

## Study on High Quality Development Strategy of Cold Chain Supply Chain under Public Health Emergency

Chunxiang Zhao, Fei Zhang\*

Hunan Institute of Traffic Engineering, Heng Yang, Hunan, 421009, China

\*Corresponding Author

**Keywords:** Public health emergencies, Cold chain supply chain, High quality development, Entropy value method, Measurement index system

**Abstract:** the epidemic of covid-19 has brought great impact to the economic development of china. For the high-quality development of the cold chain, this is both an opportunity and a challenge. To seize the opportunity, promote the logistics supply chain under the public health emergency to achieve high quality development, this article embarks from the existing literature, sums up the connotation of the high quality cold chain supply chain development, the construction of cold chain supply chain in the development of high quality measurement index system of comprehensive evaluation system to measure, it is concluded that china's cold chain supply chain quality development level, and the implementation of emergent public health events of high quality cold chain supply chain development countermeasures and suggestions are put forward.

### 1. Introduction

A public health emergency refers to a sudden outbreak of a major infectious disease, a mass disease of unknown cause, a major food and occupational poisoning, etc., which causes or may cause serious damage to public health. The causes of public health emergencies are varied and the harm is very serious. They not only affect people's health, but also affect economic development and social stability, and even have a huge impact on politics, nature and ecological environment<sup>[1]</sup>.

At the end of 2019, a sudden major epidemic caused by Covid-19 virus spread to the whole world, bringing unprecedented challenges and pressure to the development of the world economy. Although the epidemic has been effectively controlled in China, the outbreak of a cluster epidemic in Beijing Xinfadi Agricultural Products Wholesale Market in the middle of June 2020 has brought unprecedented pressure to China's cold chain supply chain, which has also exposed many shortcomings and deficiencies of China's cold chain supply chain system. How to buck the trend of cold chain supply chain? How to ensure national security, food safety and cold chain supply chain security? In view of the shortcomings and deficiencies exposed by the epidemic, it will be the bounden duty of China's cold chain supply chain system to strengthen the shortcomings and plug the loopholes. On the one hand, the implementation of the government put forward "six stability and six guarantees", the protection of industrial chain supply chain security, food security, food safety; On the other hand, in the face of adversity, to break through the tight encircle and achieve high-quality development, has become a key and core topic to be explored in depth. We should strengthen our cold chain supply chain system and accelerate the realization of its high quality development of the grand goal.

### 2. Connotation, Policy Orientation and Goal of High Quality Development of Cold Chain Supply Chain

#### 2.1 The Connotation of High Quality Development of Cold Chain Supply Chain

The connotation of high-quality development of cold chain supply chain needs to be defined from different dimensions: from the level of system balance, it not only covers the flow speed of cold chain logistics and supply chain, but also includes the overall improvement of its service

quality (i.e. warehousing, circulation processing, production and marketing, etc.); From the perspective of economic development: high-quality development of cold chain supply chain promotes high-quality development of economy; From the perspective of people's livelihood, with the improvement of income and living standard, people's requirements for fresh food in freshness and other aspects are constantly improving. People's needs should be met through the high-quality development of the cold chain supply chain<sup>[2]</sup>. From the perspective of environmental sustainability, green and low-carbon ideas are embodied and integrated into the cold chain supply chain to achieve high efficiency and benefit growth under the condition of energy saving and emission reduction and ecological environment protection.

## **2.2 Policy Orientation for High-Quality Development**

The concept of “high-quality development” was first put forward at the 19th National Congress of the Communist Party of China in 2017, pointing out that China's economy has shifted from a stage of high-speed growth to a stage of high-quality development. Thirteenth session of the National People's Congress in 2018 of a meeting to review the government work report formally put forward “according to the demands of the development of high quality, as a whole to promote” five one “the overall layout and coordination to promote 'four comprehensive strategic layout, structural reform as the main line, adhere to the supply side as a whole to promote steady growth, promoting the reform, restructuring, livelihood, risk prevention work”. In 2019, General Secretary Xi Jinping stressed high-quality development on several occasions<sup>[3]</sup>, clarified many key issues and put forward a series of specific requirements. The 2020 government work report stressed the need to continue to promote high-quality development of the country.

