

## Research Article

### Research on Dairy Foods' Cold Chain Logistics Development Based on "Dumbbell" Integration Strategy

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**Abstract:** In order to study the causes of weak development of dairy foods' cold chain logistics industry in china, we analyze the role that the improvement of living standards play in dairy foods' cold chain logistics to put forward higher requirements. This study discusses many serious problems in Chinese dairy foods' cold chain logistics industry, cold chain logistics system is incomplete, which cause a lot of damage to people's mental and physical. For these evergrowing problems, countries need to introduce policies and regulations, to support the development of cold chain logistics industry, increased investment, vigorously develop the integrated cold chain logistics development, so as to promote the "Dumbbell" integration development strategy of Dairy foods' cold chain logistics industry, to deal with the relationship between government and market and make the regional contribution to the realization of Chinese dream.

**Keywords:** Cold chain logistics, countermeasures, dairy foods, "dumbbell" integration strategy, mechanical effect

## INTRODUCTION

Along with social progress and living standards gradually improve, the quickening pace of life, the quality of food is getting higher and higher people's needs are no longer, as usual, eating on the market all to eat all local and now people in different places, demand for dairy foods is becoming more and more in this case, the dairy foods' cold chain logistics as an important means of dairy foods' quality and safety, the development of the national economy as a whole, the quality of national life and health raise the level to meet the needs of people play a very important role in building a harmonious society (Huangcheng and Xie, 2007).

The food cold chain in China originated in the 1950s, meat export trade. In 1982, China promulgated the Food Sanitation Law, thus promoting the development of the food cold chain started in the last 30 years Chinese food cold chain constant development as the guide of the leading enterprises of the food processing industry, has established its own products as the core of the food cold chain system, including the frozen food industry, meat processing companies, dairy foods businesses and large fast food chain. According to National Bureau of Statistics, China's east, central and west of dairy foods' cold chain logistic market share is unbalanced (Fig. 1). Due to the lack of proper cold chain, also resulted in some retail food prices high

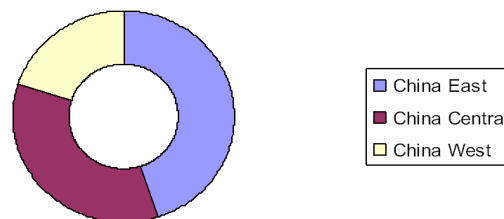


Fig. 1: Chinese dairy foods' cold chain Logistics Market share; National Bureau of Statistics (2013)

in the logistics process. In accordance with international standards, easy to logistics costs up rotten goods does not exceed 50% of the total cost at the same time, China's high-value frozen and dairy foods and consumption are increasing, which adds a huge gap of the cold chain logistics market.

Chinese food cold chain development is mainly in several aspects. Firstly, the lack of complete independence of the cold chain system as the forerunner of the leading enterprises of the food processing industry, but more perishable food processing, production of transport enterprises are still far from understanding the benefits of cold chain logistics for enterprises, food cold chain industry is still remained huge excavations space (Costa-Font and Mossialos, 2007). Overall cold chain system in terms of Chinese food cold chain has not yet formed a system, either from the economic development of China's domestic

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consumption of view, or compared with developed countries, the gap is very obvious. According to statistics, the economic losses of more than a thousand billion, dairy foods into the bazaars demolition of scattered selling, cold chain there are interruptions, which also seriously affected the quality of dairy foods and hindered the development of the Chinese food industry and food industry safety. Secondly, the dairy foods' cold chain market is very low. Chinese dairy foods' cold chain logistics industry is still in its infancy, the market size is not large, relatively strong regional characteristics, in addition to the department of foreign trade and exports, mostly in domestic circulation of fresh perishable dairy foods' logistics services, specifically for fresh perishable dairy foods' logistics services is minimal. lack of influential national food cold chain logistics industry leaders, service network and information system is not perfect, accuracy and timeliness of the poor, food cold chain logistics costs and commodity consumption is high, caused by a regional surplus of fresh perishable dairy foods, thereby greatly dampened the enthusiasm of the producers and the healthy development of the market. Thirdly, the infrastructure is outdated, there is a huge difference with the modern food cold chain logistics management. Refrigerated transport industry was built in the 1990s in China, many cold storage, obsolete device, the efficiency of underground refrigerated trucks, most of equipment far unable to meet the logistics and transport, especially China's railway refrigerated transport facilities are very old, mostly mechanical frozen wagon, the lack of specification insulation preservation of refrigerated transport compartment, dairy foods are mostly ordinary truck transport (Kalogeras *et al.*, 2009). Which is a direct result of corrosion to waste a lot of dairy foods, huge risks to food safety, while logistics costs greatly increase.

