



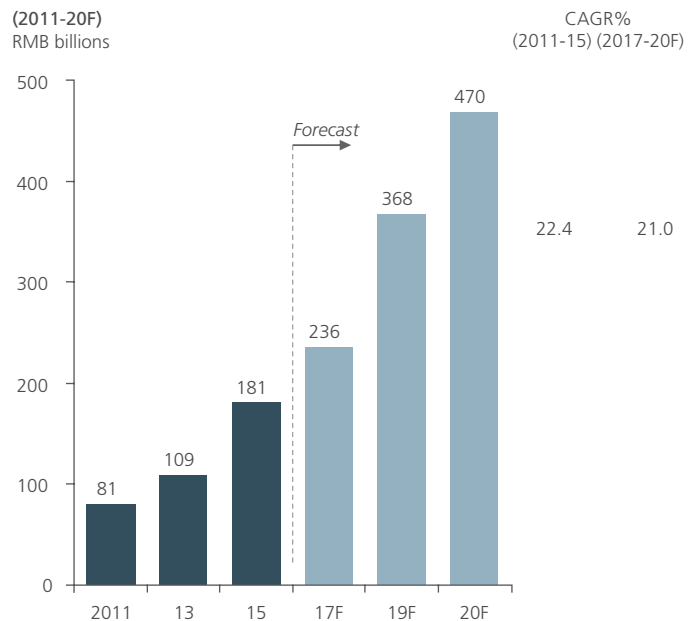
Seizing the Opportunity in China's Cold Chain Logistics Market

A demand-driven golden era of cold chain logistics

With growing income, Chinese consumers have been demanding higher standards with regard to safety, health and quality of life. However, there is increasing concern regarding food and drug safety, especially with fresh produce ecommerce taking off. Cold chain logistics form the foundation of supply for perishable products (e.g., fresh fruits and vegetables, meat, dairy, aquaculture products, fresh flowers) and medical products (e.g., drugs, reagents, vaccines, biologics), which have strict temperature, humidity and other environmental requirements.

Benefiting from the rapid growth of such needs, the Chinese cold chain market has grown at over 20% annually over the past five years, increasing from RMB 80 billion in 2011 to RMB 160 billion in 2015. Persistently increasing demand for fresh food and drugs will continue to drive growth in the cold chain industry — L.E.K. Consulting forecasts that the cold chain industry will be valued at RMB 400 billion by 2020, with transportation, cold storage and other services making up 40%, 30% and 30% of the market, respectively.

