Research on Development Model and Strategy of Agricultural Products Cold Chain Logistics in Jilin Province

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Abstract. Based on the modern agriculture of Jilin Province and the trade liberalization of agricultural products, the thesis takes "mass entrepreneurship, innovation" as the background, theory and practice, comprehensive comparison and analysis methods, and explores the development model of agricultural cold chain logistics in Jilin Province, from modern Cold chain logistics mode, innovative service mode as the future development trend and strategy, seize the opportunity of agricultural supply side reform, drive the development of agricultural products in Jilin Province to green and organic direction; improve the cold chain logistics infrastructure of Jilin Province, and build the cold chain of agricultural products logistics in Jilin Province. The new system, under the deep cooperation mode of politics, school and enterprise, deepens scientific research reform and innovation, explores a new mode of training logistics talents; makes full use of Jilin's geographical advantages, strengthens the export chain trade of agricultural products, and makes the cold chain logistics of agricultural products in Jilin Province go along the Belt and Road National development [1].

1. Introduction
Innovate the circulation of agricultural products, accelerate the transformation and upgrading of the national agricultural product market system, encourage the development of various forms of agricultural product logistics, focus on strengthening the construction of supporting services and facilities, improve the trading system, and increase new trading methods. While improving the backbone network of agricultural products cold chain circulation in the country, we will increase the construction of important agricultural products warehousing and logistics facilities. Innovate the trading methods of agricultural products and further develop agricultural futures trading. Increase the participation of logistics participants, support e-commerce, logistics companies, commerce companies, financial institutions and other involved in the construction of agricultural products circulation market. Increase the construction of wholesale markets for agricultural products, strengthen the coordination and development of wholesale markets for agricultural products, accelerate the construction of cross-regional cold chain logistics systems, and increase the construction of cross-regional cold chain logistics information.
systems [2]. We will promote the cultivation of agricultural product logistics talents in China, strengthen the joint training model of government, enterprises and schools, and inject new blood into the cold chain logistics talents of agricultural products. Strengthen the research of modern science and technology, and make the cold chain logistics of agricultural products develop in the direction of intelligence, electronics and automation. Promote the docking of agricultural product wholesale markets with agricultural cooperatives, supermarket chains, schools, enterprises and communities. According to the regional characteristics and geographical location, deepen the reform of agricultural product sales model, broaden the sales channels of agricultural products, open up foreign markets, increase export efforts, and promote the economic development of agricultural products.

2. Overview of the basic theory of cold chain logistics
Cold chain means that after the purchase or fishing of perishable foods, in the processing, storage, transportation, distribution and retail of products, until the hands of consumers, all the links are always in the low temperature environment necessary for the products to ensure the quality and safety of food. Special supply chain systems that reduce losses and prevent contamination. The cold chain is applicable to: primary agricultural products: vegetables, fruits; meat, poultry, eggs; aquatic products; flower products. Processed food: quick-frozen food; poultry, meat, aquatic products and other packaged cooked food; ice cream and dairy products; fast food raw materials. Special goods: medicines. The details are shown in Table 2.1.

Cold chain logistics refers to a systematic project to ensure the quality and performance of goods in the production, storage, transportation, sales, and all aspects of consumption before the consumption. It is established with the advancement of science and technology and the development of refrigeration technology. It is a low-temperature logistics process based on refrigeration technology and using refrigeration technology as a means.

| category | Food type | Suitable storage temperature |
|----------|-----------|-----------------------------|
| frozen food | Juice, fresh vegetables, dairy drinks, processed meat, dairy products (such as dairy products, tofu) | 0-7°C |
| Frozen food, iced goods | Ice cream, frozen food (such as buns, dumplings) | < -18°C |
| Ice warm food | Poultry, aquatic products, livestock and meat | -2-2°C |

3. Analysis on the Status Quo of Agricultural Products and Cold Chain Logistics in Jilin Province
In recent years, the economic water in Jilin Province has increased steadily. In 2017, the gross domestic product (GDP) of Jilin Province reached 142.741 billion yuan, and the per capital GDP of the province was 51,851.55 yuan, higher than the national average. At the same time, people's living standards have increased, and the demand for fresh agricultural products has increased. It has also made the development of cold chain logistics a new topic. In 2015, the total grain output of Jilin Province was 36.47 million tons, the total output of vegetables and edible fungi was 8.6 million tons, the total output of pig, cattle, sheep and poultry was 2.558 million tons, the total output of poultry and eggs was 1.073 million tons, and the total output of aquatic products was 19.5. Ten thousand tons [3]. From the analysis of the current situation of cold chain logistics in Jilin Province, there are several major problems.

