

# Construction of intelligent logistics information platform based on big data technology

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**Abstract**—In today's intelligent era, big data has become one of the most important weapons in various industries. Based on big data and related technologies, smart logistics has great advantages in improving logistics efficiency, reducing logistics costs and improving user experience satisfaction, so it represents the development direction of logistics mode. Intelligent logistics information platform supports the efficient operation of intelligent logistics. The platform integrates all kinds of logistics information and resources, uses advanced information technology and intelligent technology, operates supply chain logistics in an integrated way. By integrating all kinds of logistics information and resources and applying artificial intelligence technology, the intelligent logistics information platform can provide high-efficiency, low-cost and integrated logistics services, and promote the development of local economy.

**Keywords**—big data; intelligent logistics; information technology

## I. Development status of intelligent cold chain logistics in the environment of Internet of things and big data

The concept of intelligent logistics was put forward in December 2009. It has the ability of thinking in the process of continuous development, and the level of intelligence is getting higher and higher, just like robots. The intellectualization of logistics in the process of development conforms to the requirements of modern economic development, and is also the necessity in the journey of economic development. China's logistics development started in a short time, and there is still a gap compared with some western countries. The infrastructure of logistics development process is not very perfect. Although the Internet of things and big data are widely used, the efficiency of intelligent logistics is greatly improved compared with the efficiency of traditional logistics and providing new jobs and employing 36 million people. Now smart logistics has basically formed their ecosystem, making outstanding contributions to national stability, people's happiness and economic development<sup>[1]</sup>.

Under the background of new urbanization construction, it is difficult for rural smart logistics to develop healthily and sustainably. This is due to the influence of China's government management system. Rural smart logistics refers to the integration of all kinds of rural soil products, and government departments arrange a group of personnel to train and master new technologies. Technology is the key to promote the development of agricultural products, and the infrastructure also should follow it. The government has also noticed this and shifted its focus to technical training and infrastructure.

It is very difficult for China's Internet of things to achieve

integrated operation, unable to play its potential, mainly due to technical standards and government policies Policy issues. At present, the widely used technology of Internet of things is identification and sensing. Although it has the ability of intelligent processing, it has not been widely used. Therefore, for the Internet of things, our current problem is to use the existing Internet of things technology to share and optimize, so as to achieve the purpose of saving logistics costs and improving efficiency, so as to improve the overall level of logistics<sup>[2]</sup>.

## II. Characteristics of intelligent logistics information platform

The intelligent logistics information platform is the basis of realizing intelligent logistics. It integrates logistics information and data resources by using network information technology and intelligent software, and solves many logistics problems intelligently. Logistics does not need too much manual operation, and the intelligent cold chain logistics information platform under big data technology integrates logistics information of all parties and effectively combines artificial intelligence technology to realize high efficiency and low-cost integrated logistics service, so that customers have a better experience and promote the continuous development of logistics market development<sup>[3]</sup>.

### A. Intelligent cold chain logistics

Intelligent cold chain logistics first requires logistics to be "intelligent", that is, smart cold chain logistics. Intelligent cold chain logistics information platform can realize intelligent management and intelligent use, provide customers with more comprehensive and intelligent services, and save costs for logistics enterprises. Through sensors, GPS positioning and other technologies, the platform tracks the logistics transportation situation in real time, and carries out scheduling management according to the actual situation. By applying big data technology, it analyzes and integrates information resources, helps optimize transportation routes, develops customers, and realizes comprehensive intelligent management<sup>[4]</sup>.

### B. Integrated cold chain logistics

The integration mainly includes the internal integration of the system and the integration of the whole logistics supply chain. Inside the system, cold chain logistics equipment and logistics information collection and processing need to be integrated; externally, it is also necessary to realize the integration of this information platform and other logistics

information systems. Through the integration of various resources, the advantages of big data are used to provide users with perfect logistics services and high-quality experience<sup>[5]</sup>.

### C. Convenient cold chain logistics

The widespread application of mobile smart phones puts forward higher requirements for the logistics information platform. People can't carry computer equipment with them. Therefore, the smart logistics information platform is connected with smart clients and app. People can query the relevant logistics information in real time through mobile phones, including the stage of logistics, the location of goods, and the next step of transportation, so as to know in time Vehicle and cold chain logistics service personnel information provides great convenience for customers.

### D. Safe and intelligent cold chain logistics

The content of the secure intelligent cold chain flow information platform is complex, and there are many participants. In order to ensure the transaction security and customer information security, the platform cooperates with the industry and commerce, transportation and other relevant management departments to approve and evaluate the platform participants, and can only enter the platform after obtaining permission. At the same time, the platform provides a safe trading environment for customers with the help of third-party institutions, so as to avoid the loss of customers' funds and the leakage of personal information<sup>[6]</sup>.

