

Research on Cold Chain Network Status of Beijing

Hongqi Wang*, Jianqin Zhou
 School of Economics and Management
 Beijing Jiao Tong University, Beijing, China
 *EMAIL: 09125101@bjtu.edu.cn

Abstract: There are some researches about cold chain logistics networks, however, these researches are mainly about models of cold chain logistics network or making qualitative analysis on the network. Research on cold chain network building is few, not even construction of cold chain networks which are about a city. Cold chain of Beijing city has gained a little development, but there is great amount work to do further. Basing on the concept of cold chain network, this paper analyses the status and problems of Beijing city and gives some relevant suggestions. The author hopes that government and cold chain industry will concern cold chain logistics network building; more and more scholars will start to show solicitude for this thesis.

Keywords: Cold chain Logistics; cold-chain logistics-network Countermeasures

I. Introduction

As one of the countries those have a big food production and consumption, China should be concerned the hygiene and safety of the mass consumption food. Nowadays, with people's life condition lifting, consumers call for high level service from manufactures. So enterprises must pay more attention on refrigeration to protect the safety of food supply, then make cold chain logistics get great development as a special logistics. The application of system thought on actual manufacture process has given rise to new requests; research about cold logistics is not only based on cold logistics enterprises but cities or economical areas. In order to make best use of cold chain resources, and promote cold chain logistics to new stage, it should construct cold chain logistics networks.

The general definition[1] of cold chain logistics network is: A network consisting of cold-chain logistics organization internal network, logistics organization and other organizations network, logistics infrastructure network and logistics information network on the condition of network economy and informational technology; it is a logistics service network system formed by networks mentioned above. It can adapt to the requirements of systematic and socialization. From the cold chain logistics perspective, the definition includes[2]: Primary agricultural products: vegetables, fruits; meat, eggs; aquatic; flowers. Processed food: meats, sea foods; ice cream and milk; fast food. Special goods: drugs. While stand logistics network point, it contains logistics organization network, logistics

infrastructure network and logistics information network.

Cold chain network has some special features. The first is many nodes, it can be proved by many pause points during the transportation of fresh foods; the second is network-long route, in our country fresh food moving is long route transportation, which needs multi-transportation methods and tools; the third is multi-temperate entities, different products have various temperature requirements, so transport products should be classified and given individual transport program.

Basing on the description above, cold chain logistics network should be a multi-link and non-linear network. The research and construction of cold-chain logistics network should consider the characteristics of the actual product.

II. Analysis of Beijing city's cold-chain logistics network

As China's economic and cultural center, Beijing could provide a good technical and financial support for the development of China's logistics industry. In development of cold chain logistics network, it has the following advantages.

The government strong supports. Beijing municipal government has issued the "The implementation of the program of Beijing's logistics industry on restructuring and revitalization" document. It referred to the total goal is to establish a transportation network characterizing "three-ring, five bands, multi-center", and focus on building five logistics bases. Meanwhile, it is necessary to cultivate and support some more competitive and modern logistics enterprises for establishing modern logistics system.

Good infrastructure and development foundation. By the end of 2008, the city mileage has been up to 20.34 thousand kilometers, in which high-speed mileage is up to 777 kilometers, the throughput of cargo and mail is nearly 1.37 million tons; the city's Refrigeration business is more than 50. The city's total social logistics volume is 4.1 trillion Yuan, and average annual increase is 27% nearly three years.

Analysis of Beijing city's cold-chain logistics

Beijing city's food industry has gained great development recently. Among them, dairy products, frozen foods and meat products category represented the fastest-growing

food.

Dairy markets analysis. Dairy products mainly contain liquid milk, milk powder and other dairy products. From Figure 1 we can see that milk production of Beijing is upward on the whole during the past decades, in 2005 it reached 700 thousand tons. According to statistical analysis of the relevant departments, consumer demand for dairy products will rise 12.1% in 2010. As the shelf life of milk is generally not more than six months or even a week, and the majority of consumers prefer to drink fresh milk. All those will make higher demands on cold-chain logistics network.

