Havmor

ICE CREAM

SUMMER INTERNSHIP REPORT

SUMMER INTERNSHIP PROJECT

FINAL REPORT

Summer Internship at

HAVMOR ICE CREAM PVT. LTD.

Role: *Supply Chain Intern*

Sector: *Food & Beverages Industry*

Project: *Cold Chain Analysis and Benchmarking*

Location: *Work from Home*

Submitted To:

Prof. Prabhat Kumar Yadav

Submitted By:

Srinivas Padmanabhan (191454)

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ACKNOWLEDGEMENT

Havmor Ice Cream Pvt. Ltd. has been the perfect learning platform for a person looking for a future in supply chain and operations. The company has a profoundly well planned supply chain system and being a part of the system, assisting the operations team amidst the pandemic crisis helped me realize real time problems and the mentality required to tackle them.

I would take this opportunity to thank Mr. Ankit Jambusaria, Supply Chain Lead at Havmor Ice Cream Pvt. Ltd. for his constant guidance and support amidst hectic work schedules. I would also like to thank the entire supply chain team, helping us through the briefing and flooding me with their takes and thoughts on supply chain problems and possible solutions to it during the crisis.

I would like to thank Mrs. Pooja Mulani, HR executive who had supported me throughout the internship, attending to any issues or concerns with utmost sincerity and clarifying them without any hesitance.

I would also like to thank all the different institutional heads, managers and workers who had helped me complete the project on time.

Lastly, I am grateful to the Corporate Relations Team for assisting me in providing such a great opportunity in a leading company in its sector and Prof. Prabhat Kumar Yadav for his support.

EXECUTIVE SUMMARY

The internship at Havmor Ice Creams Pvt. Ltd. was completely based on supply chain and replenishment. The initial objective of the project was to understand company operations at its warehouses and manufacturing facility and then suggest loop holes where cost reduction can be done. Over the period of time, due to the pandemic the project objective was modified to analyzing and understanding the cold supply chain and various cost cutting opportunities in the same.

In the process, the Indian cold supply chain market was studied in detail and the various factors that influenced the market were analyzed in detail. All these factors are functionalities of various cost influencers in the supply chain. As a second step, the various cost factors influencing the cold supply chain was studied and some recommendations for improving the warehouse operational efficiencies were given.

The latter half of the project involved coping with supply chain disruption and involving with the supply chain team to understand real life challenges in supply chain due to the pandemic and then assisting the team in daily coordination with transporters and other service providers.

The major learning technically has been the operations of a supply chain team and also at a personal level the importance and effectiveness of working as a team and understanding the challenges one has to face to be a real leader under challenging circumstances.

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PART- A: ORGANIZATION PROFILE

1. INTRODUCTION

1.1 About the Company

Havmor Ice Cream was established in 1944 by Satish Chandra Chona at Karachi, Pakistan. The company then had to be shifted to India due to partition and is now headquartered at Ahmedabad, Gujarat employing over 5000 people across 14 states in India. The company is currently owned by South Korean conglomerate Lotte Confectionaries.

1.1.1 History

The founder of the ice cream giant is Satish Chandra Chona. The undeterred passion for food and the hunger for success eventually concluded in 1944 at Karachi, Pakistan where the first Havmor Ice Cream store was set up. The Indian independence and the resulting partition forced Satish Chandra Chona to leave Pakistan. Satish Chandra Chona started selling home-made ice creams in a hand cart in Ahmedabad, Gujarat. The weather always remained warm at Ahmedabad which favored the business.

The first outlet of Havmor Ice Creams was set up at Relief Road, Ahmedabad and the business soon expanded to Baroda and various other locations in Gujarat.

1.2 Products and Services

Havmor Ice Cream Pvt. Ltd. has a wide range of products in its portfolio. The company offers 3 product varieties and over 150 sub-categories of the products. All the products are manufactured from fresh dairy products acquired from various local farmers and milk cooperatives. Havmor is one of the few companies to produce fresh ice creams each day unlike many of its competitors selling frozen desserts. The company produces and sells over 0.25 million litres of ice cream each day at the Faridabad and Ahmedabad manufacturing facilities. Other than the products mentioned above, Havmor owns a chain of restaurants all over India. Havmor enjoys a retail network of over 40,000 ice cream outlets and also runs franchisee model parlors. Currently, Havmor owns over 250 dedicated ice cream parlors across India and adding more each year.

1.3 Market Segments

Ice cream industry in India is one of the fastest growing and one of highly demanded food product in India. The impulsive growth of this industry in India can be attributed to various factors such as rapid urbanization, population growth, increased disposable incomes, favorable Govt. policies, developing cold chain infrastructure, improvements in manufacturing technologies & warehousing techniques, increase in the production of milk etc. the industry has grown at CAGR of 14.1% during 2014-2019 period. The industry is expected to reach INR 440 billion by 2025.

