Sending a Chill through China

Cold Chain Underdevelopment Offers Growth Potential

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As China has opened to Western influences, both local and foreign demands have necessitated that the cold chain infrastructure is expanded – albeit at different speeds. On the one hand, with growth in industries such as frozen foods and pharmaceuticals, many suggest that China's cold chain is underdeveloped. On the other hand, traditional wet markets enjoy a sizeable retail market share. Hence there is the belief that local demand does not currently require temperature monitoring.

As the business landscape in China continues to evolve, this early stage of development is drawing companies to cold chain operations. For most, investment has been focused on building process standards that are necessary for material movement. For others, improved capacity, lead time and inventory management have been and continue to be focal points.

A Developing Infrastructure

Historically, demand for cold chain requirements came primarily from export production. Large global logistics facilities were invested in near seaports allowing for temperature control in overseas transport; however, this also created a lag in monitoring from the supply base. According to Brad Gilmour and Guoqiang Cheng[1], China's perishable freight spoilage is nearly 33 per cent and accounts for almost USD 9 billion annually. With increasing total costs, higher levels of investment have been focused on expanding midstream capacity.

China's perishable freight spoilage accounts for almost USD 9 billion annually

In recent years, investment in refrigerated warehousing facilities, railcars and road transport containers has increased. Industry specific facility development has also witnessed growth. According to A.T. Kearney[2], existing cold storage infrastructure in China is more than seven million cubic meters. This figure should be compared, though, to the USA which has 88.8 million cubic meters. Specific knowledge of global cold chain standards continues to develop, yet China's cold chain is clearly at an early stage of maturation.

With these limitations, further segments have developed. Large local companies have invested internally in cold chain resources and represent a move to cold chain operations centred at the supply base. Global companies with operations in China have more recently realised similar interests investing in pre-cooling and storage facilities closer to production. Local, small to medium third-party logistics providers (3PL) are another growing segment; most are regionally based due to size, scope and regulations. Local providers commonly serve inbound-outbound logistics with local warehouses and are sub-contracted in tiered networks. With the proximity of the local 3PL provider to both local and foreign end-customers, these stakeholders cannot be underemphasised.

Local End-to-end Cold Chain

China's cold chain serves two distinct markets, local and foreign buyers and each has different sales prerequisites. With a market of 1.3 billion consumers, we will begin with local distribution.

Both local and foreign retailers are drawing larger sales volumes that are partly due to the perception of safer products. The nature of the local cold chain is that storage commonly occurs closer to the customer which creates higher levels of inventory farther downstream, thereby increasing costs. As a result, competition remains. Many local retailers opt for standard transportation and storage which helps to maintain lower cost models. Foreign companies have found success by either adapting to local standards, or investing in integrated cold chain transportation and storage. However, oversights in logistics have posed challenges

1: *Enabling China's Agri-Food Sector*, Brad Gilmour and Guoqiang Cheng.
2: *Food Safety in China: What it means for global companies*, A.T. Kearney, 2007.

in the acquisition of talent, while capital investments and additional assets are often difficult to explain to investors.

Logistics and in-transit inventory provide key insights into China's cold chain. In 1995, China had only 1,800 refrigerated trucks and around 1,500 refrigerated railcars. According to A.T. Kearney's study, in 2007 China maintained 30,000 refrigerated trucks: even considering a compound annual growth rate (CAGR) of over 26 per cent, in-transit capacity constraints continue to limit inventory placement flexibility, a primary cost driver. As A.T. Kearney states, "The United States has nine refrigerated trucks per 10,000 middle-class consumers, China has just two. The United States has 0.36 cubic meters of cold storage per middle-class consumer, China has just 0.045." Here lies the development opportunity many see in China's cold chain.

When viewing the entire supply chain, raw material suppliers must also be considered. In the food and natural products industry, massive decentralised farming is estimated to include over 150 million farms. Without consolidation in this industry, it is difficult to benefit from efficiencies in logistics and the cold chain. Investment, expenses, risk and resource commitment are high and the future tends to forecast a return that often shows a negative net present value. At the moment, many hesitate for this reason.