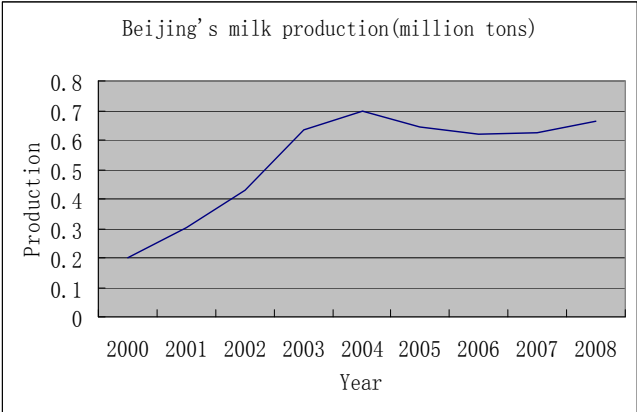


Figure 1: Beijing milk production charts
Frozen foods market analysis. Frozen food is that is fast-frozen at a very low temperature environment. Compared with general frozen food, this freezing method won't damage the internal structure of food. So the food's original flavor can be maintained. With incomplete statistics, Beijing's enterprises engaged in frozen food supply are nearly 50, and with about 200,000 tons annual output. In 2010, the demand for frozen foods will be up 20% that is same as the output increase, according to statistics from related departments. Therefore, development of quick-frozen food will continue in the next few years. As the frozen food has a strict temperature demand, the entire process must be carried out at minus 18 degrees or below; also it must achieve food transfer at low temperature environment, or it will cause great damage.

Meat markets analysis. Meat is composed by raw meat and meat products. China's meat production and meat processing enterprises are rapidly increasing recent years, such as Beijing, meat production in 2003 was 730,000 tons. This shows that our consumers' living standard has been general improving, but in developed cities, people have begun to pursue a healthy diet. For example, Beijing's meat total outputs show a downward trend in recent years. As shown in figure2, it declines between year 2004 and 2008, but in 2009 it has an initial recovery.

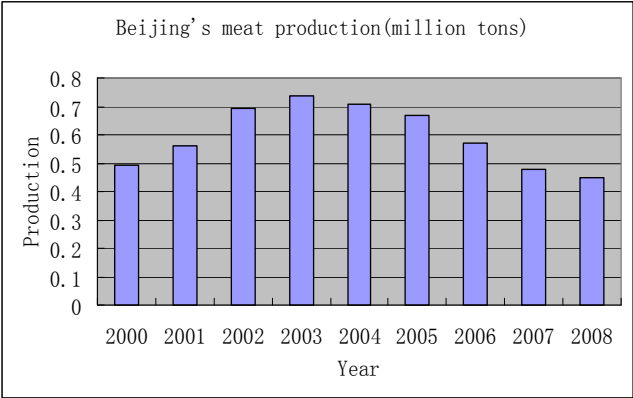


Figure 2: Beijing meat production charts
Beijing's consumer demand for meat and processed foods will raise 10-20% in 2010 according to the analysis of cold chain industry association; such a large market demand will not only promote the development of meat processing enterprises, but also accelerate the cold chain logistics development.

Analysis of Beijing city's cold-chain logistics network

As mentioned above, Beijing's enterprises working on cold chain logistics are about 50, but not many successful. Whether the individual business or group enterprises are operating respectively, this situation repeats the status that many of China's logistics enterprises are small but whole previous years.

Cold chain network whose core is single company. This network is very common, cold chain business form partnerships with other related businesses and build a simple network by contract for their own development. However, this network is poor stability, because it is formed by standing point of alone business but not cold chain.

Cold chain network with enterprises group as the core, this network has already started to form and gained a certain development in Beijing. It is alliance of many cold-chain business or subordinate corporate alliances of large enterprises. This network has a greater advantage by cooperation with other enterprises; also it has a relatively complete organizational structure.

All the two forms are enterprise behavior from the business perspective. But on the point of resource utilization, which are not conducive to the integration and use of resources of Beijing; in this respect of economic development, this model seriously hinders the city and the regional economy sound development. Some famous scholars have suggested building urban logistics network. As a special logistics network, cold-chain logistics network's construction has become more urgent with the growing market demand in Beijing.

III. Weakness of Beijing's cold chain logistics network

Cold chain logistics network construction and development of Beijing will face a series of problems, according to analysis of Beijing's cold-chain logistics network above; the following will describe the network from view of development of network planning, layout, engineering and information.

Cold chain logistics network development plan

The development planning[3] refers to development plan, relevant systems and regulations of government and industry, as well as the basic concept of cold chain logistics network.

