Construction and Development Strategy of Third Party Cold Chain Logistics System in Jilin Province Based on Financial Risk

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Abstract. This paper analyzes the development status of the industry of third-party cold chain logistics enterprises in Jilin Province, the status of third-party cold chain core enterprises and the relationship of cold chain from a macro perspective, and constructs a scientific evaluation index system to evaluate the third-party cold chain in Jilin Province. The performance of the company analyzes the differences between different enterprise performances, thus guiding the healthy development of third-party cold chain logistics in Jilin Province. At the same time, it constructs the index system of third-party cold chain logistics and financial risk system based on economics theory, analyzes the risk factors of third-party cold chain logistics, further applies scientific methods such as factor analysis to identify key influencing factors, and builds third-party cold chain logistics risk warning indicator system, establish a third-party cold chain logistics risk prevention mechanism. Finally, using regional theory and urban economic basic theory to analyze the urban cold chain logistics distribution system involving third-party cold chain logistics, and the business characteristics, main distribution modes and existing problems of B2B cold chain logistics distribution business and B2C cold chain logistics distribution business [1]. To construct a common distribution demand for the two, the urban cold chain 2B/2C fusion co-distribution model is targeted. Based on the urban cold chain 2B/2C fusion co-distribution model, the pricing game process of third-party cold chain logistics enterprises and fresh e-commerce in the urban cold chain 2B/2C fusion co-distribution model is analyzed, and the B2B cold chain is considered comprehensively by using the game idea. The logistics carries the capacity limitation, establishes the secondary supply chain pricing game model of non-cooperative and cooperative game under different strategies, and builds a third-party cold chain logistics system in Jilin Province, which promotes the cold chain logistics industry in the region to promote the sales of local agricultural products and promote Local economic development.
1. Introduction
The emergence of the cold chain logistics industry is the birth of modern logistics in the direction of specialization. Cold chain logistics is a boutique series and scarce part of today's logistics industry. Cold chain logistics refers to the use of modern technology equipment and information technology to provide customers with refrigeration, refrigeration, warehousing, transportation, distribution, packaging, processing, multimedia transport and other value-added services. Its particularity is mainly manifested in two aspects: one is the particularity of the service object, and the other is the particularity of the working environment. At present, in the developed countries of Europe and the United States, a complete set of third-party cold chain systems for food production, such as production, processing, distribution, warehousing, distribution, and after-sales, has been formed. In recent years, with the improvement of living standards and the changes in people's consumption habits and the pursuit of diversified forms [2], third-party cold chain logistics is getting hotter. It has become a sunrise industry with great potential and space in today's economic development. However, at present, China's food logistics is basically in the traditional storage and transportation mode. The corrosion loss rate of food is amazing, the level of logistics information platform is backward, and the links between upstream and downstream consumers are not close enough in the transportation process, often disconnected, so that the food transportation process can not form a true "chain" structure.

2. Establishment and evaluation measures of third-party cold chain logistics system in Jilin Province

2.1. The status quo and system establishment of third-party cold chain logistics in Jilin Province
As a large agricultural province and a large population province, Jilin Province faces enormous opportunities and challenges in the development of cold chain logistics in the future, both in terms of the output of fresh agricultural products and the market development space of fresh agricultural products. However, as far as the current development status of Jilin Province is concerned, the problems in the cold chain logistics of fresh agricultural products seriously hinder its development. The author investigates the third-party cold chain logistics enterprises in Jilin Province [3]: Huazheng Cold Meat, Zhengda Group and Guangze Dairy, and discusses the problems in the development of cold chain logistics. The authors have the following problems: First, the cold chain of fresh agricultural products The circulation rate is low, and the phenomenon of “broken chain” is frequent in all links; secondly, the democratization level of cold chain logistics of fresh agricultural products is low and the development speed is slow; thirdly, the cold chain logistics service capacity of fresh agricultural products is low, and its function is not fully exerted. The fourth is that the cold chain competition of fresh agricultural products is in an unbalanced state, which is not conducive to enhancing the overall competitiveness of the industry.

