

# Research of Intelligent Logistics Information Platform under Big Data Technology

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**Keywords:** Smart Logistics; Data Analysis; Information Platform; System Architecture.

**Abstract:** The rapid advancement of the Internet has brought about the "Internet +" ideal and theory. With the help of Internet technology, traditional logistics has developed into "smart logistics" with improving the efficiency and quality of logistics work. Smart logistics is a breakthrough and improvement of the traditional logistics management model, and has formed a new ideal of logistic development. With the advent of the era of big data, data has become a strategic resource for enterprises and constitutes a core element of corporate competitiveness. Based on the characteristics of intelligent logistics, this paper elaborates the characteristics of smart logistics from three aspects: high efficiency, unbounded and intelligent. It analyzes the specific application of smart logistics in all aspects of logistics and builds it. The system architecture of the information platform was constructed, and the main functional modules of the platform were designed. The construction and implementation measures of the logistics information platform were proposed. To provide solutions for logistics companies to reduce costs and increase efficiency and enhance enterprise competitiveness.

## 1. Introduction

As an important part of the tertiary industry, the logistics industry can not only develop the national economy, but also be an important driving force for social development and economic prosperity [1-3]. The development of the Internet provides the premise and foundation for the maturity of smart logistics. After the era of digital, information, and the Internet, human beings are entering the era of big data. In the context of big data, the smart logistics that can promote the benign development of China's logistics industry is a product of the times. From a macro perspective, the development of smart logistics conforms to the trend of the times and responds to the government's call. From a micro perspective, developing smart logistics will help enterprises overcome traditional logistics development. The drawbacks of the model are not to damage the ecological environment for profit, but also reduce the cost of the enterprise and improve the efficiency of the enterprise [4-6]. It is estimated that the size of China's cold chain logistics market will reach nearly 300 billion yuan in 2018. By 2020, the market will be nearly 470 billion yuan (Fig. 1).

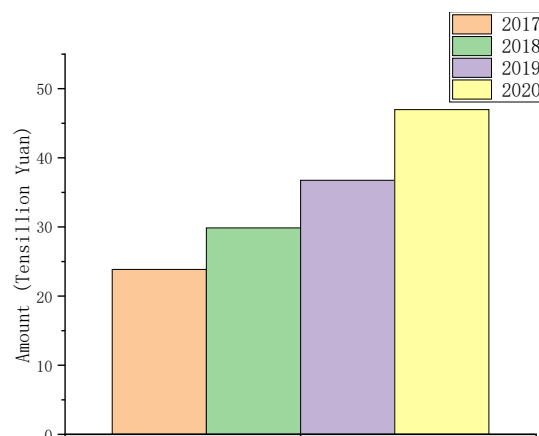


Fig.1 China's Cold Chain Logistics Market Scale

## **2. Smart Logistics**

### **2.1 Introduction to Smart Logistics**

The concept of smart logistics was first proposed by IBM. The information center of China Logistics Technology Association, Huaxia Internet of Things, and the editorial department of Logistics Technology and Application put forward the concept of smart logistics in China. The goal of smart logistics is to reduce the logistics cost of enterprises and obtain the economic benefits of enterprises. Smart Logistics aims to transform the current logistics system in a networked, intelligent, visual, automated and systematic way, thus achieving the logistics operation objectives of independent decision-making and independent analysis. By integrating various intelligent technologies, we can realize intelligent development, so that logistics and people can solve corresponding problems through the ability of perception and thinking. Smart logistics can improve the ability of logistics system information decision-making and automatic execution, achieve lean management, and better meet the diversified needs of customers for logistics. At the same time, by effectively utilizing resources, it saves logistics costs and creates more abundant logistics values.

### **2.2 Characteristics and application of smart logistics**

The most notable feature of smart logistics is the creation of intelligent park management, node-based logistics platform construction and long-term logistics industry benefits. Moreover, Smart Logistics can achieve full-scale logistics business coverage, ensuring integration of various logistics businesses in accordance with the existing logistics industry chain. Smart Logistics closely cooperates with logistics enterprises, upstream and downstream supply chain enterprises, financial institutions and other entities to achieve the purpose of integrating logistics services and comprehensively exchange real-time logistics information [7].

