Retail Supply Chain Management

3. Cold Chain for Grocery Items
Objectives

- Understand the importance of cold chain to retailers
- Learn the development and current status of cold chain in China
- Identify the major problems and opportunities in the development of cold chain in China
Cold Chain in China

- Cold chain is a temperature-controlled supply chain.
  - Uninterrupted series of storage and distribution activities which maintain a given temperature range.
  - It includes transportation, load and unload, processing, storage, and selling

1: Information source: China Franchising & Chain Store Association (2009), Investigation Report on Supermarket Chains’ Fresh Food Supply Chain.
Why Cold Chain?

- Some products need cold or frozen storage
  - Frozen food, milk, and tofu etc.

- Extend the shelf life of fresh food

- Prevent loss and improve food safety
  - 20%-30% food loss occurs in transportation or storage
### The Relationship between Temperature and Shelf Life

<table>
<thead>
<tr>
<th>Product</th>
<th>Transportation</th>
<th>Shelf Life (at 1 °C)</th>
<th>Shelf Life (at 3 °C)</th>
<th>Shelf Life (at 5 °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat</td>
<td>2.5 days</td>
<td>7 days</td>
<td>5.5 days</td>
<td>4.5 days</td>
</tr>
<tr>
<td>Sea Food</td>
<td>2.5 days</td>
<td>5 days</td>
<td>3 days</td>
<td>1 day</td>
</tr>
<tr>
<td>Strawberry</td>
<td>2.5 days</td>
<td>10 days</td>
<td>7 days</td>
<td>3 days</td>
</tr>
<tr>
<td>Salad</td>
<td>2.5 days</td>
<td>12.5 days</td>
<td>10.5 days</td>
<td>7.5 days</td>
</tr>
</tbody>
</table>
Why Cold Chain?

- Increase sales and profit
  - Jingkelong supermarket built up fresh food distribution center in 2006.
    - The sales and gross profit of vegetable and fruits increased 50% and 5% respectively
    - Gross profit of pork increased 4-6%
No country has embraced the movement away from home-cooked food and toward packaged food like the United States. A typical American is more likely to eat a frozen dinner or canned soup than a home-cooked meal. The trend is seen worldwide, as packaged food is replacing fresh food in nearly all other countries. A study in the Journal of Environmental Health found that people who eat more packaged food have higher levels of obesity, diabetes, and heart disease.

“Packaged foods are a large amount of processed and artificial ingredients,” said Mark Selikow, a professor at the University of California, Berkeley. “They are typically high in sugar, salt, and fat.”

T. Colin Campbell, a nutritionist at Cornell University, said that “there is a lot of money tied up in the industry because it is profitable. This prevents us from making healthy food available to everyone.”

The trend towards packaged food is not without consequences. The World Health Organization has estimated that processed and manufactured foods account for about 70% of global food production. This shift away from fresh food is contributing to rising rates of obesity, diabetes, and other chronic diseases.

**Metrics**

**Factory Food**

- **United States**: 602
- **Spain**: 621
- **France**: 638
- **Mexico**: 597
- **Japan**: 646
- **Russia**: 698
- **Brazil**: 677
- **South Africa**: 875
- **China**: 1,004
- **India**: 378

**Processed Food**: 624

**Vegetables**: 132

**Fruit**: 123

**Eggs, nuts, and beans**: 122

**Meat and seafood**: 122

**Fats and oils**: 122

**Sauces, dressings, condiments**: 122

**Bakery goods**: 122

**Pasta**: 122

**Soup and canned vegetables**: 122

**Snacks and candy**: 122

**Processed, frozen, and ready-to-eat meats**: 122

**Packaged Food vs. Fresh Food**: 122

**TOTAL**: 1,808

**Notes**

- Supply Chain Management Module
- David F. Miller Center for Retailing Education and Research
Cold Chain in China

» Overview

- Integrated cold chain is rare in China
  - Cold chain breaks when unloading products for 20-30 mins
- Food needs cold or frozen storage
  - 90% retailers use cold chain.
  - Cold chain is broken in some links.
- Fresh agricultural products
  - Mostly transported and sold in normal temperature.
- The rotting rate is 35% for fresh food; 10%-15% for meat and fish
  - 5% in developed country; 3% in the U.S
The Sources of Food Loss

- Transportation, 43%
- Sort & Pick, 29%
- Upload & Unload, 14%
- Others, 14%
Treatment for Food Loss

- Loss: 57%
- Return: 14%
- Re-processing: 29%
Centralized vs. Store Purchasing

- Centralized Purchasing: 89%
- Store Purchasing: 7%
- Both: 4%
Sources of Fresh Food

- Farmers, 16%
- Wholesalers, 29%
- Both, 55%
Temperature Check

- Surface Temperature, 23.08%
- Center Temperature, 27.47%
- Refrigerated Truck Temperature, 21.98%
- Touch and Sight, 35.16%
- Others, 3.30%
Distribution Centers of Supermarkets

- **Already Have Fresh Food Distribution Center, 65%**
- **Fresh Food Distribution Centers are under Construction, 15%**
- **No Fresh Food Distribution Center, 20%**
Fresh Food Distribution Center

- Relatively small
  - <5,000 m², 75%
  - <500 SKUs, 68%
- Short of high quality refrigerated warehouse
- Lack of functions
  - No processing, 57%
The Size of Distribution Centers

- <1,000 m²: 25%
- 1,000-5,000 m²: 50%
- 5,000-10,000 m²: 15%
- >10,000 m²: 10%
Transportation

- Mainly use suppliers or third party for distribution.

- 0.3% refrigerated trucks

- 15% fresh food was transported using refrigerated trucks in China; 90% in the developed countries

- 80%-90% fruits, vegetables, meats and aquatic products are transported using normal trucks.
Transportation (Cont.)

- 29.67% retailers own refrigerated trucks
- 36.26% use suppliers’ refrigerated trucks
- 13.19% use the third party refrigerated trucks rented by suppliers.
- 5.34% use the third party refrigerated trucks rented by supermarket.
Business Model for Selling Vegetables and Fruits

- Mainly Self-running, 43%
- Purely Self-running, 37%
- Mainly Joint-running/for Rent, 15%
- Purely Joint-running/for Rent, 5%
Consumers’ Preference regarding Different Retail Formats

- **2005**
  - Hypermarket: 28%
  - Supermarket: 58%
  - Convenience Store: 8%
  - Free Market: 6%

- **2007**
  - Hypermarket: 51%
  - Supermarket: 42%
  - Convenience Store: 4%
  - Free Market: 3%

- **2008**
  - Hypermarket: 46%
  - Supermarket: 44%
  - Convenience Store: 7%
  - Free Market: 3%
Sales of Fresh Food/Total Sales

- <10%, 40%
- 10%-20%, 45%
- >20%, 15%
Other Issues about Cold Chain in China

- No industry standard and regulation
- Management problems
  - Low efficient in loading and unloading
References
