

2017 Top Markets Report **Cold Chain** Sector Snapshot

Ecommerce: Transforming the Global Cold Chain

Cold chain services designed to ensure ideal storage and transportation conditions for temperature-sensitive products have developed rapidly since the 2016 Cold Chain Top Market Report was published. A clear shift among consumers is driving purchases of healthier, fresh products rather than the processed foods that dominated food sales for many years. There is also a drive for more convenient means of buying these products as consumers are progressively less inclined to spend their time shopping. With these shifts in consumer behavior, cold chain service providers have had to rapidly adopt new strategies and infrastructure for delivering goods when and where they are demanded.

At 27 percent of the U.S. population, millennials are becoming major consumers of products and are rapidly approaching their peak earning and spending years.¹ However, their preferences for frugality and convenience have shifted overall consumer buying patterns from purchases at large superstores to local markets and ecommerce. Millennials are more health conscious and digitally savvy, often preferring to purchase organic products and relying heavily on information gathered from social media. Cold chain providers, therefore, must be able to quickly and effectively get fresh products to the consumers and must be able to shift and adjust to the latest trends in demand.

The retail industry is undergoing a massive restructure caused by shifts in consumer product demand, and the rise of ecommerce as a channel for purchasing a wide variety of products from apparel to fresh food. Retail store closures in the United States have increased 162 percent over 2016, with nearly 5,500 announced closures through August of 2017.² Most of the 3,200 announced store openings this year have been in budget-driven convenience stores or “dollar stores” and small footprint grocery stores to meet the new demands of millennial shoppers. These smaller footprint stores can increase the cost of product delivery.

In the United States, increased demand for fresh products and the rapid delivery requirements associated with the growing ecommerce-based food and grocery delivery market have caused a large shift in cold chain operations away from processed/frozen foods that have a longer shelf life. The increased tempo and higher reliance on cold facilities have led to a 4.6 percent increase in cold warehouse capacity nationwide.³

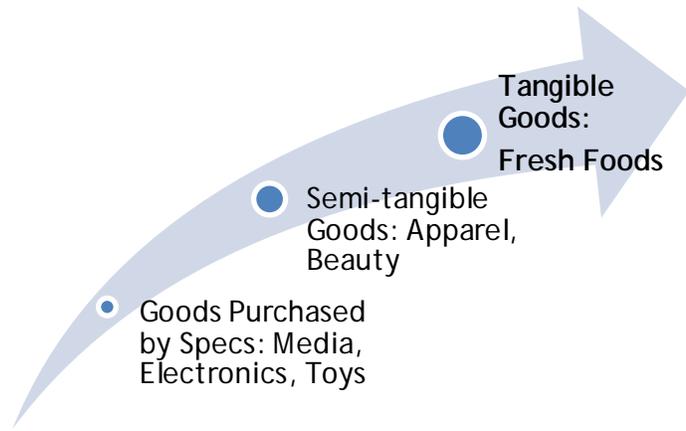
¹ <https://www.funglobalretailtech.com/research/millennials-and-grocery-2/>

² <https://www.funglobalretailtech.com/news/weekly-store-openings-and-closures-tracker>

³ 2016 IARW Global Cold Storage Capacity Report; Salin, Victoria.

At the 2017 annual meeting of the International Association for Food Protection, Wal-Mart’s vice president for food safety predicted that 20 percent of food would be sold online by 2025. At the same time, research by Fung Global Retail shows Amazon is now ranked number 13 among U.S. retailers for the number of customers in grocery sales. This ranking will likely increase with Amazon’s recent purchase of Whole Foods.⁴

Figure 1: The Development of Ecommerce



Source 1: Fung Global Retail & Technology

Innovation

The growing trend to purchase fresh food products online brings challenges and opportunities including the need for advanced, low-cost temperature monitoring devices that will ensure the safety of perishable products, automated warehouse facilities to rapidly manage inventories while reducing per-item costs, and innovative solutions to provide the most costly and critical service of last-mile delivery.