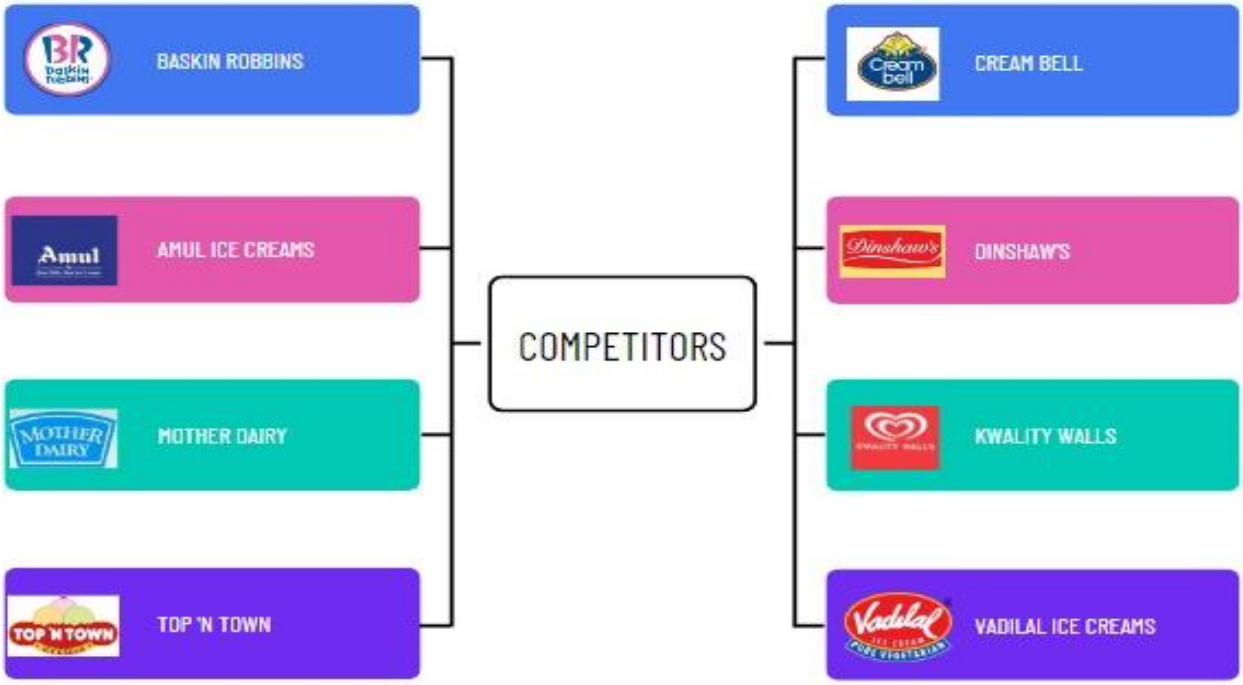
1.3.1 By Type

The ice cream market is often classified by the type and the end user of the product. In this market segment, ice creams are sub categorized as impulse, take-home and artisanal ice creams. The impulse ice cream market holds a majority of the market share and caters to people in lower and middle income category. On the other hand, artisanal ice creams are designed and produced at ice cream parlors and restaurants to cater specific needs of customers where the growth is dependent on innovation. These ice creams are more expensive in nature. The take-home ice creams cater families, parties, weddings etc. These are manufactured on a large scale basis and are consumed on large quantities. The quality, taste and price of the ice cream play a major role in this category.

1.3.2 By End User

A huge volume of ice creams manufactured in India is either distributed to retailers or supplied to various institutions like hotels, restaurants, canteens, schools etc. and only a small margin is exported to neighboring countries.

1.4 Major Competitors



The Indian market witnessed a large influx of foreign players in the last decade. The major competitors of Havmor in Gujarat, Rajasthan and Delhi remain to be Amul and Vadilal. Kwality Walls and Mother Dairy compete with Havmor in the south and south-west regions of the country. Baskin Robbins, Top N' Town, Cream Bell and Dinshaw's targets premium customers and serves an elite market.

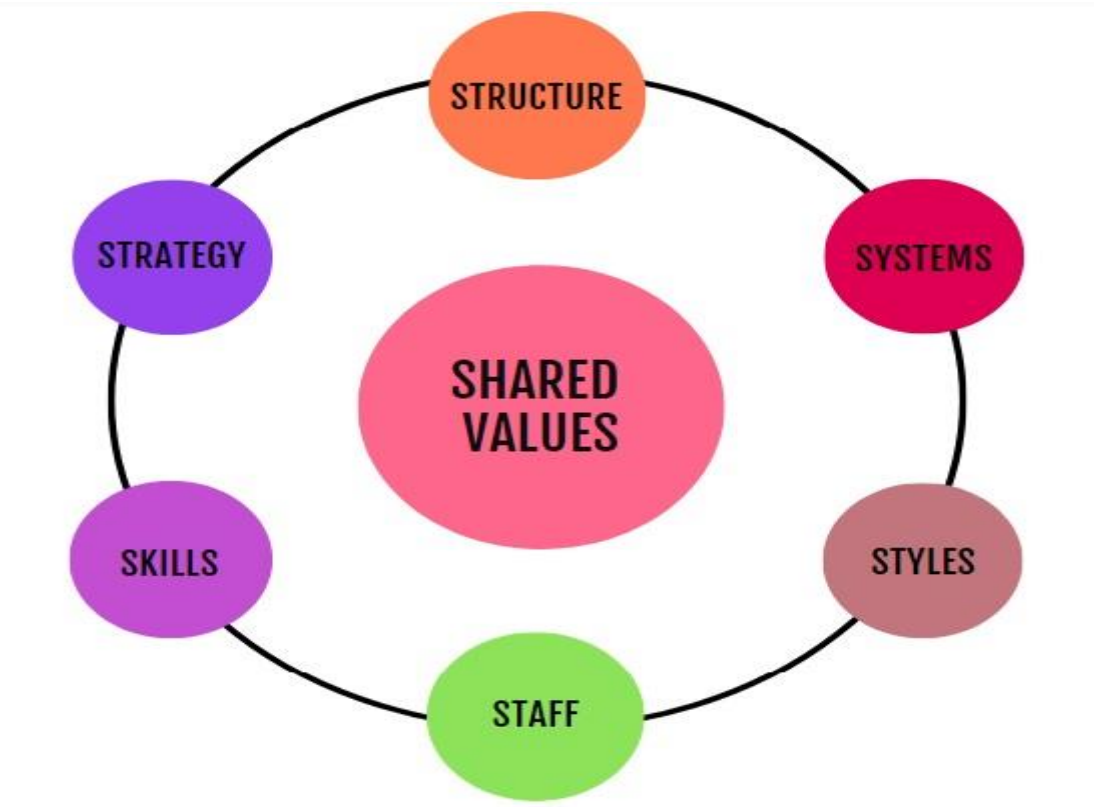
1.5 Financial Ratio Analysis (FY 2018-19)