- (1) High efficiency. Smart Logistics applies high technology to the operation of logistics, improves the operational efficiency of all aspects of logistics, and transports goods from manufacturers to consumers more quickly. For example, video surveillance, GPS, and EDI technologies can be used to obtain information on all aspects of logistics operations and collect data in a timely manner. Smart Logistics can accurately connect information so that all parties can accurately grasp information such as products, transportation vehicles and warehouses, and initially realize smart logistics and improve logistics efficiency.
- (2) Unbounded. Smart Logistics can use technology to directly connect with consumers, reduce the operation of middlemen, and truly realize the unbounded connection between merchants and consumers. Jingdong's Logistics is particularly typical in the development of unbounded nature. Jingdong has set up an unmanned supermarket. There are no employees in the supermarket. Consumers are free to choose the products they need and put the money into the designated area. This reduces the cost of using labor and increases purchase efficiency. Of course, the unbounded success is still indispensable for the use of high-tech such as video surveillance technology.
- (3) Intelligent. The use of smart logistics in logistics can realize intelligent distribution, intelligent packaging and intelligent transportation routes. It promotes the comprehensive information management of logistics enterprises and improves the efficiency of logistics. It also breaks the limitation of traditional logistics modes and reduces the inefficiency and high error rate of using labor.

The specific application of smart logistics in all aspects of logistics is different, and different application links have different functions. To achieve high-efficiency implementation of each link, it is necessary to cooperate with each other. The warehousing department mainly uses the robots in the warehouse to engage in activities such as distribution, racking, and handling. For example, unmanned forklifts can be used to transport goods. Sorting robots can be used for sorting goods, and shelf shuttles can be used for replenishment of goods. Unmanned warehouses reduce labor

costs. The development of smart warehouses can achieve information sharing, integrate upstream and downstream enterprise resources, and promote the coordinated use of various resources to minimize costs. The development of smart warehouses can achieve information sharing, integrate upstream and downstream enterprise resources, and promote the coordinated use of various resources to minimize costs. The transportation link uses GPS and GIS technologies to track the transportation vehicles, accurately know the movement of the goods, and timely feedback to the consumers to achieve open information sharing. At the same time, it can use technology to plan the optimal delivery route, so that products can be delivered to consumers faster and improve customer satisfaction. Finally, the sales process can use cloud computing technology to accurately calculate the needs of consumers, thereby helping companies understand consumer preferences, make accurate production and sales forecasts, and expand market share. It is also possible to analyze the sales weakness of the company through data analysis, reduce the production of products with low sales volume, and reduce production waste.

### **3. Intelligent logistics information platform system architecture based on big data technology**

The intelligent logistics information platform is essentially the control of the whole process of logistics activities from the beginning to the end, and realizes the intelligent management of the process. It manages logistics activities in a more precise and dynamic manner, enhances the level of integrated logistics services, and brings greater value to users. The information platform can be divided into four levels according to different contents, namely, the infrastructure layer, the database layer, the application service layer, and the user display layer [8].

The infrastructure layer is the foundation of the overall platform, providing a variety of software and hardware facilities for information. Software and hardware facilities can be divided into sensing facilities and network facilities. Sensing facilities include sensor detection, image pattern recognition, GPS tracking and positioning, and middleware for solving various heterogeneous data. Network facilities have private networks, mobile internet, wireless networks, and so on. The two work together to solve the intelligent collection and transmission of logistics information. The rapid development of the network has promoted the arrival of the era of big data, which has higher requirements for the network transmission end,

The database layer provides data support for the application service layer. First, according to the unified data format and standard standards, the database scientifically classifies, transmits, stores, processes and shares various collected logistics related data. Utilizing the management and control capabilities of the database while ensuring the security and integrity of the data, the database checks the validity of the access advocacy and its operations, and automatically checks the consistency and compatibility of the data. A highly shared database greatly reduces data redundancy, saves storage space, and avoids incompatibilities between data [9-10].

The application service layer provides various functional modules required by the platform, which is the business service layer of the platform. The application service layer is divided into two categories: logistics information management module and logistics information function module. The function of the application service layer runs through the whole process of logistics information collection, information transmission, demand information release and logistics supply and demand matching.

The logistics information function module is further subdivided into sub-modules (Fig. 2): logistics information collection module, logistics information access and transmission module, logistics supply and demand information release module, information inquiry module, operating vehicle, personnel qualification and certification module. The user publishes the supply and demand information through the webpage, the client and the mobile terminal, and the platform provides the user with customized and diversified public logistics information service through information matching. The user display layer is a user-facing front-end layer that includes users and channel types. Platform users include: logistics enterprises, cargo owners, government related departments, etc.; Platform channels include: portals, mobile apps, SMS service platforms, etc., providing users with service portals.

