Research on Smart Logistics Public Information Platform Based on Internet of Things Technology

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Abstract. Promoting the construction of IoT infrastructure in the city through the intelligent logistics public information platform, reducing the application cost of information technology and IoT technology for SMEs, aiming at improving the capacity and efficiency of urban logistics services, with data as the core, information Based on security, it provides reliable, efficient and real-time logistics information services to achieve optimal allocation of social resources.

Introduction

The State Council's "Logistics Industry Reconstruction and Revitalization Plan" proposes that the speeding up of the development of modern logistics industry should be "supported by advanced technology, logistics integration and informationization as the main line", and "improving the level of logistics informationization" as a major task. "Logistics Public Information Platform Project" is a key project to improve the level of logistics informatization. It is to solve the low level of informatization in the logistics industry and the poor communication between upstream and downstream enterprises in the supply chain, which leads to the low level of development of China's logistics industry and high-cost logistics in all society [1]. In addition, it is to establish the cornerstone of a modernized logistics service system that is socialized, specialized, and informatized. It plays an important role in promoting industrial restructuring, transforming economic development methods, and enhancing national economic competitiveness.

This paper proposes to develop the intelligent logistics public information platform, promote the construction of the Internet of Things infrastructure in the city, support the unification and standardization of government and enterprise logistics information, and realize real-time and reliable information interaction between government, logistics service enterprises and industrial and commercial enterprises. At the same time, it also aims at taking advantage of the Internet of Things, improving urban distribution efficiency and supervision, effectively reducing logistics and distribution costs, and achieving optimal allocation of social resources [2].

Feasibility Analysis

Integrate Existing Logistics Information Resources, Avoid Redundant Construction, and Promote the Modernization Process of Urban Circulation

The current situation of urban logistics informatization in China is the lack of unified planning. As a result, the format of various logistics information data is not standardized, and it is impossible to interconnect and waste a lot of resources. Unified planning of the function and construction framework of the intelligent logistics public information platform, integrating existing logistics information resources, fundamentally improving the status quo of urban logistics information construction, saving investment and speeding up construction progress, and contributing to the overall performance of the urban logistics system advantages, strengthening the coordination of all aspects of logistics, breaking the barrier generated by the division of logistics management, and providing support and guaranteeing for the rapid development of urban logistics industry. Moreover, the construction of the public information platform for logistics will promote the informationization process of logistics enterprises in Guigang as a whole and improve their competitiveness [3].
Reduce Logistics Service Costs, Provide Diversified Logistics Services, and Improve the Investment Environment

Through the intelligent logistics public information platform, logistics companies can publish, query and receive logistics operation information. This will help improve the transparency of the operation of various logistics operations, reduce the logistics information exchange, shorten the cycle of logistics operations, and greatly improve the efficiency and performance of logistics enterprises. On the other hand, it helps professional logistics companies to establish long-term partnerships with multiple logistics agents, and can quickly establish supply chain connections and provide related logistics services, which is conducive to improving the utilization of idle logistics resources and achieving logistics scale benefits. It is also conducive to the upgrading of small and medium-sized logistics enterprises to modern, networked and informationized services. Large-scale collaborative operations can reduce the cost of urban logistics as a whole, provide a full range of logistics and supply chain services and value-added services, help improve the investment environment of Guigang, expand investment, and promote the city's economic development.

Promote the Establishment of a Collaborative Working Mechanism between Logistics-related Government Functions

The operation of the logistics business involves coordination with many departments, such as banking, taxation, insurance, customs, inspection and quarantine, transportation, traffic control, foreign trade and other government functions. At present, the information sharing of these departments is low, and even the regulations and clauses of their respective regulations often have conflicts and contradictions, resulting in low office efficiency, which is not compatible with the integrated logistics operation trend. By planning the intelligent logistics public information platform and providing information sharing and exchange mechanism between relevant government regulatory departments, it is conducive to promoting the development of e-government and promoting the establishment of a coordinated working mechanism among government departments, thereby improving the operational efficiency of the entire logistics system of the city.