FINANCIAL RATIO ANALYSIS

- The ***current ratio*** of Havmor is 0.996 which indicates that the company has ₹ 0.996 to pay for every rupee of debt. Although current ratio greater than 1 is considered to be healthy, the ratio can vary each FY and this just might be an indication that the company is borrowing more money to grow.
- ***Asset Turnover*** ratio indicates the utilization of assets in generating sales revenue. In this case a ratio of 1.197 shows that for ₹ 1 worth of asset generated ₹ 1.197 sales revenue.
- ***Inventory Turnover*** represents the number of times a company has sold and replaced its inventory. In this case the inventory turnover is calculated to be 7.077. This shows that Havmor tends to turnover its inventory approximately 7 times. In this case DSI is approximately 52 days.
- ***Return on Assets*** signifies the efficiency of an organization in utilizing its assets to generate earnings. In this case the ROA of Havmor is 17.706% which shows significantly high returns and shows that the company is effective in converting its investments into income.

- ***Return on Equity*** represents the utilization of equity capital to generate revenue. On one hand, having a higher ROE might look impressive but this juts might be the result of low equity account compared to the net income. ROE is also affected by the dividends paid in the FY. In this case Havmor has not paid any dividends for the FY 2018-19 and hence and higher ROE. The indicated ROE for Havmor is 37.773%.
- ***Working Capital*** is basically the capital required for day to day operations. It is the difference between current assets and current liabilities. In this case the working capital is negative and this indicates higher debt.

2. 7-S STRETEGIC FRAMEWORK



2.1 Strategy

The strategy of a company encompasses its plan for the future, its vision, mission, goals, objectives and identifying its competitive advantage to sustain in a competitive environment. Strategy is an elaboration of what the company must not do in order to be competitive and profitable. Havmor as an organization have adopted ***product differentiation*** and accurate ***market segmentation*** as its competitive advantage. The company has 13 ice cream varieties with over 150 flavors and tastes.

2.2 Structure

The structure of the company organizes various divisions and functionality under one single roof. The structure helps various divisions align themselves towards a common goal. Havmor has more of a ***matrix structure.*** This ensures that while an employee fulfils divisional

objectives, he/she also is aligned to the organizational goals by reporting at various levels for various projects.

2.3 Systems

Systems ensure that the organization is in the right path and its employees are working effectively and are productive. Havmor uses ERP systems like ***SAP S4 HANA 1809*** to ensure operational efficiency and effective communication at every level.

2.4 Shared Values

Shared values represent the collective ethics, culture and business approach of an organization. These are the foundation of an organization and gradually develop as a brand image in the market. Havmor ensures ***"Achai, Sachai, Safai"*** in every product and service it offers. This means that every product is offered with ***"Goodness, Truthfulness, Purity".***

2.5 Skills

Skills encompass the capabilities and caliber of staff and management in enduring difficult situations as well as in leading the organization in a successful manner. The prime focus of the HR department in Havmor is to identify, assess and empower its employees with relevant skill sets in order to improve productivity. Regular training and development sessions along with exposure to latest technologies are one of the steps taken by the company to ensure high skills in its employees.

2.6 Style

Style is the administrative manner of the higher authorities. This directly affects employee morale and productivity. It is basically the prevalent corporate culture of the organization. Havmor upholds a friendly working environment and adheres to its core Indian values strictly. Every employee is treated with respect and is given his/her own personal space at work. The employees are not burdened with strict deadlines and heavy work; rather work is planned in a meticulous manner.

2.7 Staff

Staff represents the working personnel of an organization. They are the backbone of any organization and are critical to any organization's success. Proper training, promotions, pay hikes etc. helps employees to stay motivated. Recently due to Covid-19 pandemic, several competitors of Havmor laid-off many employees. On the other hand, Havmor paid all their employees including contract employees and migrant labors. The manufacturing facilities are equipped with all the safety precautions and employees are constantly monitored for their wellness. All these measures ensues a sense of importance in the employees' minds and keep them motivated and productive.

3. COMPETITIVE POSITION (PORTER' FRAMEWORK)

3.1 Competitive Rivalry

The rivalry among competitors in the ice cream industry can be considered as ***moderate to high***. Ice creams are seasonal products and as a result the demand fluctuates throughout the

year. The demand peaks during summer and gradually recedes as winter approaches. The main target of ice cream companies during off-season would be marriage parties, community gatherings etc. This fluctuation in demand raises competition among sellers.

Buyers have the luxury of switching brands easily with low switching costs and as a result companies tend to compete for increasing consumer loyalty. As switching costs are low, consumers are highly prone to brand switching.