The cold chain logistics network concept is lack. It is in two aspects. One is the general public is strange with cold chain logistics network or can't understand it completely. Due to consumers couldn't understand the operation of the entire cold chain logistics process, it is difficult for them to realize the cold chain logistics on the point of network, also they won't consider the effective integration of resources, improvement of cold chain logistics network. Another is cold chain enterprises or enterprise group don't have the awareness to establish large-scale cold chain logistics network. Whether professional pharmaceutical logistics company or operational fresh food enterprises is still in self-improvement or development period. In particular, some sales enterprise facing the end-consumer often has not yet reached the technical requirements for cold-chain operations in practical work, so the idea of establishing cold chain logistics network is view as long way off.

Cold-chain logistics network system is inadequate. Beijing's logistics overall plan mainly focused on the logistics base and logistics center; but it is a blank for logistics network policy, the most relevant is some implementation standards on the cold chain. However, they are only technical requirements for cold chain basing on its specificity. There isn't any initiative on the establishment of cold chain logistics network.

Layout planning

Layout planning contains the distribution number and land using of nodes; it also focuses on the operation and management mode of infrastructure and logistics facilities. It must be based on the actual situation of the region or city.

Leading enterprises for construction of cold chain logistics network is few. Although there are some cold chain logistics enterprises in Beijing, yet a few is successful. From successful experience of other network-building, the construction of cold chain logistics network should be driven by processing enterprises (such as dairy, meat processing enterprises), and commercial sales business (such as

large-scale shopping malls and supermarkets). It is worth mentioning that some companies have built the supply and sales network of cold chain, basing on their SCM development strategies, especially several group enterprises have made great contributions.

Industry infrastructure and logistics facilities are imperfection. Currently Beijing cold chain enterprises have some industry problems in the actual construction of cold chain: such as give great importance to meat freezer and cold but contempt fruits and vegetables; emphasis on food source and origin, but ignore the transfer of sales part. In particular, the intersection operation of refrigerated transport and sale stores caused great damage due to temperature. Traffic control and traffic congestion have a serious impact on transport and distribution of cold chain food. For example, the time that prohibits truck access is 7 to 9 points Am, 4 to 8:00 Pm within urban 4th Ring Road, while shopping malls supermarkets tend to accept the goods on 5 to 7 o'clock in the morning. This situation has made it difficult to develop immature cold-chain logistics market. And the direct consequence is increasing vehicles investment, reducing distribution efficiencies, adding distribution costs, also it is the reason that many professional logistics companies don't involve in the urban cold chain distribution business. At present, 90% of the low-temperature food products in the Beijing market are transported at general temperature; it is not only seriously affecting the product quality and safety, but also cause enormous products loss.

Cold chain business operation mode is oversimplified. The current operation modes of Beijing's cold chain companies include individual enterprise mode, cooperation with third-party companies (outsourcing parts to professional third-party logistics companies), fully operated by third parties models and a number of joint operations according to research report of the cold chain industry. However, most cold chain businesses choose their own operating mode, and a few use the mode of business cooperation with third parties partly, while the other two modes are very few. The layout of this business model will hide enterprises to develop their own core strengths. Meanwhile, it is not conducive to play other professional cold chain business advantages to construct logistics network.

Information and Resources Planning

Information and resource planning is defined as the various resources and information technology support to ensure the effective functioning of cold-chain logistics network.

Talent of cold chain logistics network is shortage. Presently logistics personnel are pressing shortage; and cold chain logistics talents are even scarcer. Especially those who have experience in cold chain logistics have become a key factor of restricting the cold-chain logistics network development. Therefore, fostering the cold-chain logistics talent is the

premise of establishing cold chain logistics network.

Cold chain technology and standards is insufficient. In the cold chain development process, a variety of techniques have been produced, some of which stem from the logistics field. Such as GPS (positioning system) and GIS systems (Geographic Information System) are used in transportation and distribution processes. Refrigerated trucks multi-point temperature can be quickly and accurately recorded and returned through the combination of these technologies and multi-point intelligent temperature detector, so that temperature can be controlled effectively.