## **2.3 Cold Chain Supply Chain High Quality Development Goal**

The goal of high-quality development is to promote the transformation of China's economic development pattern, establish a modern economic system, and lay a solid economic foundation for the realization of the Two Centenary Goals and the Chinese Dream of national rejuvenation. The development goals of cold chain supply chain based on high-quality development should be reflected in the following aspects.

First of all, the efficiency of resource allocation is high, and the supply and demand of the cold chain supply chain is balanced.

Second, improve the quality of products and services in the supply chain. The quality of products and services is improved, and they are safe and reliable, in line with the requirements of the supply chain and domestic and international mainstream markets.

Thirdly, the integration of production, supply and marketing is realized. The upstream and downstream of the cold chain supply chain are connected, forming a seamless cold chain supply chain from the origin to the final customer, realizing the integration of resources, optimization of processes and coordination of organizations among industries<sup>[4]</sup>.

Finally, the green and sustainable development of the cold chain supply chain is realized. Accelerate the development of green and low-carbon cold chain supply chain, form a more harmonious relationship between human and nature, protect and maintain a good living environment and ecological environment.

# **3. Measurement Index of High Quality Development of Cold Chain Supply Chain under Major Public Health Emergencies**

## **3.1 The Dimension Selection of Measurement Index System**

According to the connotation of high-quality development of cold chain supply chain, the realization of high-quality development should pay attention to the transformation from “quantity” to “quality”, and realize the optimization of industrial structure and the transformation to innovation-driven. Starting from the response level of emergency cold chain supply chain in response to major public health emergencies, the following five dimensions are mainly taken as the

measurement indicators of the high quality development of cold chain supply chain.

#### **4. Innovation Drive**

Innovation drives the high-quality development of cold chain supply chains.

To improve the ability of innovation and development, on the one hand, we should realize the innovation of business form, mode and technology, and on the other hand, we should rely on the support and ability of scientific research investment and high-level talent training.

Its dimensional indicators include the ratio of cold chain supply chain R&D expenditure to GDP, the number of patents granted, the ratio of scientific research and education expenditure to total fiscal expenditure, professional talent cultivation and other secondary indicators.

#### **5. Structural Optimization Degree**

The high-quality development of cold chain supply chain needs to promote structural optimization and improve the coordination, collaboration and cooperation capacity of the whole industrial chain.

Its secondary indicators include the degree of strategic target synergy, the ratio of supply chain process cost to revenue, the proportion of warehousing and fixed assets investment in post and telecommunications, etc.

#### **6. Flexible Intelligence**

Through the optimization and adjustment of the integration and intelligence of the cold chain supply chain, the emergency demand of medical protection materials and fresh goods is realized, and the operation of the cold chain supply chain is more humanized.

The secondary indicators of “flexible intelligence” dimension include the ability to respond to market demand and the per capita growth rate of cold chain goods supply.

#### **7. Appropriate Operation Adjustment**

By means of efficient information communication and resource deployment capability of the cold chain supply chain, the whole operation process is regulated to ensure that the regional cold chain supply chain operation can also realize the cross-regional resource scheduling and deployment of the cold chain supply chain in the event of public health emergencies.

The second-level indicators of “operation adjustment” dimension include information communication efficiency, cold-chain food production index, coordination degree of government departments, and social satisfaction<sup>[5]</sup>.

#### **8. Emergency Responsiveness**

To achieve high-quality development of cold chain supply chain in the event of public health emergencies, it is necessary to have the ability of rapid response, rapid distribution and distribution of materials, timely make plans and complete the distribution of materials in the whole process.