Food transporters within the United States are adopting new technologies that allow real-time temperature monitoring throughout the shipment process. Recently designed temperature monitoring systems, like those from Carrier Transicold, allow multi-temperature monitoring from the cab of a refrigerated truck and can provide graphical trip reports to assure that a consistent temperature has been maintained through transit.

Today’s automated refrigerated warehouse utilizes technologies that streamline inventory management. With the proper mix of radio frequency identification (RFID) technology, bar code scanners, robotics, and cloud based inventory management software, a warehouse can cut its per-unit operational cost significantly. Wal-Mart’s recent testing of automated warehousing systems found that food retailers can decrease labor cost by 80 percent, and operate in a 25-40 percent smaller real estate footprint.⁵

These technologies improve accuracy in inventory management and provide analytics that can help operators determine the best locations to store items based on customer demand rates, temperature specifications, and expiration dates. Some warehouses are beginning to use augmented reality systems that integrate voice commands with image capturing and constant visual scanning to assist workers in picking the correct items for customer orders.

These technologies, which are developed by both large technology companies and smaller start-ups, will become increasingly essential in the rapid delivery of products through ecommerce. The mix of technologies also helps cold chain service providers maintain proper documentation in compliance with the FDA Food Safety Modernization

⁴ <http://www.foodsafetynews.com/2017/07/time-bombs-carriers-shippers-do-little-to-protect-perishables/#.WZWdIWdIJJaQ>

⁵ <https://www.fungglobalretailtech.com/wp-content/uploads/2017/01/2017-Trends-1-17-January-17-2017.pdf>

Act, which requires full accountability for food products' safety, sanitation and transportation from suppliers and distributors⁶.

Delivery, logistics and infrastructure companies in the sector are developing new and innovative technologies to assure proper delivery, from software that can route drivers and assign deliveries in the most efficient ways to deliver packaging that ensures each product retains the best temperature and humidity levels to maintain integrity. Key players in last mile delivery include Caviar, DoorDash, Foodler, GrubHub, UberEats, and Amazon.

This effort is critical since last mile delivery-logistics and infrastructure can often be the most expensive part of supply chain distribution. Cowen and Co. estimate that last mile food delivery is a \$43 billion business in the United States, and will rise to \$76 billion by 2022.⁷

Despite the trends toward new technology, there are growing concerns over the safety of food products delivered to consumer homes through many standard delivery shippers. Some of these concerns were emphasized at the July 2017, annual meeting of the International Association for Food Protection where the results of a study by Tennessee State University were highlighted. The study found 500 websites that offered raw food for sale, including meat, fish, and poultry, and new websites were showing up as fast as others were going out of business. Nearly half of the food orders conducted in the study were at the upper limit of the safe temperature zone for pathogen development at delivery. The study concluded that there is a great variation in the methods used to keep products cold, and many are ineffective or deemed unsafe.⁸

Cold Chain Exports on the Rise

With the recent expansion of the Panama Canal to accept larger vessels with much greater container loads, new technologies, and trade liberalization efforts, opportunities for U.S. agriculture exports have risen significantly, increasing the need for investments to support trade in temperature sensitive products.

The **Port of Wilmington North Carolina**, for example, opened a new \$15 million facility in the last year that includes over 100,000 sq. ft. of storage, and facilities for flash freezing. CSX is expanding its rail operations to the port with a nearby intermodal terminal. The real estate developer that led the project, USA InvestCo, is now reaching out to smaller farms and agriculture developers to turn them into exporters. North Carolina agriculture exports have increased rapidly to more than \$4 billion annually.⁹

Port Tampa Bay has recently completed the first of a three-phase expansion of refrigerated cargo handling facilities. The first phase includes a new 132,000 sq. ft. cold storage facility with seven different temperature zones, gantry cranes capable of servicing 10,000 TEU ships, nearly 100 reefer plugins, a -100-ton crane for containers, and a temperature-controlled fumigation building on site to quickly treat agriculture products. The next phases will include express rail connections to the Midwest and will be followed up with a food campus that