Overall words, the dairy foods' cold chain to the lack of overall planning and integration of upstream, midstream and downstream. Effective convergence of dairy foods' cold chain logistics efficiency depends on each node of the cold chain logistics. The extent of the industrialization of dairy foods supply and integration level is not high, from the point of view of the primary products of animal husbandry, production, transport and sales is huge, but in the primary animal husbandry products and fresh perishable animal husbandry supply chain, supply chain upstream, midstream and downstream of the overall planning and coordination between the lack of a serious imbalance in the local development and the phenomenon can not be supporting the overall development planning, the lack of impact of the dairy foods' cold chain resources integration and the promotion of the industry (Gaskell *et al.*, 2004). We hope these can promote the "Dumbbell" integration development strategy of Dairy foods' cold chain logistics industry, to deal with the relationship between government and market and make

the regional contribution to the realization of Chinese dream.

## MATERIALS AND METHODS

**Preservation of Technology factors:** There are two major categories: low-temperature storage and gas transfer storage. Easy storage, room temperature shelf life is only about 7 days now, constant temperature preservation period of 2 months, air-conditioned library shelf for three months. Shelf technology is not yet the essay, has restricted the dairy foods' industrial development problems.

**Transportation technology factors:** With the continual emergence of new varieties of fruit color and social varieties, listed a long time, good quality and nutritional needs increase, the need to enhance fruit storage technology, new technology research and development work, only to seize the affected fruit quality and shelf-life of key technical issues in-depth and detailed study to explore the fruit post-harvest ripening and senescence mechanism in order for the fruit storage technology lay the foundation for further research to explore more, better and more practical fruit storage technology for fruit Industrial value-added technical support (Abad *et al.*, 2009).

**Cold chain technology factors:** Cold chain technology to guarantee the quality of dairy foods play a critical role, while there is no cold chain storage and transport through the dairy foods in the logistics chain loss rate up to 20 to 35% due to the lack of cold chain storage and transport of jujube not only adds unnecessary deterioration, impact products quality, but also resulted in its high retail price, severe compression of the market demand and market space Sales radius, so the new technologies and new methods and gradually applied to the preservation of dairy foods to imminent. Storage and transportation technology to do the promotion of science and technology, so that scientific and technological achievements into productive forces in time (Abad *et al.*, 2009). The promotion of good storage technology, the promotion system and establish a stable channel, so closely integrated with the market and only the market can get much-needed technology, market demand for research to get the information to provide impetus to scientific research is more targeted.

**The microbial environment factors:** The microbial environment in the study found that dairy foods spoilage caused by mechanical bruising is the most important reason, followed by physical decay, caused by the propagation of microorganisms and a very small proportion of dairy foods decay, but should not be underestimated (Hui *et al.*, 2009). Production in order to prevent the infection of various bacteria, the use of

disinfection before production processing and during storage sterilization and other methods to control.

**Cold chain logistics potential risk factors in the construction:**

**A lack of refrigeration products:** Cold-chain storage and other post-processing technology lagged behind the pace of development in the base so the problem of supporting cold chain facilities must pay close attention.

**The low level of animal husbandry cold chain hardware:**

Existing facilities, obsolete equipment, development and uneven distribution, showing semi-mechanized, semi-underground and other simple storage methods coexist (Fischer and Frewer, 2009). The resulting two direct consequences: Firstly, a large number of loss of primary animal husbandry products. Secondly, there is a huge security risk.

**The cold chain of upstream, midstream and downstream of the integration:**

Due to the current level of industrialization and production, supply and level of integration is not very high, although the production volume is large, but in the animal husbandry supply chain, both the lack of cold comprehensive chain professionals, a lack of the supply chain between the overall planning and coordination, so there are serious imbalances and not supporting the phenomenon, the lack of impact of the overall development plan of animal husbandry products of the cold chain resource integration and industry driven (Hui *et al.*, 2009).

**The degree of cold chain market is very low, less than third-party intervention:**

Dairy foods' cold chain logistics business more than most from the primary production base completed, the cold chain logistics is lagging behind the development of third-party logistics, services, funds and information systems are inadequate (Xie *et al.*, 2007).