Companies in the ice cream industry are continuously innovating in order to keep their products differentiated from others. This helps increase customer base and loyalty. As a result, the competition keeps on increasing.

3.2 Threat from New Entrants

The threat from new entrants in the ice cream industry can be estimated to be ***low to moderate.*** This shall be attributed to several factors such as economies of scale, brand loyalty, availability of distribution channels, govt. policies etc.

The well established brands have their own methods of cost cutting and might have attained economies of scale. The companies having larger production capacities will have cost reduction techniques in place and thus survival in the industry would be difficult for new entrants.

Acquiring efficient distribution networks and maintaining a profitable supply chain would be difficult task for a new entrant. Effective and efficient distribution channels are attained through years of presence in the market and by continuously building customer base.

3.3 Bargaining Power of Suppliers

The bargaining power of suppliers in the ice cream industry can be considered as ***low to moderate.*** India is a large producer of agricultural products. Milk production is one of the dominant sectors in agriculture. Milk being the primary raw material for ice cream production, it is relatively easy for manufacturers to procure milk from farmers on a large scale.

The number of suppliers in the industry is very high resulting in lower control over prices and gives the manufacturers opportunity to switch easily. This reduces the bargaining power of suppliers and emerges as a weaker force in the industry.

The chances of forward integration by suppliers are very low. This means that the suppliers will not emerge as an ice cream manufacturer on a larger scale. Even though some local manufacturers exist, they are not as equipped as national players and thus the scope of expansion is very low due to various reasons.

3.4 Bargaining Power of Buyers

The bargaining power of buyers in the ice cream industry can be considered to be ***moderate to high.*** Ice creams are seasonal products and during off season, the companies are forced to reduce prices due to lower demand. This seasonal behavior of the product increases the bargaining power of buyers.

The availability of substitutes in the industry is pretty high and as a result consumers switch brands more often for better prices and quality. Companies continuously need to work on improving brand image and loyalty.

Buyers are continuously becoming aware f manufacturing costs, procuring costs etc and as a result becoming more sensitive on prices and quality. The availability of more information makes the bargaining power of buyers a stronger force.

3.5 Threat from Substitutes

The threat from substitutes in the ice cream industry can be classified as ***moderate to high.*** The ice cream industry has witnessed a large influx of foreign players in the past decade. Various govt. policies favoring foreign investment have attracted several big brands to enter Indian market. These ice cream brands mostly serve premium customers but most of them have entered mass markets.

The Indian customers are highly price sensitive and expect a large variety to be served. This is a huge task for ice cream companies and many of them thrive to be innovative and inexpensive. Indian customers easily switch brands for better quality at lower price. This increases the threat from substitutes in the industry.

PART- B: PROJECT WORK

4. ABOUT THE PROJECT

Project Title: ***To Study Cost Factors and Cost Efficiency Opportunities in Cold Supply Chain and Develop Supply Chain Benchmark***

The project offered by Havmor is based on the cold supply chain logistics and allied operations. As Havmor is an ice cream manufacturer, the raw materials as well as the final products needs to be stored and transported under controlled environments. The supply chain associated with food processing which requires controlled environment is referred to as cold supply chain and it posses its own unique challenges. The products developed at the facility needs to be stored, transported and distributed under strict temperature control. The project is to study and evaluate the cost components involved in the cold chain and through this identify some cost saving opportunities which shall be implemented at a later stage. The project also involves identifying the cost incurred by logistics service providers, in reefer transports and cold storages.

4.1 Objectives of the Project

The objectives of the project are as follows:

- Study the Indian cold supply chain market
- Identify the factors influencing cost in cold supply chain
- Identify challenges in cold supply chain and suggest methods of improving operational efficiency
- Analyze and benchmark costs in cold chain logistics

4.2 Significance of the Project

As markets across globe face unprecedented downfalls and unparalleled situations, cost plays a major role for a company's survival and growth. Currently, the pandemic Covid-19 has wrecked havoc across the planet and many industries have reported heavy losses. The present condition translates into critical supply, demand and financial volatility. As many company's try

to stay afloat and pas through the crisis, a major share of cost of operations goes into supply chain and it is far greater for manufacturing companies like Havmor.

Supply chain disruptions have lured the company is these unprecedented times resulting in difficulties in procuring raw materials, production & storage and distribution of finished products. The cost of handling materials in the ice cream industry is significantly higher due to the inevitable requirement of controlled atmosphere. Adding to the already existing costs, the current economic situation has attracted higher running costs. Due to lower consumption and demand, the storage costs have been on the rise and also the cost of running the manufacturing plant with minimal staff is also undeniably high. The current circumstance and the continuing need to improve cost efficiencies and higher profits has led to assigning a project which helps identify cost factors which influence the supply chain and through which opportunities of cost cutting shall be identified.

4.3 Cold Supply Chain: Overview and Indian Market

The cold chain is procurement, manufacture and transport of temperature sensitive products with adequate thermal insulation so that the product does not lose its integrity. Each step in a cold chain requires adequate temperature control and a customized working atmosphere. Although, globalization has had a huge impact on the supply chain, making transactions and transportations easier, items like perishables, pharmaceuticals and other medical substances are prone to damage due to complex long distance transportation. These products lose their integrity upon chemical reactions, uncontrolled temperature and interactions with outside environment.

