, real estate, personnel, vehicles and goods in the park 24 hours a day.

2) CORE FUNCTIONS
Smart transportation supervision service. This function can analyze specific data in real time according to order placement, realize real-time tracking of vehicles and goods, and intelligently plan transportation routes, and adjust the optimal route in real time according to road conditions to optimize transportation resources [22], [23].

Smart warehouse management. This platform can provide warehouse management functions for warehouse rental users, and can also provide interfaces to existing management systems to achieve supply chain integration. Use big data analysis technology to analyze the warehousing information year by year to provide tenants with lean warehousing management services.

Car and cargo matching function. Through the information platform, the logistics service demand side and the logistics service provider can be bridged and exchanged, and the capacity information and logistics demand information can be released in real time to solve the problem of asymmetric
information between the two parties. And according to the usage habits of platform users, analyze their demand-oriented, push related services, reduce the retrieval process and improve the matching rate. Decision analysis function. The information platform accumulates a large amount of data through real-time public services, and eventually forms a big data system under good operation. By establishing a mathematical model for data analysis, it can be used by different decision makers for reference.

3) EXTENDED FUNCTIONS
Government affairs coordination service. The public information service platform of the logistics park can open management interfaces with relevant government departments such as industry and commerce, taxation, transportation, traffic police, etc., and provide services such as policies, regulations, and industry standards.

Financial service function. The establishment of the logistics financial system can ensure the smooth progress of the logistics business, and connect the banking business system and the insurance company business system through the public information service platform of the logistics park [24]. Other park services. The interconnection of logistics parks to achieve information sharing is the future development trend. Through the docking of the logistics information platform interface, to achieve organic linkage with other parks.

IV. DESIGN AND IMPLEMENTATION OF INTELLIGENT LOGISTICS INFORMATION SYSTEM
Doing a good job in the overall planning and design of the construction of a smart logistics information platform is a prerequisite for ensuring that the platform construction can be implemented. This section mainly studies the goals and principles of smart logistics information platform construction, and designs its overall architecture, introduces the Internet of Things, cloud computing and big data analysis technologies to realize the inflow of information flow and capital flow of the information platform and Subsequent intelligent data processing functions.

A. SYSTEM DESIGN GOALS
The logistics park as a whole realized cost reduction and efficiency increase. Through the operation of the intelligent logistics park information platform, the efficiency of integrated business operations in the logistics park has been improved, and the cost of business management has been reduced.

Promote standardization. The operation of the information platform will guide the enterprises in the logistics park to use the predecessor logistics technology, exchange experience between enterprises, and make information exchange and sharing smoother through standard formulation, thus forming industry-binding technical standards.

Build a regional smart logistics information platform. Give the platform “wisdom” through cutting-edge technology, with self-detection and feedback capabilities, so that customers experience the convenience and speed brought by technology. The platform data collected by the Internet of Things technology is imported into the database to meet the information needs of different customers [25], [26].

B. SYSTEM ARCHITECTURE DESIGN
In order to complete the design of the intelligent logistics information system based on the Internet of Things, this article deeply integrates the Internet of Things, cloud platform and intelligent logistics system by integrating multiple communication technologies to optimize the user experience. In order to realize the development of the intelligent logistics information system based on the Internet of Things, this article uses the IoT-based IoT platform and the OpenStack-based private cloud platform [21]. The entire architecture consists of the access layer, data processing layer, platform layer, application layer, and experience layer. The cloud service layer is composed of a cloud service support sublayer and a cloud service application sublayer. A typical architecture of cloud fusion IoT for specific applications is given.

The cloud platform in this article is mainly responsible for the cleaning processing and data storage of logistics data. The cloud platform is based on the network topology of the cloud platform. Use IoT sensors to collect logistics process data, which can interact with the cloud platform in real time.

1) ACCESS LAYER
The access layer can also be called the data collection layer, and its role is to obtain data through various data
collection methods. Through the access layer, dynamic information on the status of vehicles and goods can be collected. Through continuous data collection, data accumulation is realized, which lays the foundation for big data mining [27].

2) DATA PROCESSING LAYER
The data layer is an important part of the smart logistics information platform. The access layer uses the massive unprocessed data collected by the Internet of Things technology to transmit to the data layer through the optical fiber network cable. The data is processed and classified into different databases for storage management. In addition, the data layer can use external interfaces to introduce data from external systems (including logistics companies, banks, insurance, government, etc.), and use data exchange technology to achieve data exchange and sharing, thereby enriching database data accumulation [28]. The data layer also uses a variety of advanced cloud computing data processing technologies to dig deep into the data and pave the way for data decision-making applications.