First, a sound cold chain logistics system has not yet been formed. There are about 200 agricultural product logistics companies in Jilin Province. However, there are not many large-scale, well-equipped and cold chain logistics services. Among them, the well-known cold chain logistics companies include Zhonglang Logistics Co., Ltd. and Changchun Huashang Refrigeration Logistics. Co., Ltd., Huayuan Logistics Co., Ltd., Jilin Province Ding sheng Cold Chain Service Co., Ltd., etc., the above-mentioned...
Cold chain logistics companies have a competitive relationship rather than a partnership, failing to jointly build an integration including storage, distribution and processing trade. Services, the formation of shipping, land transport and rail transport in a variety of ways to transport the cold chain logistics system, the value of energy rising cold chain logistics costs also rise, but due to the low level of cold chain facilities and equipment, the entire logistics costs accounted for perishable 70% of the cost of goods, some logistics companies will reduce costs by lowering the cold chain standards to cater to dealers.

![Constraints on the development of cold chain logistics of fresh agricultural products in Jilin Province](image)

**Figure 3.1** Analysis of the reasons behind the development of fresh cold chain logistics in agriculture in Jilin Province

Secondly, the construction of cold chain logistics nodes is poor and the capacity level is not high. The distribution of cold storage construction in Jilin Province is unscientific, and the per capital cold storage capacity is less than 0.05 cubic meters. In terms of per capital cold storage capacity indicators, the situation in Jilin Province is much lower than that in coastal developed areas. Taking the fruit and vegetable aquatic products market in the capital city of Changchun as an example, it is mainly distributed in the aquatic products wholesale market under the Changchun Fruit Wholesale Center Market, Changchun Vegetable Wholesale Market and Changchun Northeast Asia Logistics Co., Ltd. Among them, only the Fruit Center has established a storage pool of 11,600 cubic meters, which was built in the 1970s and has outdated equipment [4]. The logistics node lacks overall planning, and the cold storage construction cannot meet the actual cold chain requirements. In addition, some remote rural roads are muddy mountain roads, which affect the overall road traffic level in Jilin Province. In terms of refrigerated transport vehicles, mainly including railway refrigerated trucks and road refrigerated trucks, according to relevant information, Jilin Province refrigerated transport vehicles only account for 1.3% of transport vehicles, while road refrigerated trucks only account for 0.27% of transport vehicles, the standard of Jilin Province. There are not many cold chain cars, and there are few professional temperature control equipment, and a large part of them still use some backward refrigeration technology and technology. It is difficult to ensure that all kinds of fresh products are in their suitable low temperature environment.
Third, the level of information is low. Jilin Province has not yet formed an efficient cold chain information system. The low-efficiency cold chain information system will not only lead to information asymmetry between the links of the cold chain, but also cause certain difficulties in its organization and coordination. The formation of a unified standardized cold chain logistics information system may lead to deviations in information docking among members of the cold chain logistics system, thereby weakening the fit and even reducing execution. In many places, the development of science and technology is uneven. The information technology of the sales network used in the entire region of Jilin lags behind. More than 60% of the business activities in Jilin are dispatched and supervised by telephone, and manual settlement is realized through cash payment. The asymmetry of cold chain logistics information causes no way to share tracking. Monitoring information and settlement information [5].

Fourth, there is a shortage of professional talents in cold chain logistics. It is reported that among the personnel engaged in the logistics industry in Jilin Province, the proportion of all employees with university education or above accounts for less than 20%. This academic qualification can also indicate that the overall knowledge level of local cold chain logistics practitioners needs to be improved. The main source of talents in cold chain logistics enterprises in Jilin Province is graduates from colleges and universities in the province. However, the current situation of setting up logistics majors in colleges and universities in the province is not optimistic, and the number of graduates is unable to meet the needs of cold chain development. Taken together, most of the current skills of cold chain logistics practitioners in Jilin Province cannot meet the post requirements of the development of the cold chain logistics industry. With the growing space for the development of the cold chain industry in Jilin Province, the demand for cold chain logistics talents will become more and scarcer. Then there are few cold chain logistics professionals, and the urgent need to train cold chain talents has become an important constraint to the continued healthy development of cold chain logistics of fresh agricultural products in Jilin Province.