The second-level indicators of the “emergency response” dimension include the missing rate of the overall chain, the amount of emergency supplies, and the completion rate of task disposal.

#### **8.1 Comprehensive Evaluation of Measure Index**

Indicator weighting: The weight of an index represents its importance in the measurement index system, so index weighting is a very critical step. To save In this paper, the weighting method combining subjective and objective is chosen to determine the weight of indicators, namely, the subjective weighting method is applied to the first-level indicators The objective weighting method (entropy value method) is applied to the weighting of secondary indexes. For the missing part of data, the subjective assignment method will be adopted to supplement.

Single index evaluation:Single index evaluation method uses a value index as the objective standard of comprehensive evaluation of economic development quality, which is divided into positive index and negative index

To index and interval index three categories.

Positive index: the greater the expected index value, the better the evaluation;The smaller the expected index value, the worse the evaluation.Index system of the communist party of China has 12 positive indicators: r&d input intensity, the patent grant, scientific research and education expenditure to total fiscal expenditure ratio, strategic objectives coordination degree, ability to response market demand, the supply of cold-chain items per capita growth rate, the information communication efficiency, material production index, government support, social satisfaction, emergency supplies reserves, task completion of disposal.

Negative indicators: the larger the expected index value, the worse the evaluation;The smaller the desired index value, the better the evaluation.At the same time, there are two negative indicators in the index system: the ratio of cold chain supply chain process cost to revenue and the out-of-stock rate of the whole chain.

Interval index: if the expected index value falls within a certain interval, it represents a good evaluation.The more out of the range, the worse the evaluation.In addition, the index system has a range of indicators: warehousing and telecommunications fixed assets investment ratio.

Comprehensive evaluation of high quality development: the final comprehensive score of the development quality of cold chain supply chain is obtained by multiplying and summing up the weight calculated by each index and the evaluation value of the index.

## **8.2 The Evaluation Results**

The outbreak of the epidemic has a significant impact on the cold chain supply chain.On the one hand, a large number of fresh food trading centers are forced to close down, which makes the offline transactions that the cold chain supply chain relies on for a long time almost stop operating. In addition, due to the reasons of road closure and low resumption rate, the circulation of the cold chain supply chain is blocked, showing an obvious downward trend.On the other hand, the shortage of materials and fresh products leads to the increased demand and dependence on the cold chain supply chain.Therefore, we will put forward specific countermeasures and suggestions to improve the response capacity, emergency response capacity and disposal capacity of the cold chain in response to public health emergencies on the basis of helping the cold chain achieve high-quality development.

## **9. Suggestions on the High Quality Development of Cold Chain Supply Chain under Public Health Emergencies**

### **9.1 Improve the Policy System of Cold Chain Supply Chain**

The government should give full play to the role of overall planning and macro-control, and promote the response level of the cold chain supply chain in an orderly way.First of all, the government improves policies and systems and establishes a long-term cold chain supply chain response mechanism to deal with emergencies, so as to ensure rapid detection and early warning, emergency response, multi-party coordination and information sharing.Secondly, the government should give priority to ensuring the supply of labor elements in key areas and conduct regional allocation of cold chain materials.

### **9.2 Build and Improve the Emergency Cold Chain Supply Chain System**

To mobilize all social forces to establish emergency cold-chain supply chain joint response mechanism, pushing forward the construction of the emergency logistics supply chain information platform perfect emergency cold-chain transport supply chain system, strengthen emergency supplies distribution, optimization of emergency materials reserve system, improve the emergency logistics legal safeguard mechanism, gradually build up fast and efficient emergency cold-chain

which accords with the situation of current supply chain system.

### **9.3 Cold Chain Supply Chain and Cloud Economic Model Integration**

It is particularly important to promote the integration of cold chain supply chain and cloud economic model. On the one hand, under the background of the epidemic, the security of offline delivery has received unprecedented attention, and cloud delivery modes such as “unmanned delivery” and “contact-less delivery” have emerged, which alleviate the security problem of “last kilometer” transport capacity through self-picking of parcels. On the other hand, by promoting the combination of cold chain supply chain and Internet big data to achieve operation upgrading, upgrading the combination mode of online and offline, that is, focusing on community marketing, the security of offline distribution, expanding and optimizing online marketing, to achieve the integration of the entire industrial chain.