## RESULTS AND DISCUSSION

**Dairy foods' industry development and growth needs the support of cold chain logistics industry:**

Dairy foods from the processing, storage, transportation, distribution and retail until the hands of consumers, all aspects of its products are always in need of low-temperature environment, in order to ensure product quality and safety, reduce losses (Shi *et al.*, 2000). We must make the appropriate cold chain facilities to keep up with, in order to reflect the scale and efficiency of the synchronous growth.

**A large number of products exported to expand the cold chain logistics industry development:**

Dairy foods' conditions at room temperature storability are not varieties, which form a product contradictions in the absence of cold chain logistics facilities under the conditions of the formation of herdsmen farming,

serious waste products, low prices, the market can not balance the supply and therefore a large number of products exported to the storage, transportation and processing of the higher requirements, the establishment of advanced and efficient cold chain logistics system proposed higher requirements (Xie *et al.*, 2007).

**Product long distance, regional, high-volume deployment also needing the support of cold chain logistics:**

Most of dairy foods market need to rely on the developed areas, there are some products directly exports due to the consumer market and product origin distances, the need for producing a good and efficient cold chain logistics system, dairy foods production base to achieve long-distance transport links with the mainland market, the efficient connection.

**Low cost of cold chain logistics:** With the current national and regional integrated logistics network continues to grow and improve. a variety of transport modes complement each other. Cold chain logistics for the development of animal husbandry logistics facilities to lay a solid foundation, so that dairy foods base only needs to focus on cold chain supporting the building, they can form a relatively complete cold chain logistics system, thus completing the production of products from the base to the value-added, effectively extend the industrial chain (Gaskell *et al.*, 2004).

**Cold chain logistics industry helping to improve food safety:**

With the development of society, the consumer fresh food safety, freshness consumption and constantly demanding higher, the demand for cold chain logistics growing. So that the circulation of animal husbandry products mainly for the cold chain logistics competitive level of competition present, the country's increasing emphasis on food safety and gradually stepped up all aspects of the monitoring efforts. Regulatory constraints also need dairy foods' cold chain logistics system rapidly development and improvement (Kalogeras *et al.*, 2009).

Nowadays, in the cold storage building on the existence of great importance to meat cold storage building looking down on the dairy foods' cold storage building, emphasis on the city's operating cold storage building looking down on the origin and processing cold storage building, attention to large and medium-sized cold storage building to underestimate the wholesale and retail. The lack of overall development plan affecting the dairy foods' cold chain resources integration, as well as the promotion of the industry.

**The national macroscopic policy strongly controlling and supporting at the upstream and midstream stages of dairy foods' cold chain logistics "dumbbell" integration strategy:**

In our industry segmentation has been a serious impediment to the healthy growth of the cold chain logistics industry, service providers nationwide to provide logistics

services, you must obtain the operating license according to the provinces and the mode of transport. This approach greatly constraints the integration of the logistics industry and state departments should develop policies conducive to the development of cold chain logistics industry, to eliminate the policy barriers to meet the evolving needs of the cold chain logistics and the establishment of an effective monitoring mechanism, the close monitoring of perishable foods cold chain in all aspects of running condition.

Combined with industry and related businesses, the development of cold chain logistics standard. According to our country and countries with relevant experience to develop in line with the industry standards of China's industrial development needs, evidence-based cold chain enterprises in operation, standardize industry as a whole, but also to protect China's food safety.

After 2010 economic slowdown, a major shift was observed in frozen food industry due to increased investments of the large players in this sector. Various initiatives taken by the governments have also drastically affected this market positively. Due to the requirement of more cold storage and transport facilities, the leading players are gradually shifting towards emerging markets such as Asia and Latin America (Gaskell *et al.*, 2004). This shift is also influenced by changing preferences and tastes of the consumers in the existing market. Strategic acquisitions with smaller local companies are made by these players to enter the untapped market.

Rapid increase in the level of Chinese cold chain logistics, large-scale use of advanced technology to improve and update the existing refrigeration equipment. Efforts on equipment replacement and to develop new refrigeration equipment. Developed countries in the large-scale use of refrigerated containers at the same time, advanced information technology, control the entire process of refrigerated

transport, such as computer network management system in the United States and Europe, electronic data exchange system and play a important role in the process of refrigerated transport (Huangcheng and Xie, 2007). China should also actively establish unified standard computer management information systems and electronic data exchange system, a comprehensive dynamic monitoring of the transport of a variety of refrigerated trucks, simplified refrigerated truck transportation plan approvals and Empty Wagon link.