⁶<https://issuu.com/supplydemandchainfoodlogistics/docs/flog0717>

⁷ https://www.washingtonpost.com/news/wonk/wp/2017/08/08/the-insane-43-billion-system-that-gets-food-delivered-to-your-door/?hpid=hp_rhp-top-table-main_delivery-240pm%3Ahomepage%2Fstory&utm_term=.c2a6e93b1da4

⁸ <http://www.foodsafetynews.com/2017/07/time-bombs-carriers-shippers-do-little-to-protect-perishables/#.WZWdIWdIJaQ>

⁹ https://www.washingtonpost.com/news/wonk/wp/2017/08/08/the-insane-43-billion-system-that-gets-food-delivered-to-your-door/?hpid=hp_rhp-top-table-main_delivery-240pm%3Ahomepage%2Fstory&utm_term=.c2a6e93b1da4

will have additional warehousing, packaging and distribution operations. Primary export markets of opportunity from the expansion include Mexico and Asia (for citrus exports).¹⁰

The **Port of Los Angeles** is looking to capitalize on increased cold chain traffic as well. The port currently has 5,337 reefer plugs spread across eight container terminals and is planning to add 6,000 additional spaces for reefers. As part of their modernization efforts, the port is also adding rail infrastructure to provide more on-dock rail solutions since weight restrictions usually require exports from the Midwest to travel to the port by rail rather than road.¹¹

The ocean carrier **Maersk Line** has purchased nearly 50,000 refrigerated containers in the last three years. The shipping line's total capacity of 270,000 reefers has allowed it to capture about 20 percent of the global market. The newest containers provide temperature management to -76°F, control the atmosphere for longer shelf life of the product, are outfitted with global tracking capability, and can provide cold treatment for chilled produce based on various country entry requirements.¹²

Selected Trading Partner Updates

India Update

In India, the International Trade Administration has pushed for more open retail markets that will encourage international companies to invest in local cold chain development. Since the 2016 Cold Chain Top Market Report, the Government of India has reduced restrictions on Foreign Direct Investment (FDI) to allow 100 percent FDI in food retail, including retail ecommerce, if the food products are sourced and manufactured in India.

The country is now seeing greater interest from international investors to develop cold chain systems to safely and effectively transport products throughout the country. Amazon, for example, has announced plans to invest \$500 million in cold chain development to support its ecommerce food delivery systems in this market.¹³ A 2016 study produced by the Indian government suggests that each year the country still loses \$14 billion of produce due to inadequate cold chain systems.¹⁴

Food constitutes nearly two-thirds of consumer spending in India, reaching an estimated \$400 billion in 2016, and many international retailers have expressed their interest in investing in the consumer market. However, since the new FDI liberalizations are limited only to food retail, most U.S. retailers have stressed that they cannot see a path to profitability until further liberalization in retail FDI occurs.

The scarcity of large retail outlets in India is a direct result of the restrictions on retail FDI which has driven many shoppers to ecommerce for products not available locally. The India Brand Equity Foundation, a trust established by the Government of India, estimates the country's retail market will be \$1 trillion by 2020 and ecommerce will make up 12 percent of retail sales.¹⁵ The International Trade Administration anticipates that the largest growth in

¹⁰ <http://www.foodlogistics.com/article/12354130/port-tampa-bay-partners-with-port-logistics-refrigerated-services-on-new-cold-storage-facility>

¹¹ <http://www.foodlogistics.com/article/12337893/ocean-carriers-and-ports-invest-in-food-safety>

¹² <http://www.foodlogistics.com/article/12337893/ocean-carriers-and-ports-invest-in-food-safety>

¹³ <http://www.livemint.com/Industry/j3SQRQ6yPuXopxg9Ty9HGJ/Govt-to-soon-clear-Amazons-proposed-FDI-in-food-retail-Har.html>

¹⁴ <https://www.funglobalretailtech.com/research/deep-dive-international-grocery-retailers-india-1-3-billion-consumers-shopping-dinner/>

¹⁵ <https://www.funglobalretailtech.com/research/deep-dive-india-rising-e-commerce-disruptors-india/>

the country's food retail industry will be e-commerce food sales. ITA will remain diligent in discussing the benefits of further liberalizing the market with the Government of India, and expects to see further progress soon.