Figure 1
China's cold chain logistics market size



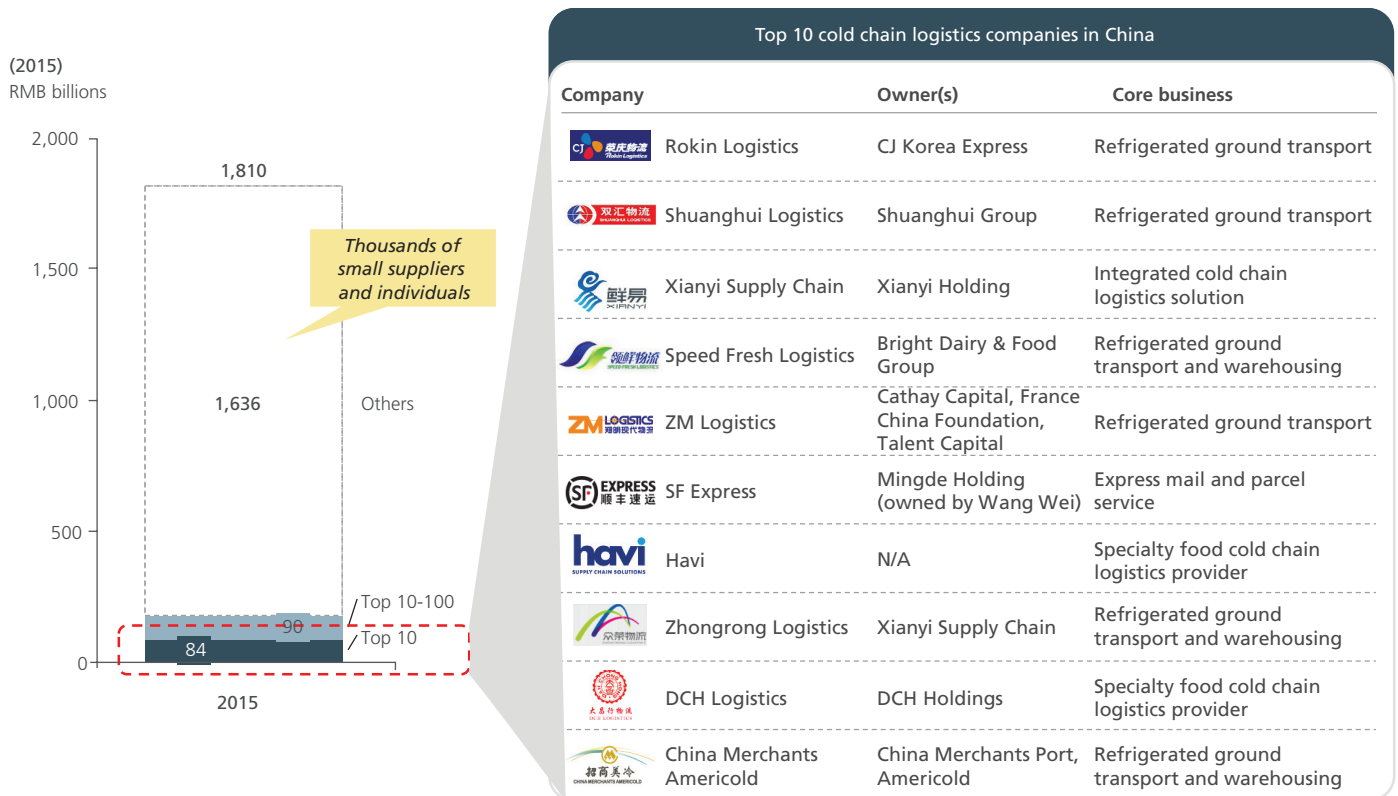
Source: Zhiyan Research, China International Capital Corporation, iResearch, L.E.K. analysis

Despite this remarkable growth, China's cold chain industry is still in its infancy. The market itself is also extremely fragmented, with the China Federation of Logistics and Purchasing's Cold Chain Logistics Committee estimating that revenue from the top 100 cold chain logistics companies accounts for less than 10% of the overall market.

Seizing the Opportunity in China's Cold Chain Logistics Market was written by **Yong Teng**, Principal, and **Helen Chen**, Managing Director, in L.E.K. Consulting's Shanghai office.

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Figure 2
China's domestic cold chain market split by market share and top 10 players



Source: China Cold Chain Logistics Committee, company websites, China Venture, L.E.K. analysis

Although the market is growing rapidly, the unreliability and “breakage” of the cold chain remains a serious problem. As ownership of each stage of the cold chain — warehousing, ground transportation, air freight, airports, distribution and other services — is very fragmented, the lack of end-to-end process control results in widespread mismanagement of such logistics. Additionally, the use of temperature monitoring technology, information systems and other forms of technical assistance is still very immature. As a result, statistics suggest that the rate of cargo damage to fresh products within the cold chain could be as high as 20-30% — much higher than the 5-10% in developed countries.

In recent years, the Chinese government has worked with industrial associations to jointly introduce a series of standards and policies to regulate and promote the development of the cold chain logistics market. With regard to industry standards, the General Administration of Quality Supervision, Inspection and Quarantine and the Standardization Administration of China jointly issued the first Operation Specifications for drug cold chain logistics (GB/T22842-2012) at the end of 2012. In 2014, the National Development and Reform Commission introduced