RFID[4] is another new monitor technology of cold chain logistics. By using RFID technology, temperature changes are recorded in the "RFID tag with temperature sensor," so the product fresh and quality can be managed accurately and detailed. In addition, RFID can also be extended to cold chain monitoring center processes data platform covering the entire cold chain, so business or members of the alliance have access to relevant data through a password. It can monitor and warn the cold chain temperature; also it provides consumers with easy accessible means and publishes the product safety traceability information to public. The use of information technology greatly contributes to the development of cold chain logistics and provides technical support for the establishment of cold chain logistics network.

But the cold chain technology applications mentioned above are not very extensive, and then they should be vigorously promoted. Meanwhile the country has developed a number of technical standards on the cold chain to regulate the operation of the cold chain market, in order to realize goal of the system optimum and low temperatures as the core of the cold chain.

IV. Countermeasures

It is suggested that adopting the following aspects to solve the problems, basing on analysis of Beijing cold-chain logistics network status, problems and summary above.

Establish the concept of cold chain logistics network

Establishing the concept of cold chain logistics network is primary of construction of cold chain logistics network. It is necessary to make enterprises understand that the establishment of cold chain logistics network is a requirement for cold chain development. An effective way is to achieve integration of resources and means to ensure the cold chain food quality and safety through the industry seminars. The most important is to enhance consumer awareness of food safety and food traceability. With the concept of demand will decide the model of manufacturing business, therefore, the consumer concept of cold chain

logistics network determines the concept of the whole industry.

Government and industry

As Government, Beijing Municipal should play a guiding role in the building of cold chain logistics network. Firstly, cold chain logistics standard-setting is the basis of cold chain networks. It is important to further improve the cold chain logistics standards and to norm cold-chain logistics company's business operations. Such as: development of cold chain operating standards and technical standards, supervision and management of cold chain industry. Secondly, industry and government should stand in the overall situation angle to look at the network build and strengthen cold-chain logistics infrastructure planning and construction; a variety of facilities should be in line with the geographical features of their own needs and docking with other regions networks smoothly; it is necessary to form the cold chain networks with centers of five major logistics base. Finally, it should be planned and purposeful to focus on nurturing and supporting the cold chain businesses, such as: the Beijing business group and its cold-chain logistics subsidiary of the East Division and the three new refrigerated storage and transportation companies, and make them become the core of cold-chain logistics network as soon as possible.

Business Group angle

Building cold-chain logistics network has to rely on cold-chain logistics enterprise group cooperation and integration of resources finally. Therefore, as the pillars of strength, these cold-chain logistics enterprises should continue to accelerate their own development and change their business model, in order to achieve their own core competencies by cooperation with the upstream and downstream business or professional third-party logistics companies as much as possible. In a word, only using systems thinking and chasing overall interests can the cold chain logistics network build is possible.

Resources Technical Support

All kinds of logistics training institutions and schools should formulate an effective training program, especially should increase cold-chain logistics personnel according to the actual needs of the talent market. Because the application of cold-chain technology is at an early stage, new type cold-chain technology should be used widely and continuous improvement and innovation.

V. Conclusion

This article has discussed the status of Beijing's cold chain logistics network and its existing problems and corresponding countermeasures, basing on the definition of cold chain logistics network. As the research on the

cold-chain logistics network only began to take shape, the article is mainly based on the analysis of cold-chain logistics in the writing process, and then it illustrates the establishment of cold-chain logistics network. This article is not the only one article that is about cold-chain logistics network, but it proposes construction of cold-chain logistics network problem at the first time. Also it is a specific idea about network construction of the city, so there are a lot of researches on how to build Beijing cold-chain logistics network needing to be studied further.

References

- [1] Gao Yi-jia, 2009. The Complexity of Cold-chain Logistics Network Analysis and Optimization Method. *Knowledge Economy*, No. 4, 101-102.
- [2] Zhang Hong, 2009. Development Status and Countermeasures of China's Cold Chain Logistics, *Technology and Market*, 16(6):42-43.
- [3] Zhou Yuejin, Chen Guo-hua, 2008. *Logistics Network Planning* Beijing: Tsinghua University.
- [4] Ye Yong, Zhang YouHua, 2009. Latest Developments and Countermeasures of Cold-chain Logistics in China. *Journal of Huazhong Agricultural University (Social Science Edition)*, No. 1, 69-72.

Background of Authors

Wang Hongqi (1985-), male, School of Economics and Management, Beijing Jiao Tong University, Master.

Zhou Jianqin (1975-), male, School of Economics and Management, Beijing Jiao Tong University, Associate Professor.