3) PLATFORM LAYER
The platform layer mainly completes system integration and data processing. The platform layer needs to use technical means to integrate the existing information systems of various departments, and perform deep self-configuration processing of the data collected by various subsystems, and complete deep data processing and storage through database servers and large enterprise-level databases [29]. The platform layer combined with the data layer can complete the main data processing of the information platform, and can realize data filtering, exchange, analysis, and mining between various systems to support the application needs of different users at the application layer. At the same time, this layer is responsible for the regular maintenance of the system, data encryption and security protection.
4) APPLICATION LAYER
The application layer is the user-oriented service layer. The intelligent logistics park information platform designed in this paper consists of two sub-platforms: the park’s internal control management platform and the external public information service platform. The internal control management of the park is the auxiliary function area of the information platform, mainly for the information and intelligent management of the logistics park. The external public information service platform includes: Intelligent Transportation Management System (TMS), Intelligent Warehouse Management System (WMS), and Public Information Service System.

5) EXPERIENCE LAYER
The experience layer can more intuitively express the intelligent services of the intelligent logistics park information platform, allowing social users and the decision-making layer of the group to show the operating status of the system. Users can access the service platform and experience smart services through computer websites, mobile APP applications, large screens in dispatch centers, information centers, and terminal experience devices.

C. SYSTEM DATA CENTER
The dense data center established by the intelligent logistics information system further ensures the stability of the system and the need for further processing of the required data. A disaster preparedness center, two data centers, and two production centers constitute the system’s information assurance system. The disaster preparedness center consists of one EMC CX700 disk array and two IBM P650. The system consists of a data support center consisting of a data production area, a data exchange area, and a final decision area. The data generation area of the center includes the data accumulation of Hui Logistics Information System. The decision-making area of the center refers to the macro decision-making information database that can generate conventional statistical tables and sample surveys. The above information database can cover the most comprehensive data and information of the system. Using the above database for data analysis, mining and other operations, a more accurate and effective data model can be obtained, thereby providing effective suggestions for the development and reform of smart logistics informatization.

V. SYSTEM APPLICATION TEST AND EVALUATION
The above describes the design and implementation of a smart logistics information system. In order to verify the feasibility and efficiency of the intelligent logistics information system based on the Internet of Things proposed in this paper. We built a cloud platform server based on OpenStack and an IoT system based on Arduino, and will perform functional tests on the system to analyze and verify the practicability and efficiency of the system. The cloud platform is mainly responsible for the cleaning processing and data storage of logistics data, and the cloud platform is built according to the cloud platform network topology. In order to realize the real-time interaction between sensor data and cloud platform, using IoT sensors to collect logistics process data, a smart logistics information system based on IoT was built.

A. SYSTEM TEST ENVIRONMENT
When testing the intelligent logistics information system, the configured test environment is shown in Table 1. In addition, the application server and the database server all use the Inter L5520 type CPU, Centos-6.5 system, the database is MySQL 5.5.28, and the mobile client uses the normal IOS operating system.

B. SYSTEM FUNCTION TEST
After the realization of the intelligent logistics information system, the system function test is first carried out. The test results show that the system can meet the needs of logistics transportation. The main test examples are shown in Table 2. Among them, the main functions of smart logistics information system registration, login, user review, user group management, user rights configuration, user role configuration, Internet of Things system, cloud platform system, etc. are tested. The test results show that the intelligent logistics information system has been able to operate normally and carry out business processing operations.

C. SYSTEM PERFORMANCE TEST
In the process of system design, multiple data security mechanisms are adopted to ensure reliable data transmission. On the one hand, while the logistics data is transmitted in real time through the Internet of Things to the cloud platform, the data is stored locally in the short term. On the other hand, when a small amount of data is lost, you can start

### Table 1. Test environment of intelligent logistics information system.

| Test Environment | Database Server | Application Server | Client       |
|------------------|-----------------|--------------------|--------------|
| CPU              | Inter L5520     | Inter L5520        | IOS A13      |
| RAM              | Kingston 2g      | Kingston 2g        | 4g           |
| Operating System | Centos-6.5      | Centos-6.5         | IOS          |
| Middleware       | Apache Tomcat 7.0.79 |                |              |
| Database         | MySQL 5.5.28    |                    |              |
the instant retransmission mode, that is, when data packet loss occurs, the system starts the instant data retransmission mechanism, without affecting the real-time data transmission, the real-time transmission gap will be lost the data is sent back to the data server. When the network is disconnected for a long time or the network signal is poor resulting in a large amount of lost data that cannot be transmitted in real time, the system will issue an alarm prompt.