China's Im- & Export Cold Chain

As an increasing share of global food and pharmaceutical supply and demand includes China, cold chain transportation for exports and imports must be included. In viewing the cold chain design, local processes are the usual default unless the end-to-end cold chain includes foreign investment in capacity and standards' monitoring. According to the China Supply Chain Council's survey[3], 35 per cent of transportation is accounted for in road transportation, while another 46 per cent in sea freight or air cargo requires localised transportation as well. Due to the nature of internationally transported products, in-transit inventory and material handling processes must be considered. Storage during inspection and customs clearance, for example, has limited capacity resources, meaning that products can easily be delayed and become spoiled if not closely tracked through the declaration process.

Cold storage infrastructure in China is more than seven million cubic meters

Although seaports maintain a higher level of cold storage capacity in China's major shipment centres, Shanghai and Beijing, other logistics centres such as Ningbo or Xiamen have far less capacity. Airport facilities in second-tier cities with growing cargo traffic face similar constraints.

Global tracking and tracing integration is still a developing technology. Few local companies are willing to commit to the investment required for monitoring temperature and transportation location which are complex capabilities. Some foreign companies operating in China, however, have built sophisticated systems. With increasing global buyer attention on cold chain products, local investment is justified. As local consumer demands continue to increase in China, greater accountability will be placed on the companies involved in material movement flows. Operational efficiencies will also facilitate an increased acceptance of these technologies.

Cold Chain Management

Cold chain management combines the complexities of two complementary disciplines:

- Technical understanding of temperature variability tolerance and unique shelf-life
- Supply chain knowledge regarding lead time, capacity and forecasting accuracy

China's supply chain industry suffers from a gap in knowledge and the cold chain faces a similar reality. External views are quite telling as to the state of China's cold chain management. According to the China

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3: *2006 Cold Chain Logistics China Survey, China Supply Chain Council.*

Supply Chain Council survey, 42 per cent of respondents indicate that there are three top areas which need improving:

- Service level
- Cost efficiency
- Lead time

These respondents' sentiments directly correlate to knowledge of the foundations of the supply chain.

The nature of the cold chain demands co-ordination between supply chain stakeholders. The following factors will affect, for example, a full truckload container shipment entering China:

- Local cold chain capacity may impact upon the delivery window with inadequate resources for localised distribution;
- Product yield will influence the total costs;
- Less-than-truckload shipments may place multiple products with different temperature sensitivities together;
- Spoilage costs may be significantly higher.

To ensure that batch size optimisation and cold storage capacity can efficiently maintain low costs and reduce the risk of inventory loss, supply chain contributors have to be effectively integrated.

Specific cold chain practices are also important: localised transportation, for example. Truck drivers rationalise a cost trade-off for utilising the on/off switch with cold storage freight. For many industries in China, short-term costs and energy conservation take priority over the cost of spoilage and cost savings are achieved by turning off the cooling system. Hence a driver may trade these benefits for long-term impacts such as product safety and customer satisfaction.

For many industries in China, cost savings are achieved by turning off the cooling system

Knowledge of cold chain resources is required for operations, yet a dearth of infrastructure means that the available talent pool is limited, thereby creating higher investments in continuous training and education. China's local logistics knowledge is still moving beyond traditional principles and cold chain practices present an even larger learning curve. The fundamentals start with hygiene and minimised material handling. Further training may emphasis particulate contamination, heat sensitivity, or risk exposure due to specific environmental impacts.

The entire Olympic Games contract has been awarded to Havi Foods Services, a foreign operated firm, making the reality of China's cold chain clear. Few local companies possess the capabilities to manage a national, let alone international cold chain that adheres to Western standards. This leads some to believe that the market will develop based on business growth potential, while others argue that cold chain development will be led by government imposed standards. At the moment it is clear that traditional transportation will remain competitive without intervention, while differentiation and innovation will continue to steer the industry.

The next phase of China's cold chain industry will include continued expansionary investment in infrastructure and increased supply chain co-ordination. This strategy will improve lead time, capacity and inventory management. These components will become essential to build a sustainable competitive advantage, but they require integrated local and foreign knowledge. China's ascension as a global leader will ultimately facilitate evolutionary growth and lead to a new dawn for cold chain operations. ■