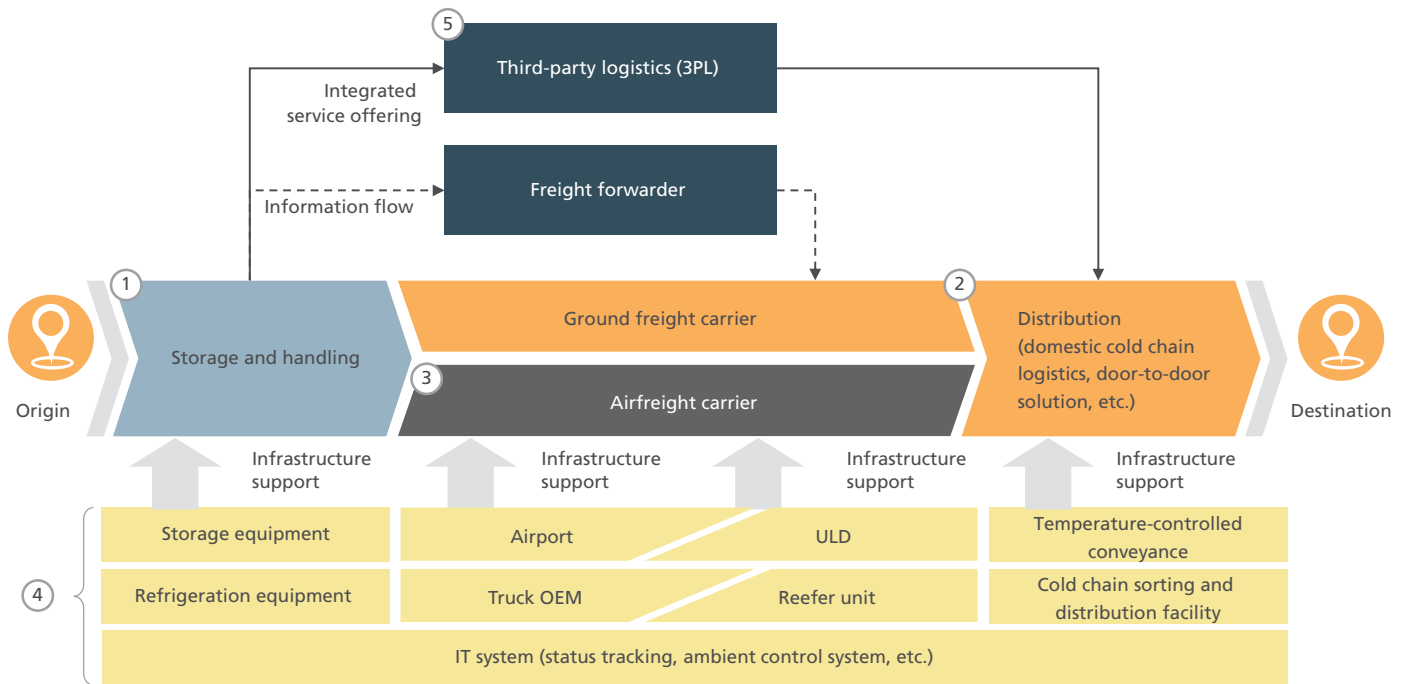
guidelines for cold chain logistics services for aquaculture products (GB/T 31080-2014). At the same time, the International Air Transport Association introduced a formal certification, “CEIV Pharma,” for medical logistics projects for China. In February 2016, Shanghai Pudong International Airport was the first and only airport to achieve CEIV Pharma certification. The “No. 1 Executive Order” of the Central Government in 2016 re-emphasized the plan to accelerate the development of the cross-region cold chain logistics industry through pilot projects.

Hence, L.E.K. believes that the cold chain industry in China has entered a golden era of development — with many opportunities along each step of the value chain.

Dissecting the value chain: transportation, storage, equipment and 3PL

A series of steps are required for temperature-controlled products to move along the cold chain. The cold chain can be broken down into the following segments: warehousing, ground transportation, air transportation, distribution, infrastructure providers (e.g., equipment, systems, basic services) and third-party logistics service providers, also known as 3PL.

Figure 3
The cold chain logistics value chain



Source: L.E.K. analysis

Air and ground transportation in cold chain logistics play different roles due to their respective characteristics. Ground transportation typically involves the use of refrigerated trucks, which are highly cost-efficient, flexible and reliable; allow for door-to-door delivery; and have a low cargo damage rate since their temperature-controlled technology is relatively mature. Conversely, air transportation provides highly efficient and secure transport of goods, but is constrained by high costs and limited volumes — and hence reserved typically for high-value goods with strict delivery requirements such as drugs, flowers and expensive aquatic products. However, as the cold chain is easily “broken” in the ground-to-air transportation connection, the use of air transportation carries a higher probability of cargo damage.