China Update

China's growing middle class has fueled a growth of the country's agriculture market to \$1.4 trillion. These consumers have been demanding higher levels of safety and are increasingly willing to purchase fresh products from the United States and other foreign sources. The U.S. Department of Agriculture now estimates that China accounts for 16 percent, or \$20 billion, of U.S. agriculture exports.¹⁶

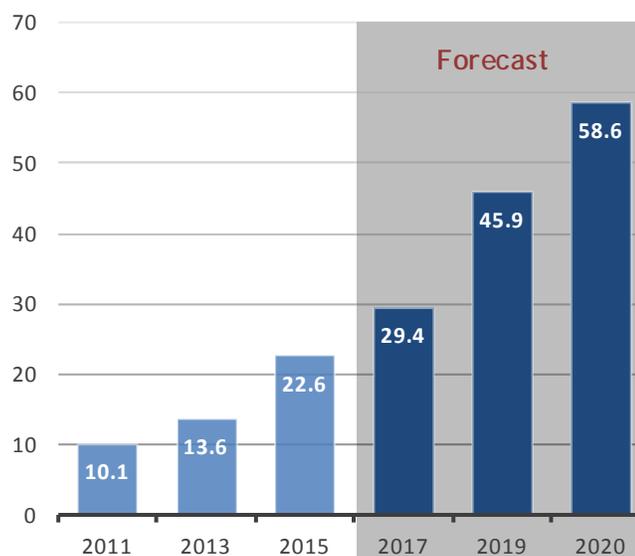
The cold chain market in China has grown more than 20 percent per year since 2011 to \$23.5 billion.¹⁷ Management consulting firm L.E.K. Consulting has forecast the cold chain market in China to more than double, becoming a \$58.6 billion market by 2020. The market continues to be extremely fragmented. According to China Federation of Logistics and Purchasing's Cold Chain Committee, there are nearly 2,000 suppliers and individuals engaged in cold chain logistics. The committee also notes the top 100 companies control just 10 percent of the cold chain logistics market. Food wastage of products is estimated at 20-30 percent.¹⁸

China's General Office of the State Council recently developed guidelines on cold chain development, calling for increased use of cold chain, and the development of logistics infrastructure and temperature tracking systems by 2020.

In May 2017, China reduced restrictions on U.S. beef exports directly to China. Since then, the U.S. Commercial Service has received numerous inquiries from second- and third-tier Chinese cities interested in developing cold chain systems that will be able to support U.S. agriculture products and food brought into their cities by U.S. franchises.

The International Trade Administration will continue to work in China to enhance the cold chain systems and provide greater opportunities for U.S. exports.

Figure 2: China Cold Chain Logistics Market Size (\$ Billions)



Source 2: Zhiyan Research, China Capital Corporation, iResearch, L.E.K. analysis

¹⁶ <https://www.ers.usda.gov/webdocs/DataFiles/50441/xfytop15.xls?v=42720>

¹⁷ <http://www.foodlogistics.com/article/12346063/chinas-cold-chain-is-growing-to-meet-demand-despite-its-many-broken-links>

¹⁸ <https://www.chinabusinessreview.com/seizing-opportunities-in-chinas-cold-chain-logistics/>

Singapore Update

As mentioned in the 2015 and 2016 Cold Chain Top Market Reports, 60 percent of Malaysia's population is Muslim, making the country a prime opportunity for cold chain providers that are certified under Malaysia's proprietary halal standard.

In April 2017, the Japanese express delivery service provider, Nippon Express, seized upon the opportunities to provide cold chain distribution in halal and had received halal certification for its distribution centers in Tokyo and Fukuoka to service its facilities in Malaysia. The Malaysia facilities have had certification since 2014, and now Nippon Express looks to expand its halal services throughout the Asia region. The demand for halal certified logistics has rapidly increased throughout the region beyond Malaysia, including Japan, Indonesia and Thailand.¹⁹

¹⁹ <https://asia.nikkei.com/Business/Companies/Nippon-Express-seizes-chance-in-halal-food-transport>