The cold chain involves a series of processes and intricate technology. A clear understanding of the chemical and physical properties of the material being transported is required to devise a proper logistics planning. Technology plays a major role in helping the logistics and supply chain providers to ensure that the products are transported in the right condition.

4.3.1 Indian Market: Key Drivers

- ***Growing Food Retail Chains:*** The food retails in India is largely unorganized, street vendors and part time sellers dominate the Indian market. Rapid urbanization and increased living standards of rural and urban consumers has increased the demand for

organized food retail chains. The organized retail food chains are set to become one of the biggest growth drivers of cold chain in India. The increasing urge for suppliers to meet the consumers' diverse needs of fresh fruits & vegetables, dairy products, meat and poultry, drugs etc has contributed towards greater investments in cold chain sector. Major food chains have ramped up their investments in cold storage infrastructure which they believe would be key for a stronger supply chain.

- ***Increasing Demand for Processed Foods:*** The increase in food parks, food festivals, cafes and change in urban culture has added to the demand for processed foods. As cafes and parlors grow across the country, the demand for processed food and thus cold chain infrastructure would also grow.
- ***Increased Health Consciousness:*** The Indian market has always been flooded with a variety of street food which is more or less considered a less healthy by a large section of people. This shift in thinking has increased the demand for fresh fruits and vegetables. Fruits and vegetables to remain fresh over time requires controlled atmosphere.
- ***Increasing Standards in Healthcare Sector:*** Apart from food and beverages industry, pharmaceutical companies extensively use cold storage and cold logistics. The biotechnology industry in India relies heavily on controlled atmosphere for storage of research materials, clinical trials, vaccines etc.

4.4 Elements in Cold Supply Chain

Major elements that drive a cold supply chain are as follows:

- ***Cooling Systems:*** Cooling systems are essential components and technology which helps in maintaining the recommended temperature. These sophisticated systems are deployed for processing, storage and transportation.
- ***Cold Storage Units:*** Cold storage as the name suggests are the facilities which are used for storing raw materials and finished products. These storage units could either be company owned or outsourced. Materials awaiting final distribution or waiting to be transported to manufacturing facilities are all stored at adequate temperature ensuring that no external interactions take place.
- ***Cold Transportation Facilities:*** As the name suggests cold transport refers to the facilities that carry out the movement of raw materials and finished goods from one place

to another. These include reefer trucks, refrigerated containers, refrigerated railcars etc. The major challenge for the transporters lies in understanding the nature of the cargo and preserving its integrity until final delivery.

- ***Cold Processing and Distribution Centres:*** These are facilities that provide adequate measures to convert and process raw materials into finished goods. These facilities pack the final goods in the required manner with thermal packaging and ensure that the integrity of the product remains intact.

4.5 Controlling the Temperature

When it comes to perishables especially ice creams made from pure milk, temperature control is of utmost important. It is one of most important factors which determines the quality and taste of the product. Refrigeration is one of the most cost consuming activities in cold chain. As a result, several techniques have been deployed to effectively control the temperature cost efficiently. Major technologies and techniques used for refrigerated transport are as follows:

- ***Dry Ice:*** Dry ice is nothing but solid carbon dioxide at about -80° C. Dry ice has the capability to keep the goods frozen for higher time periods. However the major drawback is the inability to set a specific temperature. Some items like fruits, ice creams etc need to be stored at specified a temperature which is not possible using dry ice. However, pharmaceutical products are widely transported using dry ice as the coolant.
- ***Gel Packs:*** Gel packs are special substances which are capable of maintaining specific temperature by absorbing escaping heat from the products. Pharmaceutical supplies and medicines are transported using gel packs.
- ***Eutectic Plates:*** These have a similar operational function to that of gel packs. The basic difference is that in this case, plates are filled with liquids which help maintain the temperature of products. These are best suited for short distance deliveries and are widely used in delivery boxes.
- ***Liquid Nitrogen:*** Liquid nitrogen as we know is similar to dry ice but sustains at a much lower temperature of -196° C. These are not used for transport of perishables as it reacts with food and ruins its integrity. This cooling technique is widely used in the transportation of human organs, tissues etc.

- ***Reefers:*** Reefers are widely used for transporting perishables. Reefers refrigerated units of trucks, pick up vans, semi trailers or containers of 20' of 40'. This makes reefers the most flexible and preferred form for transport. These units are specially designed, insulated and can be used at wide temperature ranges. A standard refrigerated container hold large amount of cargo.

4.6 Cold Storage

Cold storage as the name suggests is a facility that enables storage of perishables like fruits, vegetables, dairy products, meat etc at specified temperatures. These units form an integral part of the supply chain. There are various third party service providers who store, pack and transport ice creams and other dairy products.

4.6.1 Types of Cold Storage

When it comes to cold storage units, there are several options and choosing the right type of unit largely depends on the product, its chemical and physical composition, time period to be stored and the product demand. The range of cold storage units are as follows:

- ***Refrigerated Containers:*** These are the most widely used storage units, available at different sizes and a wide array of temperature range. These units are mobile and flexible making it best suited for products which have seasonal or less demand. The investment required for a refrigerated container is relatively less when compared with other types of storage units.
- ***Blast Freezers and Chillers:*** These units provide rapid cooling and much more powerful than refrigerated containers. These are best suited for intermediate cooling before delivering the product to the final destination. These are widely used in ice cream parlors, canteens, restaurants etc. These units are available at varying sizes ranging from portable units to mini freezers.
- ***Cold Storage Rooms:*** These are multipurpose storage units widely used in manufacturing facilities and large warehouses. These units require high investment, intricate design and precision mechanical instruments. These units require high maintenance and skilled labor with adequate safety measures. Major advantages of these units are storage capacity and wide temperature range.