The third-party cold chain logistics is stricter than the general logistics requirements at the node, and it is necessary to ensure that the perishable fresh food of each node of the cold chain logistics is produced and processed at a suitable temperature. Facilities and techniques for storage to ensure food quality and freshness [4]. The main nodes of third-party cold chain logistics are: upstream of third-party cold chain logistics: breeding or breeding bases, refrigerated warehouses, production and processing bases (such as slaughterhouses), frozen and frozen food production enterprises and third-party enterprises; third parties The intermediate links of cold chain logistics: refrigerated warehouses, logistics centers (agricultural wholesale markets and wholesale markets), distribution centers, middlemen and third-party enterprises; downstream of third-party cold chain logistics: farmer's markets, supermarkets (such as chains) Supermarkets, fresh supermarkets, etc.), retailers, hotels, restaurants, families, etc. All intermediate links in the third-party cold chain logistics system can be completed by third-party enterprises, using reasonable transportation methods to minimize the loss of perishable goods.
2.2. Construction of the index system for third-party cold chain logistics enterprises in Jilin Province

In this paper, the related literalness on third-party logistics and cold-chain logistics capabilities are studied. The combination of frequency statistics and theoretical analysis is used to select some indicators of third-party cold chain logistics system evaluation. Secondly, through theory the above analysis has obtained the overall evaluation index structure, and added new indicators. The first-level indicators for the evaluation of the third-party cold-chain logistics system are human resources, management level, technical equipment and service capabilities, which are cold to the third party in Jilin Province. The performance of chain enterprises is evaluated to guide the healthy development of third-party cold chain logistics in Jilin Province [5].

| Third-party cold chain logistics system evaluation index | Primary indicator | Secondary indicators                                                                 |
|--------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------|
|                                                        | Human Resources   | The quality of personnel                                                               |
|                                                        |                   | Staff knowledge level                                                                  |
|                                                        |                   | Capacity structure                                                                    |
|                                                        |                   | work experience                                                                       |
|                                                        | Management level  | Rationality of organizational structure                                                |
|                                                        |                   | Corporate culture construction level                                                   |
|                                                        |                   | The degree of perfection of the management system                                     |
|                                                        | Technical equipment| Effectiveness of work completion                                                      |
|                                                        |                   | Advanced technology equipment                                                         |
|                                                        |                   | Equipment suitability                                                                  |
|                                                        |                   | Equipment maintenance status                                                          |
|                                                        | Service capabilities| Speed of technology update                                                            |
|                                                        |                   | Dramatization level                                                                   |
|                                                        |                   | service quality                                                                       |
|                                                        |                   | Logistics costs                                                                       |
|                                                        |                   | Customer satisfaction                                                                 |

The fuzzy analytic hierarchy process is used to determine the index weights. The hierarchical ordering ranks the influence degree of a certain layer of factors on the upper factors, and then performs the hierarchical single sort consistency test, that is, the test of the validity of the calculation results, the
result is valid, and vice versa. The consistency check process is as follows. Computational consistency indicator is $CI$.

$$CI = \frac{\lambda_{\text{max}} - n}{n - 1}, \lambda_{\text{max}} = \frac{1}{n} \sum_{p=1}^{n} \left( \frac{B W_B}{W_B} \right)_p$$

Where $\lambda_{\text{max}}$ represents the largest eigenvalue of the judgment matrix; $B$ represents the judgment matrix to be tested; $W_B$ represents the hierarchical single sorting vector obtained from the judgment matrix. Calculate the consistency indicator ratio $CR$.

$$CR = \frac{CI}{RI}$$

Where $RI$ represents the proportional coefficient, which can be obtained according to the order of the judgment matrix.

3. Construction of the indicator system of financial risk system based on economics related theory

As an emerging financing method, logistics finance has the characteristics of standardization, standardization, information, remoteness and extensiveness. Its influencing factors are very complicated [6]. At the same time, through the analysis of the whole operation process of third-party cold chain logistics finance the participants involved two main bodies: banks, logistics enterprises and agricultural production and processing enterprises. This paper focuses on the risks faced by third-party cold chain logistics enterprises in the process of agricultural products logistics and financial services.