Furthermore, government-based, integrated cold chain upstream and downstream enterprises. Coordination with the planning of primary animal husbandry products and fresh perishable animal husbandry products and downstream enterprises, so that resources will integrate the resources of the overall planning of the cold chain logistics.

**Basically deploying resource by the market at the midstream stages of dairy foods' cold chain logistics "dumbbell" integration strategy:** Professional third-party cold-chain logistics enterprises to meet the dairy foods' cold chain logistics industry trends and market demand, can solve the problem of large enterprises are faced with the initial investment, high operating costs, professional management is difficult, so that the dairy foods distribution services to adapt to a greater extent Construction of market-oriented need to strengthen the capability of independent innovation of the third-party food cold chain logistics enterprises is a fundamental way to promote the development of Chinese dairy foods' cold chain logistics.

Due to technological improvements, largest producers of dairy foods are heading towards more exports of frozen foods. U.S. Forms the largest market in frozen food industry due to excessive demand for dairy foods (Dowling, 2006). In Europe, Germany is one of the largest markets due to the increased consumption of dairy foods.

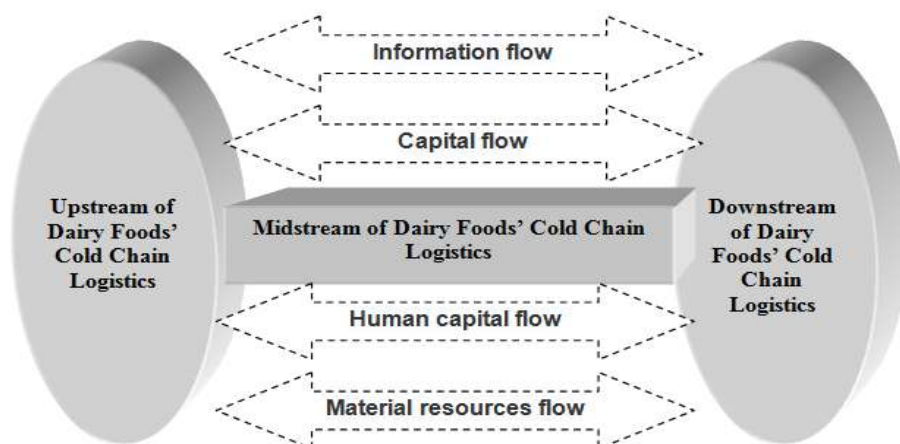


Fig. 2: Mode of dairy foods' cold chain logistics development based on "dumbbell" integration strategy

In fact, dairy foods' cold chain logistics and storage technology has long been the weak link in deploying resource by the market, which affects not only the value-added products and market competitiveness, but also affect the storage and processing quality of dairy foods, restricting the storage processing industry. dairy foods' cold chain logistics and technology, according to their physiological characteristics and requirements listed period, targeted to the choice of appropriate technical measures to improve its storage and market quality, to achieve the best economic and social benefits in deploying resource by the market.

Therefore, in order to improve dairy foods' cold chain logistics market in China, we need a high degree of national attention and support, to capture the overall Chinese development trends of dairy foods' cold chain logistics in order to achieve the rapid development by dairy foods' cold chain logistics development based on "dumbbell" integration strategy (Fig. 2: Mode of dairy foods' cold chain logistics development based on "dumbbell" integration strategy), in order to protect the people's needs and national dairy foods security.

#### **THE VERTICAL GRAVITY "CLUSTER EFFECT" AND THE LEVEL TENSION "CHAIN EFFECT" OF "DUMBBELL" INTEGRATION STRATEGY**

**"Dumbbell" integration strategy of the vertical gravity "cluster effect" at upstream and downstream of dairy foods' cold chain logistics:** The dairy foods industry of a region can form their own characteristic and the competitive advantage, not just rely on one or several large enterprise group (e.g., profit or nonprofit), but also as the industry value chain system, how the industrial cluster effect, particularly as how industrial cluster effect downstream of the industry value chain (Mingwei *et al.*, 2008). Otherwise, affect the extension and expansion in the midstream industry value chain.

"Dumbbell" integration strategy of the vertical gravity "cluster effect" at upstream and downstream of dairy foods' cold chain logistics, mainly manifested in the following two aspects: firstly, the rigid economic effect of industrial cluster; secondly, the flexible social effect in industrial clusters. Physical and mechanical cluster effect of the vertical gravity principle.