4.7 Cold Logistics

Cold chain logistics refers to the transport of products which require temperature controlled atmosphere from one place to another. Ice creams are one of the many products classified as perishables and require specific storage and transportation temperature. Especially in case of Havmor, ice creams are made from milk and thus temperature control is particularly important to maintain its integrity.

Cold chain logistics at Havmor can be broadly classified into three categories:

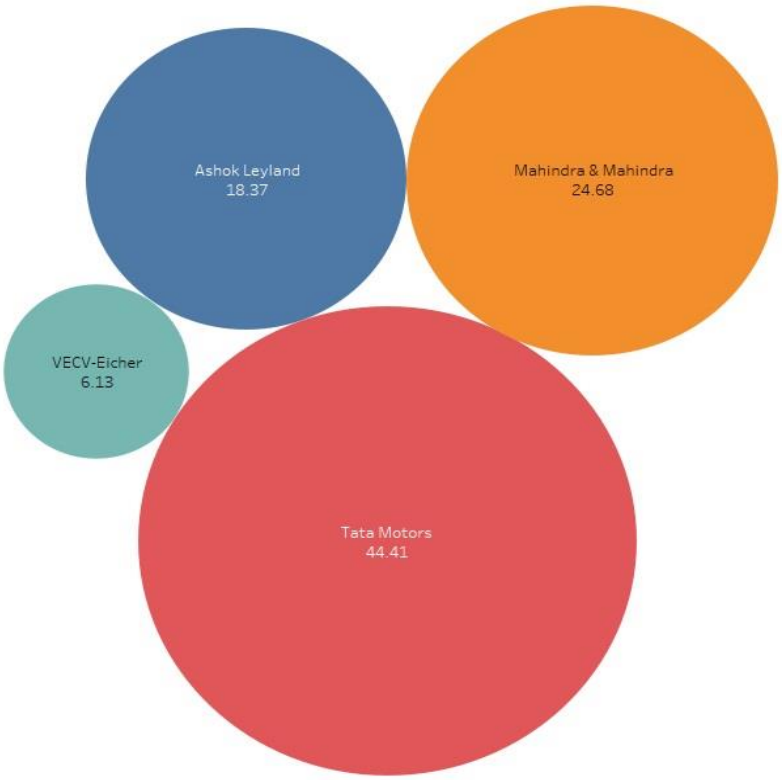
- ***Procurement Logistics:*** This refers to the movement of raw materials like milk, sugar, food preservatives and other essentials from farmers, dairy cooperatives and other suppliers to the company warehouse or directly to the manufacturing facility. This is carried out by third party logistics providers.
- ***Sales Logistics:*** This refers to the movement of finished products from the manufacturing facility/warehouse to distributors/retailers/customers. Havmor runs over 120 direct retail outlets and more than 40,000 franchised outlets. The movement of goods from the company manufacturing facility to these outlets takes place at regular intervals of time and is mostly done by third party logistics providers.
- ***Reverse Logistics:*** This refers to the movement of unsold and waste products from retail outlets and manufacturing facility to the recycling or disposal plants respectively. These may include expired products and manufacturing by products.

4.7.1 Commercial Vehicles and Manufacturers

In India, commercial vehicles are mainly classified into three categories namely ***LCV, MCV*** and ***HCV.*** Reefer trucks are mainly modified vehicles to which custom built reefer containers and freezers are fixed. These custom built vehicles are largely used by small scale logistics providers and industries.

- ***LCV:*** Light commercial vehicles are widely used for short distance transportation and are classified as vehicles whose *GVW,* Gross vehicle weight is less than 6 MT. Gross vehicle weight is the total weight of the vehicle including the rated payload. Popular examples of this category are Tata Ace, Tata Intra, Piaggio Ape etc.

- ***MCV:*** Medium commercial vehicles are those vehicles with a GVW less than 16 MT and greater than 6 MT. These vehicles are largely converted into reefer trucks and are reliable for long distance transport and are highly cost efficient.
- ***HCV:*** Heavy commercial vehicles are those vehicles with a GVW greater than 16 MT. TATA, Eicher, Ashok Leyland and Mahindra are the major manufacturers in this segment. These reefers are largely used for interstate transport with highly reliable refrigerating technology and superior vehicle specifications.



Source: Society of Indian Automobile Engineers

The commercial vehicles market is dominated by TATA Motors, Mahindra & Mahindra, Ashok Leyland and Eicher Motors. The segment has witnessed a large growth in 2018-19.

5. HAVMOR ICE CREAM PVT. LTD.: OPERATIONS

Havmor Ice Cream Pvt. Ltd. enjoys major market shares in the northern region of India in states like Gujarat, Delhi, Rajasthan and Uttar Pradesh. The company's presence is building up gradually in states like Maharashtra and major Southern cities like Vizag, Hyderabad and Bangalore. The company manufactures over 250 SKUs (Stock Keeping Units).