### **9.4 Technology Drives the High Quality Development of Cold Chain Supply Chain**

In order to realize the high quality development of cold chain supply chain, cold chain technology is particularly important. In the future, should from the information system of the investment of research and development, hardware equipment, the improvement of intelligent, unmanned, and the transparency of the entire industry chain of applications, the wisdom of a comprehensive logistics supply chain system, realize the intelligent warehouse management, data visualization, an unmanned vehicle, unmanned aerial vehicle (uav), intelligent express ark, no warehouse, such as wide application, the cold chain technology combined with the cold-chain scene is more open and collaborative, realize the whole network, the whole scene, the whole chain of “one-stop” service supply chain<sup>[6]</sup>.

### **9.5 Transformation from Traditional Cold Chain Supply Chain to Platform Cold Chain Supply Chain**

Through the platform mode, the cold chain supply chain carriers are gathered to maximize the integration of the cold chain resources in all regions, improve the rationality of vehicle scheduling and distribution, and deliver goods to the disaster areas and consumers in a timely and accurate manner. By using the big data guide system of the cold chain supply chain platform, we collect the real-time monitoring data of warehouses, vehicles and goods. Through data analysis, we carry out a reasonable inventory layout, realize the nearest allocation of goods and materials, shorten the supply chain and save time. In this way, platform, sharing, information and networked cold chain supply chain management can be realized to improve the operation efficiency of cold chain supply chain and form an intelligent cold chain supply chain.

## **10. The Implementation of Conditions**

In a word, the new global epidemic is both an opportunity and a major challenge for the cold chain supply chain. Should fully reflect our country cold chain supply chain short board and plugging point, summarize experience and lessons, reflect on the supply chain process, to swallow the short board and through plugging point as soon as possible, establish and improve the cold chain of supply chain in the face of major public health emergency policy guarantee, pattern innovation in emerging technology driven forms, the construction of emergency logistics supply chain system, the major public health emergency in response to the future, do nip in the bud, reasonable allocate supplies, co-ordinate resources to realize the high quality cold chain supply chain development of strategic objectives.

## **11. Acknowledgment**

Scientific Research Project of Education Department of Hunan Province in 2020: Research on The Innovative Development of Consumer Poverty Alleviation Business of Commercial Banks -- A Case Study of Agricultural Bank of China (Project No. :20C0721)

## References

- [1] Glik D C. Risk Communication for Public Health Emergencies [J].Annual Review of Public Health, 2007,28 (1) : 33-54.
- [2] Burkle F M, Greenough P G. Impact of Public Health Emergencies on Modern Disaster Taxonomy, Plan-ning, and Response [J].Disaster Medicine & Public Health preparedness, 2008,2 (3) : 192-199.
- [3] Liu Qionglian. Covid-19 Response Code of Public Health Emergent Events: Building a Social Governance Community and Promoting the Joint Force of “Five Governance” [J].Journal of Tianjin Institute of Administration, 2020,22 (2) : 3-10.
- [4] Li Rui. Market Control of Epidemic Prevention Products in Major Public Health Emergencies [J].Journal of Law, 2020,41 (4) : 22-31.
- [5] SHENG F F, LI Z M. Impact, transmission and response of major public health emergencies on economy -- A case study of Covid-19 epidemic [J].Business Economics, 2020 (3) : 12-20.
- [6] Sheng Chaoxun. Understanding the Five Dimensions of Quality Development [J].Zhang Junkuo, Hou Yongzhi, Liu Peilin, et al.The goal requirement and strategic path of high quality development [J].Management World, 2019,35 (7) : 1-7.