Finally, in the industry value chain, the downstream as the focus, in order to focus on the product, leading industry promoting the development of small and medium-sized enterprises complementary mating group, strongly promote the industrial economic restructuring and strive to enter the international

cooperation system and industrial chain, effective way to achieve scale economy and scope economy rigid development.

**"Dumbbell" integration strategy of the level tension "chain effect" at midstream of dairy foods' cold chain logistics:** According to Michael Potter (USA) "competitive advantage" logical exposition, every enterprise is a link in the industry chain, if a business enterprise want to win and keep the competitive advantage, not only depends on its internal value chain, but also depends on a larger value system.

"Dumbbell" integration strategy of the level tension "chain effect" at midstream of dairy foods' cold chain logistics to the right and to the left of the horizontal tension, mainly manifested in the following two aspects: firstly, the epitaxial extension effect; secondly, the connotation of extending effect.

Finally, level tension "dumbbell" integration strategy of "Chain effect" of left or right can more effectively promote the specialization and cooperation. On the one hand is to specialization, the value chain of the enterprises to fully play their director create relaxation and orderly market environment, enterprises only concentrate on one job, so as to achieve the industry chain on the users to enjoy more valuable services, expand the value flow; on the other hand is for the industrial value chain of the value chain to "link" and "continuous" provide support for cooperation, inter industry and intra industry enterprise interdependence, mutual restriction is always maintained at an appropriate balance supporting points provide lasting centripetal force (Dowling, 2006).

As a whole, industrial value chain of enterprises through the correlation industry must be integrated with mutual cooperation, in order to build up a much larger than a single enterprise advantage competitive advantage -- cluster and chain advantage. The mechanical effect of "dumbbell" integration strategy (Fig. 3: The mechanical effect of dairy foods' cold chain logistics development based on "dumbbell" integration strategy), as the government based on the status of existing resources, geographical characteristics, economy, environment, investment environment and local social and cultural environment, through careful cultivation and development of novel splicing and alternative industries, scientific and effective implementation of the regional limited resource and strategy industrial restructuring. Gradually formed a diversified industrial economy structure supporting the "dumbbell" integration strategy in transformation of new mission, new pattern of regional development, the pace will calm solid without losing

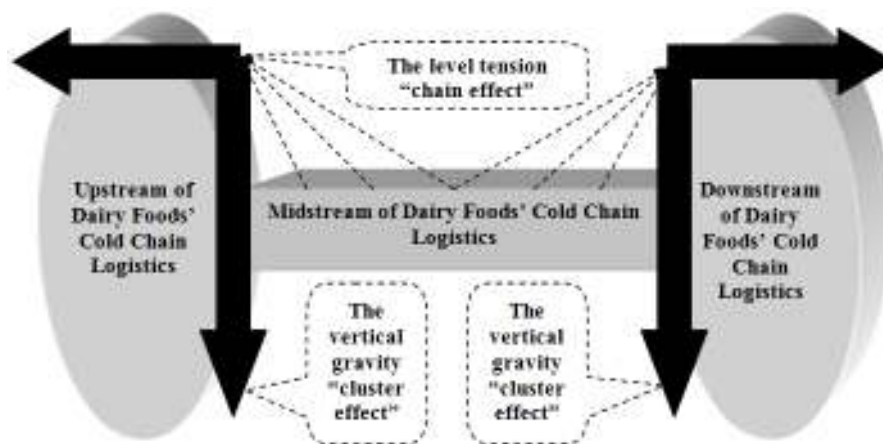


Fig. 3: The mechanical effect of dairy foods' cold chain logistics development based on "dumbbell" integration strategy

speed, to deal with the relationship between government and market and make the regional contribution to the realization of Chinese dream.

### CONCLUSION

It can be seen from the current development of Chinese dairy foods' cold chain logistics, the food cold chain logistics in China is still immature, there is lack of hardware facilities, cold chain logistics system is not perfect, the lack of overall planning, market level is not high, third-party The logistics involved in fewer and software technology behind compared with some European and American developed countries there is a big gap. Therefore, in order to improve dairy foods' cold chain logistics market in China, you need a high degree of national attention and support, to capture the overall China development trends of the food cold chain logistics in order to achieve the rapid development in dairy foods' cold chain logistics industry, in order to protect the people's needs and national food security. Gradually formed a diversified industrial economy structure supporting the "dumbbell" integration strategy in transformation of new mission, new pattern of regional development, the pace will calm solid without losing speed, to deal with the relationship between government and market and make the regional contribution to the realization of Chinese dream.

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