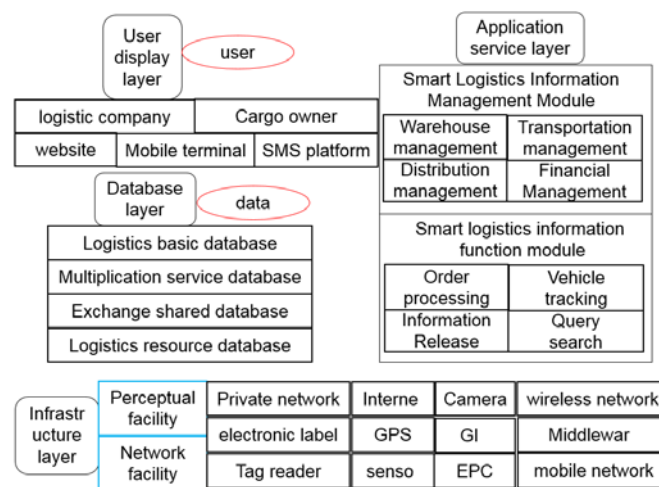


Fig.2 Architecture diagram of intelligent logistics information platform based on big data technology

#### 4. Construction and implementation of smart logistics information platform

The development and operation of the intelligent logistics information platform is the government and enterprises, which need to meet the market demand and have certain public welfare functions. Relevant government departments should do macro-control and provide functional support and financial support for the component information platform. The development of the platform should also be combined with the market, and it is necessary to meet the needs of all parties in the market, bring economic benefits to the enterprise, and effectively solve the needs of people.

The construction and implementation of the intelligent logistics information platform should be carried out in stages and steps. According to the operating mechanism and operation mode of the platform, the intelligent logistics information platform focuses on building some core functions of the platform in the early stage. Combined with the actual situation and characteristics of the logistics industry in the urban area, it continuously developed characteristic value-added services and supporting service functions.

The construction start-up phase mainly completed platform financing and infrastructure construction. This phase requires the formation of a project team with the participation of government departments, project teams and operating companies. The government department issued relevant support policies for the early stage construction of the platform, and provided some

initial start-up funds for the platform to provide construction sites. In the initial stage of platform construction, the project team must establish a complete set of standard standards, including development standards, transmission protocol standards, and service interface standards. The main task of this stage is to prioritize the construction of the infrastructure layer, develop the core service functions of the platform, and build the basic framework of the platform. The platform invites logistics enterprises or enterprises with logistics business to enter the platform to realize the storage and sharing of enterprise data. Enterprises can cooperate with data capture software to easily achieve data capture on the logistics information platform.

With the steady expansion of the scale of the platform and the mature development of operation management, the government only needs to do supportive service work and provide guidance on the development direction and platform positioning. The platform's mission is to focus on expanding the cost-added services such as core value-added services and ancillary services.

Finally, experienced professional companies are responsible for the operation and management of the intelligent logistics information platform to achieve continuous and effective operation of the platform. Through the platform, government departments effectively manage the logistics industry and provide government services. The platform integrates networked resources of all parties, and its services gradually expand to the upstream and downstream of the supply chain. It provides users with intelligent warehousing, intelligent transportation, and traceability of the supply chain, providing solutions for enterprise technology application upgrades.

The smart logistics platform cannot be limited to the narrow logistics information platform function, but it is necessary to gradually expand the coverage of the existing information platform. Gradually expand the platform functions to government monitoring, logistics financial services, logistics environment identification and other related fields. Only by achieving an all-round expansion of the park information platform can the park information platform truly achieve the goal of optimizing various logistics decisions.

## **5. Conclusion**

The information platform constitutes the necessary guarantee for building smart logistics at this stage. In the face of a new era of big data, information technology has been able to integrate into the practice of logistics. In the process of completing the all-round construction of the information platform, the core measure is to choose the scientific platform control mode, and achieve the purpose of enhancing the effectiveness of logistics operation on the basis of the division of the perception module. Using advanced technologies such as big data and cloud computing, the intelligent logistics information platform enables logistics operations of upstream and downstream enterprises in the supply chain to be integrated, greatly improving efficiency and reducing logistics costs. Therefore, in practice, the comprehensive integration of big data and smart logistics information platforms should also focus on in-depth exploration to ensure the flexible use of the Internet of Things and big data technology in the field of smart logistics.

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