MANUFACTURING FACILITIES	
AHMEDABAD	**FARIDABAD**
• Caters to demand all over India • 250+ SKUs	• Caters to demand in Northern India • 80-90 SKUs

The company has tow manufacturing facilities, one in Ahmedabad and the other in Faridabad. The ***Ahmedabad facility*** is a central manufacturing facility and is owned by the company which supplies to all parts of India and produces over ***250 SKUs*** according to the demand. The ***Faridabad facility*** is run in compliance with a third party service provider and is comparatively smaller to the Ahmedabad facility. This plant produces around ***80-90 SKUs*** and fulfils the demand in neighboring cities. Small scale demands in rural Punjab, Haryana, Rajasthan, Delhi NCR and Uttar Pradesh are catered by the Faridabad facility. On the other hand,

the Ahmedabad facility caters to demands all over India with major supply being in Gujarat and Rajasthan. A third manufacturing facility in Solapur used to cater demand in rural Maharashtra and cities like Mumbai and Pune. The plant had to be shutdown due to third party contract issues and the supply Maharashtra is being taken up by Ahmedabad facility.

The logistics is supported by various service providers spread across the country. More than ***26 CFAs*** (Carrying and Forwarding Agents) are associated with the company both on long term and short term contracts. These agencies facilitate the movement of raw materials as well as finished products to various warehouses and distribution centers.

5.1 Transportation Model

The company basically has two modes of supply: ***1) Primary Supply*** and ***2) Secondary Supply.*** Both these supplies are facilitated by third party service providers and a small fleet of dedicated transport.

TRANSPORTATION	
Long Distance Supply (Capacity)	**Short Distance Supply (Capacity)**
• 400 Crate Capacity • 550 Crate Capacity • 600 Crate Capacity	• 200 Crate Capacity • 250 Crate Capacity • 150 Crate Capacity

- ***Primary Supply***

The primary supply refers to the movement of materials from the manufacturing facility to warehouses/distribution centers. These supplies are carried out by third party service providers or CFAs. These are primarily long distance transportation and the widely used payload capacities are ***400 Crate Capacity, 550 Crate Capacity*** and ***600 Crate Capacity.*** The materials are transported under controlled temperature in crates. Each crate has a capacity of ***4.5 Cubic Feet.*** The primary supply also includes transport to local retailers around the manufacturing facilities. These are carried out by dedicated transport which stays within the factory premises at all times

and caters critical transportation requirements. The payload capacities of these vehicles are ***200 Crate Capacity, 250 Crate Capacity*** and ***150 Crate Capacity.***

- ***Secondary Supply***

The secondary supply refers to the movement of materials from different warehouses/distribution centers to the retail outlets. These are again carried out by CFAs. The secondary supplies are usually carried out by smaller capacity vehicles and are of short distance in nature.

5.1.1 Transport Selection: Influencing Factors

There are several factors which influence transportation in a supply chain. Especially in cold chain logistics where the investment costs are very high, these factors must be carefully analyzed for long term returns and longevity.

Following are the factors to be considered before investing in cold logistics:

- ***Model***: A truck's model is one of the most basic and important cost influencing factor. As the demand for high performance trucks increases in the market, the cost for the same also goes up. Truck manufacturing companies continue to innovate and manufacture trucks with higher capacity, lower emissions and higher mileage.
- ***Performance***: Performance is a key factor which drives the trucking industry. Performance can be defined in different aspects like capacity, mileage, engine specifications, maintenance requirement etc. Trucks having a greater mileage with greater capacity and low maintenance are always preferred. The truck's useful life and resale values are also equally important.
- ***Cooling Technology***: The cooling technology used in trucks plays a major part in the truck's mileage and carbon footprint. As the world moves towards green supply chain, clean cooling systems with less polluting coolants are more preferred.
- ***Flexibility***: Flexibility can be described as the truck's cooling system to adapt to different products easily or the ease in modifying the truck's capacity or interiors. Some of the transporters modify reefer trucks according to the product and client requirements.

5.1.2 Storage Selection: Influencing Factors

There are several important factors to be considered before investing in a dedicated cold storage. The profitability of a company involved in cold chain largely depends on the product demand, the ability to find out cost cutting opportunities and efficient warehouse operations. Various warehouse management software and automation have reduced the human errors and increased efficiencies but the initial investment has remained high.

Following are the factors to be considered before investing in cold storages:

- ***Location:*** Location is a major cost pulling factor. The distance from various ports, distribution centers etc add to the trucking cost. As cold storage requires a continuous supply of electricity, the availability and consistency of the same is also very important. As the location gets more isolated, the cost of transportation, electricity, labor etc increases.
- ***Product Demand:*** Ice creams are seasonal products and hence, investing in a dedicated warehouse is a matter of concern. During the off seasons the sales revenue may decrease but the maintenance cost of the warehouse remains.
- ***Capacity/Scope of Expansion and Infrastructure:*** Cooling requires a lot of energy and energy comes with a cost. As a result, warehouses are trying to develop efficient ways to reduce the cooling area and thereby increasing space utilization and reducing energy costs.
- ***Material Handling Equipments:*** These are fixed costs and the investment decision depends on the product and product demand. If the warehouse remains under utilized for a major part of the year, then renting or leasing MHE might be a better option.

6. COST FACTORS INFLUENCING REEFER TRUCKS

Trucking as an industry is as lucrative as any other business sector. Similar to any other businesses it is important to know the various input costs that are involved in the business based on the product characteristics, configurations and characteristics of the trucks in use, demographic and geographic characteristics of area under operation, driving practices etc. Understanding these costs would enable attaining higher operational efficiencies by cutting down unwarranted costs. The costs in cold chain logistics are mainly influenced by the equipment in use, its maintenance procedures and the type of products transported. There are several other

opportunity costs involved in trucking like wait time, loading and unloading time which shall be difficult to cut down as they are controlled by several other external factors.

