Food Safety, Security and Logistics in China: Meeting the Cold Chain Challenge

Summary

China lacks proper refrigeration and cold chain handling for more than three quarters of meat, fish, fruits and vegetables moving from farm to fork within China. Spoilage rates exceed 30%, and contribute to increasing concerns about food safety and security. Apart from adding more physical assets such as refrigerated trucks and warehouses, China must develop integrated food distribution systems that are designed to maintain proper temperature control throughout the transportation, storage and distribution process. The U.S., which leads the world in cold chain reliability and food safety, offers a valuable source of technical and design expertise that could be adapted to create a strong food distribution network in China.

The Problem

Inadequate handling and refrigeration of agricultural products in China, including vegetables, fruit, meat, fish and poultry, from “farm to fork” causes:

- spoilage rates in excess of 30%
- risk of contamination and resulting sickness
- increased reliance on foreign imports to make up shortfalls

A 2014 study done by the Asian Development Bank (ADB) at the request of the Chinese government and its Development Research Center (DRC) found that there is an urgent need to modernize the country’s cold chain logistics systems: as of the end of 2011, “93.4% of fruits and vegetable, 82.8% of meat and 74.8% of aquatic products were basically transported in the absence of the cold chain.”

Although there has been a recent increase in the operation of refrigerated food warehouses and vehicles in China, these are concentrated in the eastern regions and surrounding urban centers, but shortages continue in the central and western regions. Seventy percent by volume of the fresh farm producing centers “are severely short of refrigerated and freezing facilities.”

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1 The ADB report states that SOEs still own 2/3 of cold chain warehouses, most of which are more than 30 years old and obsolete by today's standards. There are about 50,000 refrigerated trucks on the road in China, with the average refrigerated transport company owning 2.5 vehicles. Private companies dominate by numbers in the cold chain logistics industry: of 119 reported, only 18 are SOEs, but the SOEs tend to be the largest.
While China needs more refrigerated warehouses and trucks, adding physical assets alone will not solve the problem. Spoilage occurs at many points in the process as product is handed off, stored, transported, prepared and offered for sale. Only a systemic solution can maintain proper temperature control throughout, and failure or mismanagement of any one element of the “cold chain” will affect the chain as a whole. From a business perspective cold chain system design, standards, packaging, procedures and training must be cost effective and efficient, so that the reduction in waste and spoilage, and the increase in quality, will be captured without unduly increasing the cost to the consumer.

**Potential Solutions: Overview**

No single solution exists or can be put in place all at once to solve the “cold chain problem” in China. By comparison, in more advanced economies such as the U.S., cold chain was developed by private industry over many years. It is segmented into the so-called “away from home” food services market including end users such as restaurants, fast-food chains, hotels, schools and hospitals, and the consumer market that includes big box wholesalers (Costco, Walmart), super markets and local grocery stores. Away from home food service providers tend to rely on vertically integrated food distribution companies such as Sysco or US Foods at the national level, and a number of smaller regional companies. The grocery chains often purchase meat, seafood and produce from contracted suppliers, and then use their own or nationwide third party logistics companies (e.g., CH Robinson, CR England) expert in cold chain to store and transport the product, usually by land and sometimes by air as well.

Because these options do not exist in China, there has been a tendency to create smaller, specially tailored cold chain networks serving individual corporate end users. For example, according to a 2011 Harvard Business Review article, KFC has “the most advanced and integrated cold chain system in China, with 11 full-service logistics centers and six satellite centers serving every province except Tibet.” KFC China had to establish its own distribution arm, build warehouses, run a fleet of its own trucks and put in place a supplier rating system to concentrate its purchases on those that performed best in accordance standards set by KFC.\(^2\)

Highly specialized private networks such as KFC’s, designed with KFC’s fast-food restaurants in mind, do not readily lend themselves to scale for general usage. However, the DRC and the ADB support our view that the marketplace and the private sector must take the lead in experimenting with workable and scalable solutions, supported by government policy initiatives, and that cold chain logistics pilots should begin with large chain store retailers and their suppliers as customers and participants.

The multitude of small farms in China, the continuing migration from countryside to city, the long tradition of purchasing fresh produce and meat at “wet markets” and the low cost, low tech means used to preserve agricultural products, all make it unlikely that the existing U.S. cold chain model can simply be imported into China. Nevertheless, there can be a leading role for U.S. management expertise, lessons learned, systems design, training and technology to be adapted to meet China’s needs. The success of KFC in China is just one example, but it may point the way.

First Steps and Investment Models

Given the undeveloped state of cold chain in much of China, we believe that pilot projects should be initiated to devise in stages (and possibly from region to region) a vertically integrated food distribution system, applying and adapting management expertise and design from the U.S. side as appropriate. For each pilot there should be a central point of corporate control that would enable the company to put in place as an integrated system many of the currently missing pieces: a consistent process and standards for grading, labeling and packaging; tracking and inventory management using information technology integrated with enterprise resource planning (ERP) systems of the key players upstream and downstream; training; commodity specific temperature control and continuous monitoring through tracking and tracing; as well as state of the art refrigerated warehousing and transportation.

A possible starting point, for example, might be the acquisition of a small, privately owned food distributor in China that has an existing, small-scale logistics system. This entity or a similar company could be used as a scalable platform for some targeted high volume commodity shipments requiring refrigeration and cold chain handling, such as pork and a fresh vegetable or fruit.

Key to the success of such a venture would be the design of the system to be deployed, which would have to be modified as experience and conditions dictate, to accommodate a broad range of commodities and customer requirements. Design of such a system could be a complex undertaking, requiring several stages of development as data from initial operations are collected and analyzed. It might include, for example, process mapping, gap analysis (identifying which value chain pieces are missing), cost analysis, and supply chain analysis (inventory policy, network design and benchmarking against industry standards). We believe that the U.S., which leads the world in cold chain reliability and food safety, would be the best source for this expertise. It could be combined with existing food distributor platform in China, mentioned above, and a strong network of relationships in the food processing and distribution industries in China, to stand up and run the scalable pilot projects.

It is an open question, though, whether it would be best to acquire such a U.S. company outright, to purchase its services and technology as needed, or possibly to
invite it to take an interest in the venture in return for its services. These kinds of questions can only be answered after interviewing a number of U.S. companies offering such expertise, and then determining which of them is flexible, innovative, nimble and culturally aware enough to work with its Chinese counterparts to create solutions best suited to conditions in China.

The SALC is prepared to assist interested investors in identifying and interviewing possible U.S. candidates for this role, and in creating the structure for such a scalable venture to address the cold chain problem in China.