

# Research on the Construction and Development Strategy of Cold Chain Logistics Information System in Jilin Province under the Background of Rural Revitalization

Xiaoming Zhang<sup>1, a</sup>, Yongqiu Lan<sup>2, \*</sup> and Yong Liang<sup>2, b</sup>

<sup>1</sup>School of Economics and Trade, Jilin Engineering Normal University, Changchun 130000, China

<sup>2</sup>Qinhuangdao City Highway Management Office, Qinhuangdao 066000, China

\*Corresponding author e-mail: 39414698@qq.com, <sup>a</sup>yaoyue1973@sina.com,

<sup>b</sup>309185356@qq.com

**Abstract.** The Party's Nineteenth National Congress report for the first time puts forward the strategy report of the country's rejuvenation. It emphasizes that we must adhere to the priority development of agriculture and rural areas and promote the modernization of agriculture and rural areas. In rural areas, there is stability in the world and agriculture is firmly established. For Jilin province, a major agricultural province, to improve the overall quality of agriculture and rural areas under the new historical orientation, we must focus on improving the living standards of peasants. This means that we must strive to become the vanguard of modern agricultural construction on the one hand, and we must fully implement the strategy of village rejuvenation on the other. The gradual promotion of logistics Information System also provides a good platform for cold chain logistics, and cold chain logistics will soon become a rookie of the logistics industry. The market of cold chain logistics, which has just emerged, has unlimited potential. Nowadays, around the topic of analysis and discussion of the fresh food cold chain logistics market, more and more companies are present in the vast number of consumers related to the cold chain.

## 1. Background

China issued the "12th Five-Year Plan" cold-chain logistics development plan, clearly pointed out the importance of carrying out the cold-chain logistics project, and officially released the "Agricultural Cold-chain Logistics Development Plan" in 2010, proposing that the cold-chain logistics project is to optimize agricultural industrialization. The important driving force is the only way to develop modern agriculture [1].

## 2. The key task of cold chain development under the background of the strategy of rural rejuvenation

The strategy of rural revitalization is a complex and arduous system project. Rural revitalization is not simply to promote rural urbanization, but to accelerate the modernization of agriculture and rural areas on the basis of retaining urban and rural characteristics and deepening the integration of urban and rural areas. Therefore, we must focus on the weak links and highlight the key points, and swerving



Content from this work may be used under the terms of the [Creative Commons Attribution 3.0 licence](https://creativecommons.org/licenses/by/3.0/). Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

advance the implementation, especially the development of cold chain logistics Information System [2].

### *2.1. Construction of modern agricultural cold chain industry system*

The modern agricultural industrial system is an important part of the modern economic system and is also an important part of the strategy for rural revitalization. It is necessary to focus on lengthening the industrial chain, enhancing the value chain, accelerating the innovation, promotion, and expansion of agricultural industrialization clusters, accelerating the development of sophisticated processing of agricultural products, building up an advantageous agricultural industrial cluster, and actively promoting the integration of rural one, two, three, and three industries [3], and strengthening production and production. Do the best secondary production, live three production, improve the effectiveness of the entire agricultural industry chain. We must focus on expanding the various functions of agriculture, and actively develop agricultural ecological values, leisure values, and cultural values, and Information System construction of cold chain logistics in Jilin Province, and promote the deep integration of industries such as agriculture and tourism, health and pension, and cultural and creative industries [4].

### *2.2. Construction of a modern agricultural cold chain market system*

The modern agricultural market system is an important starting point for the strategy of revitalizing the countryside. Efforts should be made to strengthen the construction of agricultural products circulation facilities and market systems, speed up the upgrading of agricultural product wholesale markets, improve the circulation of backbone networks, and strengthen the construction of grain and other important agricultural products storage and logistics facilities. We will improve the cold chain logistics infrastructure such as per-cooling in production areas, improve the cross-regional cold chain logistics system for agricultural products, and promote the direct supply of live agricultural products. We will further promote the construction of agricultural product futures and options markets, and actively guide agribusiness-related companies to use futures and options to manage market risks [5]. Actively innovate the “Internet+” model, vigorously develop modern circulation methods such as e-commerce, establish a public service platform for rural circulation e-commerce public service, promote trade, supply and sales, postal services, and e-commerce exchanges, and steadily promote the agricultural product e-commerce industrial park Construction.