4. Innovative ideas for cold chain logistics of fresh produce in Jilin Province

4.1. Improve the cold chain logistics system of agricultural products

The development process of fruit and vegetable cold chain logistics is a very complex system organization, and we must actively create an “integrated” and modern logistics system network. It is formed together with other companies in the supply chain. This organization is linked by logistics and eventually forms a logistics network. Competition among enterprises has been transformed into competition among supply chains. Cold-chain logistics enterprises of fruit and vegetables develop third-party logistics under the supply chain competition environment, and purchase, transportation, storage, loading and unloading, handling, distribution, information, etc. of fruit and vegetable cold chain products [6]. The seven links are effectively integrated to form a modern cold chain logistics network with complete functions, large scale, advanced facilities, scientific management, low-cost investment, advanced technology, high quality service, high efficiency and high yield. The development of modern fruit and vegetable cold chain logistics system is the key to the core competitiveness of fruit and vegetable cold chain enterprises. The modern fruit and vegetable cold chain logistics system is a networked fruit and vegetable cold chain logistics park that integrates various fruit and vegetable cold chain logistics enterprises, integrates logistics information, shares logistics facilities, joint distribution, and modern intensive management.
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4.2. Strengthening the cooperation of government, enterprises and schools to train cold chain logistics professionals

The government department should jointly cooperate with the Cold Chain Logistics Professional Committee and the Logistics Technology and Application Professional Committee to actively promote the cooperation of government, industry, and research in the construction of the cold chain logistics standard system through scientific and technological research projects, key construction projects, and special funds. Under the organization and preparation of the Cold Chain Logistics Professional Committee and the Logistics Technology and Application Professional Committee, enterprises, universities and scientific research institutions jointly draft various cold chain logistics standards,
increase the research on Internet of Things technology in cold chain logistics, and formulate HACCP (Hazard Analyze key control points), GMP (Good Manufacturing Practice), GAP (Good Agricultural Practice) and other basic principles of agricultural products cold chain IoT full-process quality and safety control technical regulations; as soon as possible to develop various types of fresh agricultural products in the raw material collection, classification processing Standard operating procedures for standard packaging, frozen storage, refrigerated transport, wholesale distribution, distribution and retail, etc., to improve the temperature and humidity control and efficiency energy consumption standard system of each link; and to develop the whole process monitoring and quality changeability system of fresh agricultural products To formulate information standards such as data collection, data exchange, and information management, it is necessary to formulate standards for interconnection and invulnerability of cold chain-related enterprises as early as possible, such as unified coding rules and middleware interface standards for basic application platforms.

4.3. Give full play to geographical advantages and promote brand building

Jilin Province is an important supporting area of the Ha-chang city group and an important node of the Sino-Mongolian-Russian economic corridor. It is located in the New Asia-Europe Continental Bridge and is also an important route of the Belt and Road. It is bordered by Heilongjiang Province, Liaoning Province and Inner Mongolia Autonomous Region, adjacent to North Korea and South Korea has obvious geographical advantages. Therefore, it is necessary to give full play to its geographical advantages and create a vegetable geo-economic in Jilin Province [7]. Although the geographical advantage is not the key to the development of the vegetable industry chain, it affects the depth and breadth of the development of the vegetable industry chain, which cannot be ignored.

Changbai Mountain in Jilin Province is an ideal place to produce safe and pollution-free green organic vegetables. Especially the wild vegetables and wild edible fungi grow in a completely natural state, and are affected by the good ecological environment around them. The products are rich in nutrients and high in value. Some wild vegetables are used as medicinal foods at the same time, and they can also play a certain medical auxiliary role. Therefore, the regional characteristics of endogenous content are high, and it is easy to form a unique vegetable industry chain and mountain vegetable industry chain, and build on the brand advantage of Changbai Mountain. The eastern vegetable brand radiates to the province through the brand effect. This requires that all localities must first create brands belonging to the region, and then through the deck and OEM or brand serialization, to construct the provinces unified vegetable brand of “Jilin Production”.

5. Conclusion

The paper summarizes the problems existing in the fresh cold chain logistics of agricultural products in Jilin Province, provides countermeasures and suggestions for the development of agricultural products in Jilin Province, fully grasps the opportunity of “public entrepreneurship, innovation” and vigorously develops the construction of cold chain logistics system. Increase the training of talents combining government, enterprises and schools, strengthen research on new technologies, give full play to geographical advantages, promote brand building, rely on the advantages of two major agricultural provinces and Changbai Mountain to promote the development of brands in the region; increase the promotion of agricultural science and technology.

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