![Figure 2. Diagram of risk prevention and control indicators for third-party cold chain logistics enterprises](image)

Also using the above, fuzzy analytic hierarchy process to determine the index weight. After analyzing the cold chain logistics enterprise in Jilin Province, it is found that the cold chain logistics company participates in the agricultural product logistics financial business with a high risk level of 12.13%, and the "high risk" degree is 15.60%. “Risk is general” The degree is 21.76%, the degree of "low risk" is 29.73%, and the degree of "low risk" is 19.58%. It can be known from the principle of maximum membership that the typical logistics company has a lower risk of participating in the
agricultural product logistics financial business. After quantifying the processing of the comment collection, the typical logistics company’s participation in the agricultural product logistics financial business has a maximum risk of 5.6207, a minimum of 3.4318, and an average of 4.5306, so the risk is average.

4. Regional theory and economic theory analysis of Jilin third-party cold chain logistics

The general process of the third-party logistics service initial transaction is to determine the service level for the manufacturer, the service provider bids the quotation, the two parties negotiate and sign the contract, the service provider provides the service, the manufacturer supplies the goods, and the settlement service rewards. This process will evolve two kinds of game models due to different negotiation content. If the negotiation only confirms or determines the service level and service price proposed in the first two stages and the number of services in the later stage, and no substantive cooperation behavior occurs, the process can be simplified into a three-stage dynamic non-cooperative game model: the first stage, The manufacturer determines the service level; in the second stage, the service provider reports the service price after observing the service level; in the third stage, the manufacturer determines the quantity of the goods after observing the service price. The corresponding decision can be called non-cooperative decision [7].

I indicates the level of logistics services, and will not be normalized. L≥0, use e to represent the logistics cost of the unit commodity, e>0; the service cost has the following relationship with the service level: 1) the service cost e increases as the service level l increases, and the marginal cost increases; 2) the ability Strong logistics service providers have a lower marginal cost increase rate. Let’s set this relationship to the following formula.

\[ e_i = k_i l_i, \forall i \in \{M, S\} \] (3)

Use p to indicate the unit commodity logistics service price, then \( k_i l_i^2 \leq p \leq k_{M}l_{M}^2 \) means the manufacturer’s profit, \( \pi_S \) means the service provider’s profit, and \( \pi_T \) means the total profit of the manufacturer and the service provider.

\[ \pi_M = (P - c - p)q = \frac{(Q + pl - qsc - sp)q}{s} \] (4)

\[ \pi_S = (P - e_S)q = (p - K_sl^2)q \] (5)

\[ \pi_T = \pi_M + \pi_S = \frac{(Qsc - q + pl - scK_sl^2)q}{s} \] (6)

The solution process is: 1) solving the optimal service level under cooperative decision, the quantity of service and the maximum total profit of the system; 2) establishing corresponding cooperative game models (ie, three characteristic functions) according to the characteristic functions under different system states, and using Nash The concept of bargaining equilibrium solution, that is, using Nash axiom to allocate cooperative incremental profits, to obtain their final equilibrium profit; 3) to determine the service price based on equilibrium profit, service level and service quantity.

When the cost of the product is reduced to benefit the manufacturer, it may be detrimental to the service provider; at the same time, when the service capability is improved, it may be disadvantageous to the manufacturer when it is beneficial to the service provider. Therefore, manufacturers and service providers will do their utmost to reduce the production cost of products or improve the logistics
service capacity to avoid disadvantages. In this process, a possible result is that the manufacturer's product cost reduction is also beneficial to the service provider, and the service provider's ability to increase is also beneficial to the manufacturer. At this time, the service level, the number of goods sold (the number of services), the profit of the manufacturer and the profit of the service provider will increase or increase. Therefore, the role of this pricing mechanism is very consistent with the characteristics of third-party logistics as a long-term mutually beneficial strategic partnership, which enables service providers and manufacturers to focus on the development of their core competitiveness. Improve the performance and competitiveness of the entire supply chain system [8].

5. Conclusion
It can be seen from the analysis of the cold chain logistics market that the cold chain logistics market has huge market space in China and the development prospect is very broad. This means that third-party logistics companies face both opportunities and challenges in the cold chain logistics business. An aspirational enterprise should build an effective organizational structure, build its own resource advantages, and adopt an appropriate business model based on sufficient market research and analysis to develop its business in the rapidly growing logistics market of cold chain logistics. Standing firm, the company will achieve long-term development.

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