### *2.3. Constructing a modern agricultural cold chain service system*

The establishment of the cold chain logistics information system in Jilin Province is an effective complement to the modern agricultural management system, and is also an important starting point for the strategy of rural rejuvenation. We must strengthen the construction of the agricultural cold chain information service system, actively apply modern information technologies, establish large-scale agricultural data centers, develop smart agriculture, and deliver information on product supply and demand, agricultural technology, and legal policies in the most efficient, direct, and low-cost way. For agricultural producers, operators and consumers, help them adapt to changing markets [6].

## **3. Key Technology of Cold Chain Logistics Information System**

### *3.1. Information Acquisition and Tracking Technology*

#### **(1) Cold chain logistics**

Monitoring technology RFID monitoring technology is one of the trends in the development of cold chain logistics information technology. Radio frequency identification technology is a technology that automatically recognizes target objects and obtains relevant data through radio frequency signals, realizes non-contact information transmission through spatial coupling (alternating magnetic field or electromagnetic field), and achieves the purpose of identification through the transmitted information. The cold chain logistics system uses RFID technology to record temperature changes in “RFID tags

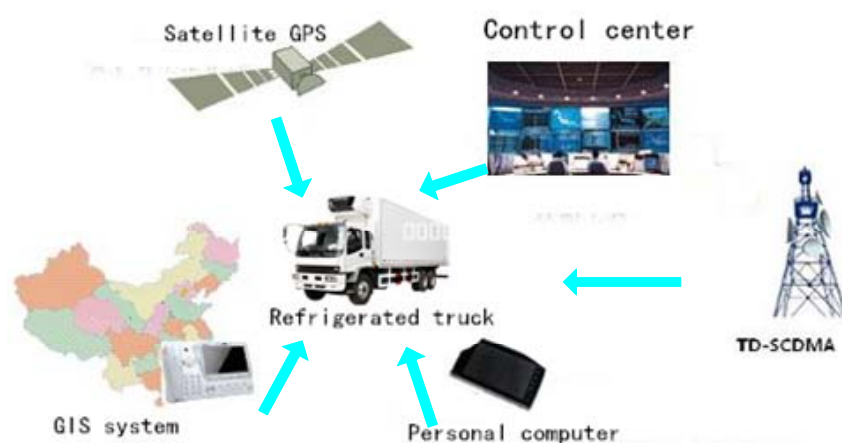
with temperature sensors” to provide detailed and real-time management of product freshness and quality. How RFID temperature tags work.

### (2) GPS positioning monitoring technology

Refrigerated vehicle GPS positioning system is an important aspect of cold chain information technology. Using multi-purpose intelligent temperature meter and refrigerated on board GPS system to achieve seamless docking, can quickly and accurately record and return the multi-purpose temperature in the refrigerated compartment, so that refrigerated transport temperature monitoring with the help of GPS system in the Internet and mobile communication systems. In order to be able to track the monitored vehicle and receive and transmit information on the vehicle, an automatic vehicle positioning device (AVL) must be equipped on the monitored vehicle. The AVL device will automatically locate the vehicle based on the positioning principle of completing the GPS. At the same time, the AVL monitoring device will interconnect the various devices of the vehicle and monitor the vehicle. The communication unit on the AVL will complete the acceptance and transmission of the information.

### (3) GIS visualization technology

GIS (geographical information system) is a computer system based on spatial data and adopting geographical model analysis method to provide timely and multi-spatial and dynamic geographic information. It is a geographical research and geographic decision-making service. Cold chain logistics system uses Global Positioning System (GPS) to carry out positioning monitoring of vehicles, and transmits positioning tracking information and communication information through the short message channel and voice channel of the GSM public network, and monitors the terminal. The use of geographic information technology (GIS) to display the monitoring target on a visualized digital map, to achieve visual monitoring and real-time dynamic management of vehicle transportation, reasonable choice of transportation routes. At the same time, in the cold chain logistics information system, GIS visualization technology is also widely used in the protection of information warehouses and logistics center location planning.