Conducive to the Government's Macro Management Department to Develop Logistics Industry Development Plan

At present, because logistics information cannot be interconnected, it is difficult for macro management departments to obtain accurate information on urban logistics operations, and it is impossible to obtain business information of enterprises such as warehousing, shipping, road transportation, and urban distribution in time, and it is impossible to obtain logistics information such as flow of goods in time. These factors make the logistics development policy formulated by the government have a great lag, and even cause mistakes in decision-making, so that a large amount of logistics infrastructure resources are not fully utilized, resulting in idleness and waste. By planning and building a smart logistics public information platform, all logistics resources and logistics business historical data are stored in the information platform data warehouse, and data mining technology and decision support technology are used to provide decision support for the macro decision-making of the macro-management department of the Guigang Municipal Government and to reduce decision errors[4].

Infrastructure Platform Design

Perception Layer Design

The perception layer (information collection and convergence) of the intelligent logistics public information platform construction project includes: information classification and coding technology, two-dimensional code, rfid, gps, gis and other underlying key technologies and wsn (wireless sensor network) and other technologies. These key technologies are the foundation that smart logistics can achieve.
Network Communication Layer Design

The communication layer mainly uses the wireless communication network, the optical fiber communication network, and the Internet to complete the communication between the customs, ports, logistics enterprises, and logistics public information platforms. Users can access some functions of the logistics communication network through the Internet to query related information.

Through the analysis of these network connection units and users, the overall networking model is constructed, and the overall network is divided into four levels namely as follows:

**Data Exchange Center Level.** That is the logistics public information platform center. The government directly connects to the data exchange center.

**Private Network Access Level.** Including some units that access the platform logistics information system center through the private network, such as logistics service providers, logistics service demand enterprises, logistics resource enterprises, and some industry management departments that need to exchange data in the form of private networks.

The access level also includes some business platforms established by other units, including: industry logistics information platform, logistics enterprise's own information platform, public information service system, bank information management system, enterprise logistics information system and logistics enterprise information management system, traffic monitoring systems, transportation vehicle management systems, emergency rescue systems, etc.

**Internet Authorized Access Level.** It mainly includes units that exchange data through the Internet access platform logistics information system center, such as some enterprises that use logistics services, and some industry management departments, etc., and access of these units is authorized.

**Internet Public Browsing Level.** The users at this level are mainly the public and practitioners, and their access mainly through the Internet Internet for portal site browsing and related information inquiry.

Data Exchange and Sharing

The data exchange service system is constrained and supported by a unified standard specification system and operation and maintenance system, and is internal to the system. Divided into several parts:

**Resource Layer.** The resource layer is composed of a spatial geographic information base library, other basic class libraries, business class libraries, and a logistics park database, which
provides data storage support for exchange. In order to ensure the flexibility of the system, the basic function provides a fine-grained demand function service for subsequent flexible stitching combination.

**Business Application.** Based on the basic functions, reprocessing to form service functions for specific data exchange services

**Service.** Mainly to serve the management functions of the data exchange system. The connection between the switching system and the outside is achieved through the interfaces in the basic services section.

The data exchange system is an application server based on a three-tier architecture, adopting xml as a data transmission standard, and introducing third-party software (such as mq, etc.) for data transmission. A universal data exchange platform that provides various service functions such as data extraction, data reception, data inspection, and log management. The platform can be used to establish data reporting standards and data reporting channels between the private network and the external network; to solve data collection of data center, data exchange and data sharing between networks, and data redundancy and inconsistency between systems [5].

**Internet of Things Application Layer System**

The IoT application layer of the intelligent logistics public information platform includes seven major systems: logistics information release and inquiry system, logistics transaction and payment system, cargo traceability and management system, urban distribution and smart storage (distribution center) management system, logistics vehicle monitoring and dispatch management system, cold chain logistics management system, dangerous goods transportation management system.

**Logistics Information Release and Query System**

The logistics public information platform is the convergence point of logistics information, involving the information needs of multiple participants. The platform provides effective information classification and classification presentation means, and provides different information inquiry mechanisms for different types of information presentation forms and implementation methods, so that users can view the required information.

Logistics market supply information: transportation, warehousing, distribution, cargo agency, customs declaration, circulation processing services and integrated logistics services, logistics system planning, design services and other supply and demand information.

Logistics market demand information: logistics service requirements such as transportation, warehousing, processing, loading and unloading, third-party logistics service requirements, customer logistics system and network development planning and design requirements, logistics agents and outsourcing requirements.