## III. Intelligent logistics information platform architecture based on three big data technologies

The platform operation of agricultural products intelligent cold logistics based on Internet of things and big data includes three aspects, mainly data collection operation, data model establishment operation and intelligent decision-making operation, etc. Financial data are intelligently integrated to get some useful information for users to use and prepare for the next step. For cold logistics, the work of data collection is very important, because the characteristic of cold logistics is the high demand for time. If the data can be collected and processed in time, it can ensure the complete operation of cold logistics and the freshness of products. The RFID technology used in the Internet of things is mainly through the label attached to the logistics goods. This technology is used in the transportation vehicles and distribution items on the. For the global positioning system, it is mainly for the real-time monitoring of the distribution of goods, real-time monitoring of the goods distributed, and then displayed in the software platform.

## IV. Logistics integration analysis under big data technology

Logistics integration includes two aspects, within the system, it is necessary to integrate logistics equipment, information data collection and data processing technology at the sensing end, and realize the docking in function; in the whole logistics supply chain management, it is necessary to realize the integration of information platform and other logistics information systems. Different supply chain entities exchange and share information with each other. The information platform provides integrated intelligent logistics

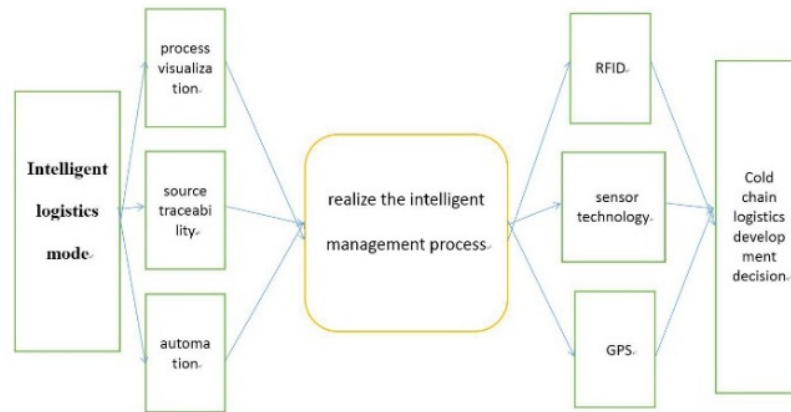
services and decision support for relevant users by integrating and integrating resources and information of various systems with the help of big data and modern intelligent technology<sup>[1]</sup>. Also, the big data information platform can connect with the e-commerce platform through the data interface, grabs customers' needs or accepts their orders and analyzes and integrates the order data, and submits it to the management platform to configure and schedule logistics resources and complete logistics tasks.

## V. Analysis of logistics information service function module based on big data technology

At present, China's cold chain logistics market is gradually changing from the traditional basic logistics service mode to the logistics value-added service mode, so as to broaden the service value-added channels of cold chain logistics enterprises, and gradually improve the business chain, so as to provide customers with more comprehensive value-added services. Logistics information service is the basic service function of logistics information platform. For example the logistics resource transaction function module is a very important part of it. The logistics resource transaction module undertakes the negotiation and transaction of transportation capacity, storage resources and logistics facilities. Business transaction function supports logistics enterprises, goods suppliers and customers to conduct online transaction processing. Through the system interface, all relevant entities and relevant government departments carry out data exchange, information transmission and information processing. The module also provides related supporting logistics services and monitoring the safe production process of warehouse, etc.; at the same time, it can track the orders that have been transacted and follow-up contract management. E-government function module is also one of the important modules. The platform can provide users with one-stop online government services<sup>[2]</sup>.

The information platform for receiving people from government service systems such as industry and commerce, taxation and customs can be handled for users of the platform: online examination and approval, online payment, tax payment, electronic customs declaration, entry and exit inspection and quarantine services, etc., so as to improve the efficiency and efficiency of logistics services. A complete big data system needs intelligent auxiliary decision function module. Using big data mining, autonomous learning, and prediction analysis technology, the information platform carries on the advanced processing to the collected logistics information data, uncovers the valuable information hidden in the massive data, calculates based on the related mathematical model, assists the distribution path optimization and so on intelligent decision-making; the business planning and so on; uses the big data forecast technology to make the forecast to the future economic development trend, provides the decision basis for the government related department to formulate the strategic plan and the policy formulation.

## VI. Intelligent logistics mode based on big data mode



Fic.1 Distribution diagram of Intelligent logistics mode based on big data mode.