**Fig 1.** Key Technologies of Cold Chain Logistics Information System

### 3.2. Information Transmission and Switching Technology

The cold chain logistics information system completes EDI electronic data exchange through various networks (digital data network, wide area network, local area network, etc.), and implements cold chain logistics information using computer network technology, CORBA technology, open EDI technology, and EDI/XML technology. Information sharing and information exchange requirements between the system and other systems ensure the openness and stability of information transmission and exchange. EDI technology is an electronic means of transferring orders, invoices and other operational documents between companies. EDI technology is widely used in order management, inventory management, etc., making invulnerability between heterogeneous systems more smooth,

greatly accelerating the cold chain food procurement efficiency, reducing inventory costs, and achieving paperless information transmission.

### 3.3. Information Processing Technology

#### (1) Data Mining Technology

As a data-intensive enterprise, the cold-chain logistics industry has a large amount of data, such as incoming and outgoing historical records, transportation data, warehouse inventory data, real-time temperature data, and service records, which are the basis of data mining. Data mining technology helps to understand the overall situation of transportation, optimize the mode of cargo distribution, improve transportation efficiency, reduce inventory costs, achieve higher core competitiveness, and reduce the cost of cold chain logistics.

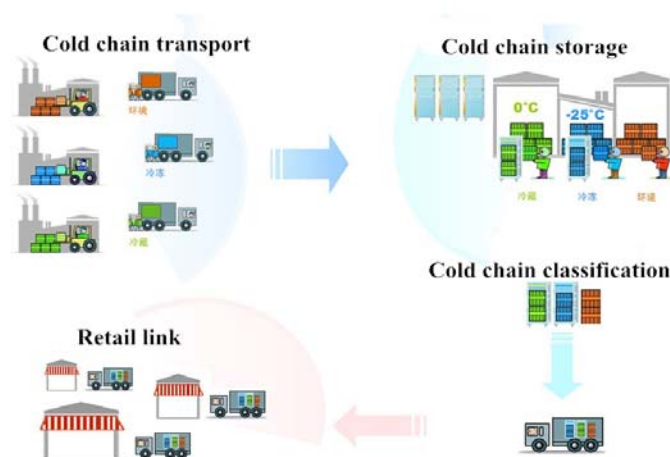
#### (2) Information standardization

Standardization of information is the processing and processing of various information in accordance with specific standards, increasing the sustainability and versatility of information. Cold chain logistics is a huge system, which is much larger than the construction investment of normal temperature logistics. The standardization of cold chain logistics information is the basis for making modern cold chain logistics scale and globalization.

## 4. The path of cold chain logistics information

### 4.1. Optimize Cold Chain Logistics Enterprise Service Information Platform

It is inseparable from the support of the information platform to get out of the dilemma of Information System in the cold-chain logistics industry. Cold-chain logistics companies need to realize information sharing, information integration, and information coordination through information platforms, and exchange information between the government, cold-chain logistics companies, and consumers. The structure realizes the cross-organizational monitoring of cold chain logistics and at the same time ensures the transparency of the cold chain logistics distribution link. In cold-chain logistics enterprises, the transformation of information technology from storage silos to information clouds is strongly promoted. This process is based on the cold-chain logistics information platform, and is also the key to the information of the cold-chain logistics industry. This requires cold-chain logistics companies to further increase investment in information platform construction, continuously optimize the function of cold-chain logistics enterprise service information platform, enrich the content of cold-chain logistics information platform, realize cold-chain logistics information sharing, and deepen the promotion of information platform construction. Application and Development of Cold Chain Logistics Information System.



**Fig 2.** Cold chain logistics information system

#### *4.2. Promotion of RFID Technology in the Cold Chain Logistics Industry*

Going out of the cold-chain logistics industry's information application dilemma requires the promotion of advanced technologies, and the cold-chain logistics distribution process is affected by factors such as time, product, and temperature. The key to cold-chain logistics is the use of RFID technology. The key to product quality. Each link of the cold chain logistics supply chain includes product processing companies, logistics companies, warehousing and transportation companies, and terminal marketing channels. In all aspects of the process, the use of RFID technology needs to be based on the existing ERP system of cold chain logistics companies. The information platform technically constructs a mutually coordinated information system for each link of the cold chain logistics supply chain, realizes temperature changes in various aspects of the cold chain logistics product, and controls the temperature within a range that is conducive to ensuring product quality. The promotion and application methods of RFID technology are as follows:

#### *4.3. Give play to the role of government in promoting the Information System of cold chain logistics industry*

The use of Internet of Things technology in the cold-chain logistics industry objectively requires the cold-chain logistics industry to construct a cold-chain information tracking and inquiring system. Through the existing Internet of Things technology resources, the cold-chain logistics information electronic archives will be established to carry out all aspects of cold-chain logistics. Supervision and management play a role of government supervision and guidance in this process, and it is very important to perfect the Information System mechanism of the cold chain logistics industry. we will establish a supportive and nurturing urban and rural integrated cold chain logistics center, increase the construction of modernized cold chain logistics center construction resources, research and development of logistics technology, and promotion and support policies for cold chain logistics technology. We will use the Internet of Things technology as a basis to bring into play policy effects. Based on the cold chain logistics policy, policies and measures conducive to the promotion of independent innovation of cold-chain logistics companies, and the use and development of high-tech logistics technologies will be formulated to promote the development of cold-chain logistics industry in information technology.

#### *4.4. Continue to optimize modern agricultural cold chain transportation structure*

The general requirements of the strategy for revitalizing the countryside are, first and foremost, the prosperity of the industry. Jilin Province has a good resource endowment and industry base. The prosperity of the industry needs to change from the past expansion of quantity to quality and efficiency, so that the integration of secondary, tertiary, and tertiary industries can be achieved. For example, the agricultural industry can promote the transformation and upgrading of agriculture by extending the industrial chain of agricultural product processing and developing intensive processing. The output of Jilin fruits and vegetables showed a steady growth trend. At the same time, the per-capita share of fruits and vegetables also showed a trend of increasing year by year. Huge supply of fruits and vegetables and demand pushed forward the development of cold chain logistics.

### **5. Conclusion**

China must strengthen its agriculture, and China must be beautiful in the countryside. The Chinese must enrich the farmers. In the future, China's agriculture will become stronger. The fact that Chinese peasants are truly wealthy is a sign of fulfilling their century-long dream of becoming a powerful nation. When beautiful villages spread all over the land of China, beautiful China became a reality. This is a sign of building a powerful, modern, harmonious, civilized, harmonious and beautiful modern country. It is necessary to apply innovative technologies for the Internet of Things to accelerate the construction of cold chain logistics information. Make full use of existing technologies, speed up the construction of a batch of demonstration projects of cold chain logistics, realize the real-time supervision of the whole life cycle and the whole process of cold chain products, and promote the

transparency, technology, and integration of cold chain transportation management. Under the new market environment, the Information System of cold chain logistics enterprises in the process of reform has paved the way for the rise of the industry.

### **Acknowledgments**

This work was financially supported by Supported by Program for Innovative Research Team of JiLin Engineering Normal University; Funded by the 13th five-year social science research program of the education department of jilin province, Research on the Construction and Development Strategy of Cold Chain Logistics Information System in Jilin Province under the Background of Rural Revitalization, Project manager: Xiao ming Zhang

### **References**

- [1] Fu Yongqiang, Xia Shaomo, Li Changjian, et al. Knowledge Mapping of Academic Research on Domestic Cold Chain Logistics. *Railway Transport and Economy*, Vol. 42 (2017) No. 3, p. 68-73.
- [2] Zhang Guibin, Liu Yi, et al. The application of big data and cloud computing technology in the cold chain logistics Information System of agricultural products. *Global Market Information Herald: Theory*, Vol. 27 (2015) No. 5, p. 58-61.
- [3] Yang Xiaolou, et al. Research on the status quo and development of China's fruit and vegetable cold storage supply chain. Chongqing: Chongqing Jiaotong University, 2006.
- [4] Huang Huafang, Men Jianting, Zhang Ping, et al. Research on the Optimization of Fruit and Vegetable Transportation Vehicle Routing Based on Improved Ant Colony Algorithm. *Preservation*, Vol. 12 (2011) No. 3, p. 24-27.
- [5] Zhang Rentang, et al. Fruit logistics and factors affecting the development of modern fruit logistics in China. *China Fruit Industry Information*, Vol. 31, (2006) No. 4, p. 1-4.
- [6] Du Weidong, Wei Qiwen, et al. Research on the Development Strategy of Cold Chain Logistics for Vegetables and Fruits in China. *Journal of Yantai Vocational College*, Vol. 14 (2008) No. 7, p. 24-35.