**Logistics Trading and Payment System**

Through the construction and application of the transaction and payment system in the logistics information platform, the openness, fairness and justice of logistics transaction activities are realized, and the construction of the logistics transaction market is further improved, and the basic allocation of resources to the market and the improvement of logistics are better realized. Effective management of infrastructure resources and service support systems.

**Cargo Traceability and Management System**

Cargo traceability and management is an important function of the logistics public information platform, including two major contents: product traceability function and cargo status tracking and query function.

The product and goods traceability management system based on rfid technology uses rfid's tracking and traceability technology and relies on network technology and database technology to realize information fusion, query and monitoring, and to provide feasible decisions on product safety, product composition sources and inventory control throughout the entire process including
each piece for each production stage and distribution to the final consumption field; and to achieve product safety early warning mechanism. Rfid technology runs through food safety, including production, processing, circulation, and consumption. The whole process is strictly controlled, and a complete industrial chain product and cargo safety control system has been established.

**City Distribution and Smart Warehousing (Distribution Center) Management System**

The city distribution information management system, based on the whole system link of logistics, based on the demand and supply situation of the upstream and downstream enterprises in the supply chain, the “car-to-goods” app system developed by lbs information technology is used to make the distribution link as core, and optimize configure enterprise and vehicle resources to achieve completion of delivery in terms of time, location, quantity, and variety. To help logistics enterprises integrate social resources, improve the optimization of information management systems from the aspects of network communication technology and data processing technology, and adopt more advanced and practical algorithms to realize the automation of scheduling work and the auxiliary optimization of decision-making activities.

Smart warehousing (distribution center) is based on long-distance electronic tag fixed identification system. The system consists of electronic tags, electronic tag readers, data exchange, information management systems and so on. The system can be divided into two parts: hardware and software.(1) Hardware: Includes electronic tags and electronic tag readers. The electronic tag reader portion includes a control portion, a memory, an ipo port, a codec associated with electronic tag communication, and an RF antenna.(2) Software part: realize data exchange between PC and reader, and then realize writing and reading of electronic tag information.

**Logistics Vehicle Monitoring and Dispatching Management System**

Through the intelligent logistics public information platform, logistics enterprises, especially small and medium-sized logistics enterprises, can overcome the problem of the construction of logistics information platform due to the lack of their own capabilities. Logistics companies only need one computer to access the Saas-based logistics information platform, and real-time, visual online scheduling and management of logistics vehicles through GPS satellite navigation and positioning. The vehicle monitoring system mainly consists of four parts: GPS global positioning system, vehicle terminal, wireless carrier's communication network and monitoring center (including sub-monitoring center).

**Cold Chain Logistics Management System**

The cold chain logistics consists of four aspects: freezing processing, frozen storage, refrigerated transportation and distribution, and frozen sales. Cold chain logistics belongs to temperature-controlled logistics. In order to realize information processing and timely processing of cold chain logistics, optimization of distribution process, access and sorting automation, and intelligent logistics management, cold chain logistics requires information technology as an auxiliary means.

The cold chain logistics system needs to detect the temperature of each device in the cold chain system in real time and display it in various ways, such as recording, printing, real-time display, and anytime, anywhere query.

**Dangerous Goods Transportation Management System**

Real-time information on the real-time status of dangerous goods through Gps and Rfid. The rfid tag and sensor information collected by the management platform through the rfid reader can not only obtain specific information such as the date of production of dangerous goods, but also provide users with inquiries; they can also keep track of the transportation of dangerous goods and the temperature of the vehicle container of dangerous goods transport vehicles. Real-time data and historical data such as humidity, pressure, smoke, electromagnetic environment and leakage are processed, stored, and issued with warning information when the dangerous goods are in a dangerous critical state. The alarm information is issued in time after the accident.
Conclusion

The construction of the intelligent logistics public information platform should meet the logistics information needs of the public and enterprises, reduce the application cost of information technology and Internet of Things technology for small and medium-sized enterprises, aim to improve the capacity and efficiency of urban logistics services, and take data as the core and information security as the basis, provide reliable, effective and real-time logistics information services, promote the establishment of coordinated operation mechanism and strategic cooperation relationship of logistics enterprises, support the establishment of interactive collaborative working mechanisms such as industry management and market standardization management between government departments and provide scientific decision-making in accordance with.

References