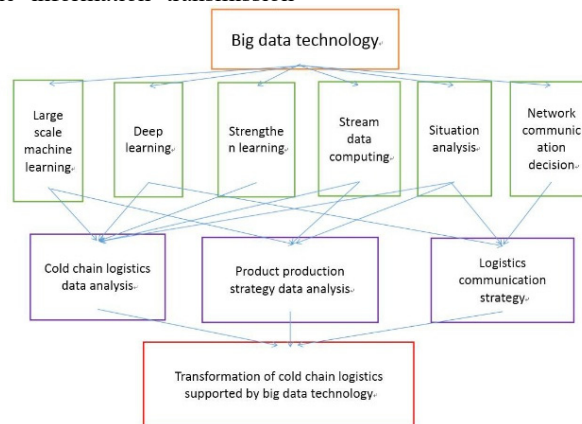
Logistics intelligence is the highest level of logistics development. Users of the platform hope that it can provide integrated logistics services with process visualization, source traceability and automation. The intelligent logistics information system can realize the intelligent management process and provide value-added logistics services for customers with higher quality, and producers should place orders online and offline, distribute them to chain stores for reprocessing through logistics express network, and finally sell and distribute them to target customers after sales combination. Through the integrated application of RFID, sensor technology, GPS and other technologies, the platform can realize the real-time tracking and scheduling of transportation tools, and the automatic management of warehousing. With the application of big data mining and analysis technology, the platform can provide transportation path optimization, customer in-depth development services, and provide decision support for enterprise users and relevant government departments<sup>[3]</sup>.

## VII. Standardized integration of information and platform

Intelligent logistics information platform involves logistics enterprises, logistics demanders, relevant government departments, etc., and needs to integrate all kinds of information systems of various subjects. The information transmission

standard, storage standard and development environment of different subjects and systems are inconsistent, which leads to different data standards, interfaces and specifications. Therefore, it is necessary to solve the problem of heterogeneous data exchange and information sharing between these different systems. Information standardization integration platform can complete the standardization and standardization of information definition. By providing corresponding data interface, data exchange and format conversion can be carried out between heterogeneous systems and heterogeneous data formats. In this way, different systems can connect and interact with each other on the platform. The popularization and application of mobile Internet and smart phones put forward higher requirements for the convenience of platform services. Through the intelligent terminal equipment, users hope to release demand information and logistics services on the platform at any time, and timely query the logistics link and status of goods on the platform, so as to realize the tracking and positioning of vehicles and personnel. This requires the platform and related websites, clients, mobile apps and other channels to achieve interoperability and interaction, which can provide customers with diversified services<sup>[4]</sup>.

## VIII. Research on Key Technologies of cold chain intelligent logistics under the Internet of things and big data



Fic.2 Development direction of cold chain brought by key technologies of big data

#### *A. Key technologies for smart logistics of cold chain products under big data*

The smart logistics big data of cold logistics generally includes agricultural product price, agricultural product logistics price, infrastructure and other data. Data collection management technology mainly uses cleaning algorithm to discard useless data, so as to collect truly effective data sets.

Due to the vast amount of logistics data information updated every day, these data need to be stored and analyzed. This paper studies the distributed storage technology, which is to make the storage devices in different areas into a virtual storage device, and store the data in a good location according to the needs, which makes the data extraction more convenient. The main data storage mode is HDFS and high-efficiency data storage system. The main data storage mode calculates a large amount of logistics information in real time, then takes measures to deal with the data information, makes correct decisions and improves work efficiency. The common real-time computing and processing technologies are storm and S4 technologies, which belong to Twitter and Yahoo respectively<sup>[8]</sup>.

The latter key technology of big data applied in the cold chain logistics product intelligent logistics is security protection technology, which is a very important technology. Intelligent logistics contains user's personal information, storage location, transportation mode, bank account number and other information. Once obtained by illegal elements, it will not only threaten the safety of logistics goods, but also threaten the security of logistics goods. In order to ensure the safety of users, user access control, data isolation and other technologies are usually used to protect users' personal safety.

#### *B. Key technologies of intelligent logistics of cold chain logistics products under the Internet of things*

There are many key technologies used in the intelligent logistics of cold logistics products under the Internet of things, mainly including radio frequency identification, wireless sensor and global positioning system technology. They are mainly used in the perception interaction layer. These technologies are mainly used for positioning and identification of logistics goods and information management of goods. In addition, there are cloud computing, M2M (machine to machine) and data cluster communication technology under the transport layer of the Internet of things. Cloud computing is a virtual technology, which is considered to be an advanced technology. The cloud computing technology applied in intelligent logistics is developed on the basis of Internet service technology. This technology can extract vast amounts of data more efficiently and obtain effective information. In a sense, cloud computing is to provide the final decision number for intelligent logistics. It is believed that the development of smart logistics will move in the right direction. M2M technology in agricultural products

The function of Hui logistics is to monitor, track and control the cold chain logistics goods. In order to make relevant decisions and improve the efficiency of cargo handling process, green handling is the main form.