1. Following the development of the cold chain logistics industry, China’s market for temperature-controlled warehousing also has experienced rapid growth. According to the International Association of Refrigerated Warehouses, the total national cold storage capacity increased from 13 million square meters in 2008 to 76 million square meters in 2014. Jiangsu Runheng Logistics Development Ltd., Yurun Group, Shandong Yangchun and

Chenzhou Yijie Logistics are the leading domestic players within the cold storage market.

To keep up with the rapid growth of air transportation in the cold chain, a number of temperature-controlled warehouses have been built near airports and the surrounding Airport Economic Zones. Top domestic airports within China with cold storage capacity include Pudong Airport (Shanghai), Baiyun Airport (Guangzhou) and Kunming Airport. Firms such as Xiamen Wanxiang Cold Chain Logistics Centre, Central China Hub of Frozen and Fresh Produce, and Hangzhou Pharmaceutical Logistics Park of Stater Logistics have invested heavily in cold storage infrastructure in the surrounding Airport Economic Zones in recent years.

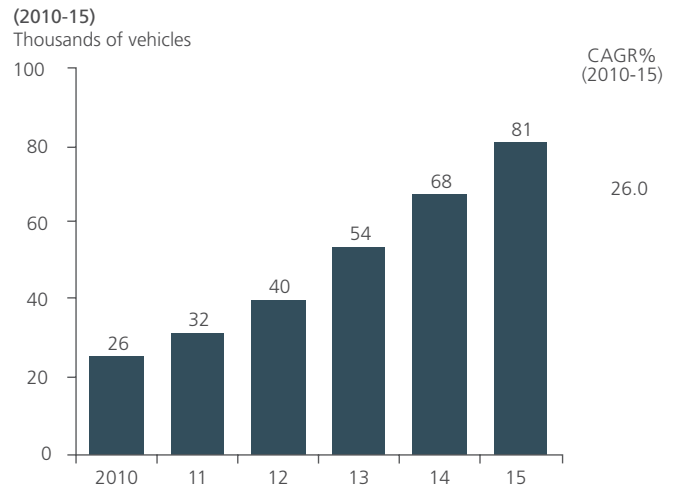
2. For ground transportation, there are three types of key market players: traditional trucking companies, fresh produce suppliers or trading companies, and specialty cold chain logistics service providers.

Traditional trucking companies, such as Rokin Logistics and Zhengming Modern Logistics, entered the cold chain market by offering both temperature-controlled and

non-temperature-controlled transport services. In the second group, cold chain logistics departments are set up by fresh produce suppliers or trading companies to store and transport large volumes of raw materials or finished products, and gradually develop into larger national cold chain logistics companies. Examples of such spinouts include Shuanghui Group's Shuanghui Logistics, Zhongpin Food's Xianyi and Bright Food's Speed Fresh Logistics. With increasing specialization of cold chain logistics, logistics providers have emerged that specialize in temperature-controlled freight shipping with added features such as long-haul transport or last-mile delivery. Domestic players (e.g., Zhongrong Logistics, DCH Logistics), multinational players (e.g., Havi) and joint ventures (e.g., China Merchants Americold) are present in this emerging sector of the market.

- Airline companies and large express mail and parcel service companies are the two main cold chain air cargo providers in China. With increasing market demand for high-quality cold chain services, many airlines have set up cargo subsidiaries to provide air cargo services. Airlines expanded their portfolios to provide cold chain courier services by either purchasing new cargo aircraft carriers or utilizing the cargo compartments of existing passenger aircraft to transport goods at low temperatures. Domestic players, such as Air China Cargo and China Cargo Airlines, utilize passive temperature controls to provide cold chain transport services, while multinational companies, such as Lufthansa Cargo, Singapore Airlines Cargo and Emirates SkyCargo, offer more customized services based on the nature of the transported goods. Additionally, some large-scale express mail and parcel companies have diversified their offerings to provide cold chain air transport. Three domestic players currently provide cold chain logistics services through their own air freight transport fleet — namely, China Post, SF Express and YT Express. While domestic players mainly provide basic cold chain services, multinational companies, such as FedEx, UPS and DHL, utilize more sophisticated and integrated IT systems to offer customized cold chain solutions.
- Ground transportation infrastructure has experienced continuous improvements in recent years. Ownership of refrigerated trucks has more than tripled — from 26,000 trucks in 2010 to 81,000 trucks in 2015. However, the market for refrigerated truck suppliers in China remains extremely fragmented — the top 10 suppliers, including Zhenjiang Kangfei Auto and CLW Special Auto, make up only 26% of the market.