In the process of system performance testing, the two indicators of system response time and packet loss rate are used to test the concurrent performance of the system and the performance of responding to customers. Limited to the network environment and server performance has a greater impact on performance indicators. The network environment during the test was selected as the internal network, and the server was a stand-alone server with a brand-new system

| Test Items                  | Test Input                          | Test Output                      | Test Results | Remarks |
|-----------------------------|-------------------------------------|----------------------------------|--------------|---------|
| System registration         | Enter legal data                    | Registration success             | Registration success | ✓       |
| System registration         | Illegal input data                  | Registration failed              | Registration failed | ✓       |
| System login                | Legal                               | Login successful                 | Login successful | ✓       |
|                            | Username, password                  | Login failed                     | Login failed | ✓       |
| System login                | User name and password are illegal  | Login failed                     | Login failed | ✓       |
| User group permission       | Configure user                      | User has the appropriate         | Permission   | ✓       |
| configuration               | Group permissions                   | permissions                      | Configuration succeeded | ✓       |
| User review                 | User information is legal           | Successful review                | Successful review | ✓       |
| User group management       | Addition and                        | Database user                    | Functioning normally | ✓       |
|                            | Deletion of users                   | Data changes                     |               |         |
| Mobile management           | Mobile                              | Database Corresponding           | Successful Management | ✓       |
|                            | Information Change                  | Information Change               |               |         |
| IoT system management       | IOT system                          | Database Corresponding           | Successful Management | ✓       |
|                            | Information Change                  | Information Change               |               |         |

**TABLE 3. Data transmission reliability test results.**

| Serial number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------------|---|---|---|---|---|---|---|---|---|----|
| Device ID     | 8 | 16| 20| 28| 35| 42| 56| 64| 71| 80 |
| Running time / h | 25| 24| 23| 26| 27| 23| 25| 26| 28| 22 |
| Total number of packages | 48313 | 47895 | 48923 | 48766 | 48788 | 47570 | 46036 | 46786 | 47591 | 48136 |
| Number of lost packets | 73 | 89 | 65 | 95 | 85 | 18 | 88 | 127 | 76 | 83 |
| Successful retransmission packets | 73 | 89 | 65 | 95 | 84 | 18 | 88 | 127 | 76 | 83 |
| Retransmission failed packets | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Packet loss rate | 0.15% | 0.19% | 0.13% | 0.19% | 0.16% | 0.04% | 0.19% | 0.27% | 0.16% | 0.17% |
| Retransmission success rate | 100% | 100% | 100% | 100% | 99.90% | 100% | 100% | 100% | 100% | 100% |
| Maximum number of retransmissions | | | | | | | | | |
and a cluster with two stand-alone servers. It can be seen from the test results that the packet loss rate of wireless data transmission is <0.1%, and 99% of the packet loss data can be retransmitted successfully. Only device No. 5 has a low battery power when the packet is lost, and one data packet is not turned on due to device shutdown. Can successfully resume. After the device is turned on next time, the data can still be retransmitted successfully, thus ensuring the integrity of the data.

D. SYSTEM TRIAL FEEDBACK

In order to verify the reliability of the parameters of the system in actual use, we have organized various types of system tests. Take a logistics enterprise trying out the intelligent logistics information system to use feedback as an example to analyze the effect. We collected the evaluation data of the company’s use of the system’s different businesses within 2 months, including data on changes in customer dispute cases and revenue changes for some of the company’s logistics products.

As shown in Figure 5, after the trial of the intelligent logistics information system, the revenue of some of the company’s logistics products rose significantly within two months. Among them, products 1 and 2 have increased by more than 20%. It shows that after the system establishes a smart logistics information system based on the Internet of Things, good logistics services and experience effectively improve the sales and revenue of corresponding products.

As shown in Figures 6 and 7, after the trial of the intelligent logistics information system, the number of disputes related to logistics products has been greatly reduced within two months. This shows that the increase in customer satisfaction with the purchase of related products helps to increase the credibility and sales of related logistics products. Through the investigation of user satisfaction, due to the intuitive and efficient characteristics of the system, user satisfaction has been improved in a short time, which is conducive to the further development of the logistics industry informatization process. The planning scheme of the intelligent logistics park information platform will also provide a reference for the future development of similar intelligent logistics park information systems.

VI. CONCLUSION

This paper studies the smart logistics model based on the Internet of Things. The system uses a combination of Internet of Things and cloud platform technology, collects logistics signals in real time, and interacts with the cloud computing platform through Internet of Things technology for data processing and data analysis. The actual case test and analysis illustrate the good effect of the realized intelligent logistics information system, which can provide a scientific reference model and basis for establishing a remote real-time dynamic logistics information system using Internet of Things and other technologies. In addition, this article mainly analyzes the application of technologies such as the Internet of Things, cloud computing, and big data analysis. The application of the technology in the information platform of the smart logistics park needs to be deepened and studied at the data mining level. Focusing on the increasing and deepening demand
for the logistics industry in the future social development, we will continue to tap and improve existing smart logistics technologies to provide scientific assistance for improving the Informa ionization of the logistics industry.

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