The latter key technology in the Internet of things is the embedded intelligent technology applied in the application

service layer. This technology is mainly affected by function, volume and cost, and can enhance the function of language processing and image processing in intelligent logistics system. This technology is mainly combined with data mining technology and storage data technology in big data technology to play a powerful role.

#### *IX. Analysis of platform operation mode selection*

The structure of intelligent logistics information platform system is complex, the development and operation involves many subjects, the radiation range is wide, and the requirements for flexibility are high. On the one hand, it is necessary to coordinate the government's public service platform and meet the needs of government departments in terms of technology and service. The project team of "intelligent logistics information service platform" should be established under the leadership of the logistics competent department, and the transportation, development and reform departments should actively participate in the unified planning and design of the platform under the leadership of the leading enterprise. And in terms of operation mode, the government and enterprises are the main body of the development and operation of the logistics information platform.

According to the different ownership, dominant position and division of responsibilities of the government and enterprises, there are four development and operation modes: government sole proprietorship operation, government leading Commission consignment business, enterprise sole proprietorship operation and enterprise leading government equity participation. Each development and operation mode has its own characteristics. This is a highly public platform, which undertakes more public service functions. The government should decide the overall development direction of the platform and entrusts enterprises to operate the platform. Enterprises enjoy the benefits brought by the platform and have certain autonomy<sup>[9]</sup>.

For the mode of sole proprietorship operation, the enterprise invests in the construction in full and owns the ownership of the platform. In this mode, the enterprise is responsible for the planning and construction of the platform in the early stage. The enterprise determines the service and function of the platform according to the market demand and its own positioning, and the enterprise is also responsible for the later operation and management. The platform is fully market-oriented and does not undertake public welfare responsibilities. With the correct operation mode and platform selection, the platform and the operation route are integrated. The government provides necessary financial support, and in the later stage of operation, the platform realizes self-sufficiency. According to the market demand, the leading enterprises gradually establish the interconnection between the platform and other platforms and systems, constantly improve the functional modules of the platform, and provide intelligent logistics services for users. The biggest advantage of this mode is that the government has played a role in coordination and promotion, enterprises have full operational autonomy, mobilize the enthusiasm of enterprises, and is conducive to the benign development of the market-oriented intelligent cold logistics platform<sup>[10]</sup>.

## X. Conclusion

The application mode of big data technology in the construction of agricultural products cold chain intelligent logistics with the business transaction function can support logistics enterprises, goods suppliers and customers to conduct online and modern transaction processing and platform. This paper analyzes this topic, reflecting the help and support effect of data and information technology for product cold chain logistics. The framework of logistics chain construction based on this model and principle can help agricultural products obtain more efficient school and excellent transportation and sales effect, and improve the profit of agricultural products and the experience of buyers and gradually improve the business chain, so as to provide customers with more comprehensive value-added services.

## Reference

- [1] Shixiang L. Construction of Cooperation Logistics Information Platform Based on ITS[J]. Computer and Communications, 2006.
- [2] Heng Z, Xue-Gong L I, Management S O, et al. Transformation and Upgrading of Aquatic Product Cold Chain Logistics from the Prospective of New and Old Kinetic Energy Conversion[J]. Taiwan Agricultural Research, 2018.
- [3] Zhiyu L, Jingna W U, Yongchang S U, et al. Current status and development strategy of Fujian aquatic product processing industry[J]. Journal of Fisheries Research, 2018.
- [4] Zachery. The intelligent logistics information platform and the hyperbolic Pythagorean Theorem[J]. Foundations of Physics, 2003, 26(58):54-71.
- [5] Heng Z, Xue-Gong L I, Management S O, et al. Transformation and Upgrading of Aquatic Product Cold Chain Logistics from the Prospective of New and Old Kinetic Energy Conversion[J]. Taiwan Agricultural Research, 2018.
- [6] Zyler L, Lujipo, RJ, et al. Current status and development strategy of Fujian aquatic product processing industry[J]. Journal of Business Research, 2019.
- [7] Capolayr, Monlirh. The development strategy of Product Cold Chain Logistics[J]. Business development strategy, 2016, 141(57):134-140.
- [8] Clark Pilay. Cold Chain Logistics[J]. Technology and Industry Across the Straits, 2011.
- [9] Zylery, PO. From Product Cold Chain Logistics[J]. Agricultural Research, 2018, 28(8):24-67.
- [10] JiluyL, Polikaer, et al. Research on transformation and Upgrading of Aquatic Product Cold Chain Logistics[J]. Logistics Sci-Tech, 2016.