Figure 4
Refrigerated truck car parc in China



Source: China Special Vehicle, L.E.K. analysis

Domestic cold chain air transportation infrastructure continues to lag international counterparts, especially with regard to temperature-controlled containers. Passive unit load devices use ice and liquefied gas to control the transport temperature, while active ULDs make use of refrigerants combined with mechanical or electrical heating and cooling systems to provide more precise temperature control. Envirotainer (Swiss) and Csafe (U.S.) are two leading multinational temperature-controlled ULD manufacturers; domestic Chinese enterprises have not yet entered this market.

Adoption of active ULDs in China is very limited for three key reasons. First, narrow-body airliners make up the majority of China's air freight capacity. As active ULDs are comparatively larger in size than passive ULDs, use of active ULDs is limited to cargo aircraft carriers or wide-body aircraft, which make up less than 15% of the market. Second, as the cold chain is easily broken in the ground-to-air connection, improvements in the air cargo temperature control system have little impact on that of the overall cold chain. Finally, as the air cargo cold chain logistics market is relatively new in China, the large upfront investments required to build an active temperature capacity are not yet economically feasible for air freight carriers there.

- The number of specialty 3PL cold chain providers offering integrated services has been rapidly growing in recent years. A "one-stop shop" model to offer end-to-end logistics solutions has been favored by the cold chain industry in China. Leading local companies include HNA Cold Chain, Suntone Pharmaceutical Supply Chain, Wuhan Lanescync and Your Logistics. Looking to the future, the cold chain industry will be working toward greater efficiency,

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optimizing end-to-end logistical progresses, providing one-stop-shop cold chain solutions and taking advantage of the rapid growth of 3PL providers.

Identifying the “hot” spots for investing in the cold chain

There has been significant merger and acquisition activity in ground-based cold chain logistics in China. In 2015, CJ Korea Express, National Pension Service and STIC Investments jointly spent 382 million USD to acquire China’s cold chain logistics market leader, Rokin Logistics, from Capital Today, Pamoja Capital and GGV Capital. This acquisition enabled Rokin Logistics to deepen its hold on the domestic market while expanding its logistics capabilities internationally, rapidly improving its market performance. In August 2016, Jinjiang Investment announced its plans to acquire an additional 49% stake in Jinjiang Cold Logistics from its prior investor Mitsui & Co. at a price of RMB 147 million, making it the sole owner of Jinjiang Cold Logistics. In the same month, Jinjiang Investment announced another transaction to purchase 30% of Xintiantian Cold Chain from Mitsui & Co. and Mitsui China. Other notable M&A activity within the ground-based cold chain logistics industry includes an RMB 70 million investment by the CDB Development Fund into HHCold and a 10 million USD investment by the Ping’an Agri Fund into Express Channel Food Logistics, a regional cold chain provider in Beijing.

Recent transactions also indicate growing investment opportunities along the value chain of the air freight cold chain

in China; various airlines have made acquisitions in order to actively expand their cold chain businesses. In July 2016, Hainan Air Cargo and HNA Aviation Group invested RMB 900 million and RMB 2.8 billion, respectively, in Yangtze River Express (at RMB 1.6 per share), allowing HNA Aviation Group to own 76% of Yangtze River Express after the deal. In the same month, Henan Airport Group and Dalian Port Yidu Cold Chain Logistics jointly initiated the project of Central China Hub of Frozen and Fresh Produce with a total investment of RMB 100 million. Based on the observed growth of the cold chain industry, future investment opportunities appear most attractive with regard to ULD manufacturing and management, temperature-controlled warehousing, and 3PL.

As outlined above, the development of China’s cold chain logistics market has entered a golden era. Investors should consider the following issues when considering investment opportunities in this sector: Which part of the cold chain logistics value chain has the most potential? What characteristics should investment targets ideally have? Where will the high-growth areas be in the future? What business strategy would allow a company to play a leading role in integrating this industry? How could core competencies be built upon to rapidly improve profitability? Should enterprises position themselves as full-service providers or as specialty industry solution providers? Considering these questions will help potential investors see through the fog and accurately grasp the investment opportunities.

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