All the possible fixed and variable costs are discussed in detail in the following sections and an approximate cost per kilometer incurred by a few transporters are also explained in detail. One of the major influencers of cost is the duration/length of the trip. It is found that, longer the trip the impact of waiting time, loading/unloading time becomes more and more negligible.

The parameters used for costing can differ in different companies. Some companies would lease trucks while some of them would invest in buying trucks. The cost parameter would be different in both the cases. One might look at the expected return over the leased period and the latter would be focused on improving returns over the expected life of the truck.

The primary measure used by service providers to analyze their cost is ***cost/ kilometer*** and ***cost/ hour.*** Even though these are standard measures, there are various other measures to analyze cost which are used in specific circumstances based on the ***nature of route, type of product transported*** and the ***frequency of trips.*** Following are some of the additional measures used by service providers:

- ***Cost/ Ton***
- ***Cost/ Trip***
- ***Cost/ Crate***
- ***Cost/ Unit***
- ***Cost/ Gallon***

6.1 Cost Factors: Fixed Cost

The fixed cost in any trucking business mainly includes the equipment cost. Majority of the other costs are negligible in comparison to the equipment cost. The reefer trucks require a higher investment as it contains refrigeration equipments and a frequent equipment maintenance. The other fixed costs would primarily include ***license payments, tax payments, insurance payments, depreciation, management and overhead costs*** etc**.**

- ***Buying Cost***

The equipment buying cost would be the single largest component in fixed costs. The equipment cost can be attributed as a function of various other factors such as: ***actual price of purchase, lease rates, interest rates on loans, expected life of truck, estimated annual distance covered, salvage value, return on investment*** and ***depreciation.*** All these components add up to equipment costs and influences the decision taken by the service provider. These costs form an essential part in determining the end price for the service and for future expansion.

The ***economies of scale*** play an inevitable role in producing profitable returns on reefer trucks. As the cost of reefer trucks is higher than normal trailers and trucks, running costs for a small fleet of refer trucks would be expensive and also the expected life for reefers are lower than normal trailers.

➢ *Lease/ Loan Payments*

Lease and loan payments are paid periodically over a year or even biannually according to contract agreements. As mentioned earlier these costs are directly impacted by the equipment purchase price. As in the case of reefers, the lease/loans would be marginally higher due to higher purchase price.

➢ *Safety Equipments*

Safety equipments are another important investment to be made. Drivers/helpers are subjected to work in controlled atmosphere which operate at below freezing levels, as a result proper equipments and safety standards are to be maintained while working. The investment in safety equipments also comes with the cost of training the driver/helper to use the equipments and also effectively use the refrigeration units. Various products, require varying temperatures, so in case the workers are not comfortable operating the refrigerating unit, the product might get damaged.

➢ *Insurance Payments*

The insurance payment refers to the medical insurance offered to the drivers of the trucks. This is usually a standard protocol and every service provider covers their drivers with medical insurance and other perks and assistances. Some companies make these policies as

mandatory and prioritize driver safety above all. This will eventually result in the safe delivery and pick up of goods.

➢ *Tax & License Payments*

Trucks would require a license or a permit to start servicing within the city limits or even nationwide. These permits are authorized by respective Government authorities and certain cist is incurred in the process. The permit has to be renewed after certain time period and the renewal depends on the mechanical running condition of the truck.

Also as per the regulations in various countries a variety of taxes are levied on annual, quarterly or biannual basis. Toll charges are also a major cost for small scale reefer truck service providers. These are usually taken on annual basis and are likely to be revised after a certain period of time.

➢ *Vehicle Documentations*

This cost is mostly included in the purchase price, but some operators consider these costs separately. These are basically the extra cost incurred in bringing the truck on-road, fully operational by clearing all the government permissions and documentations that are necessary.

6.2 Cost Factors: Variable Cost

The variable costs in reefer trucks largely comprise of ***fuel consumption*** and ***maintenance.*** As in any other type of trucks fuel consumption is a major variable and depends on the mileage of the truck which in turn depends on maintenance and performance of the vehicle. Various other variable costs are ***labor rates, maintenance and repair, waiting charges, loading/unloading charges, fronthaul/backhaul and deadhead miles.***

➢ *Fuel Consumption*

Fuel costs are highly unpredictable and hugely depend on the market conditions. The fuel charge varies geographically and especially in India, as oil is imported heavily the costs are always volatile with respect to the market. The tax deployed on oil imports is high and in order to remain profitable, the oil companies push up the prices of fuel. Other than the external

uncontrollable factors, the vehicle itself is a huge determinant in fuel consumption. Especially in a reefer truck where there are ***refrigerating units*** and other components operating continuously the fuel consumption tends to be slightly higher than normal trucks. Other factors like ***engine characteristics, its horsepower, speed of driving, terrain, fuel quality*** and ***payload*** plays a major role in fuel consumption. As a result an accurate estimation of fuel consumption is difficult and can only be estimated up to a limit. Even though all the service providers calculate fuel consumption rate and its cost per kilometer covered, these results vary drastically and often an average figure is taken as the cost.

➢ *Labor Rates*

The driver costs are usually fixed but on the other hand the rates for helpers, loading and unloading labors usually vary. The income for helpers mostly depends on the ***trip distance, trip frequency*** and ***time for trip.*** The cost for loading/.unloading labors usually depends on the destination/pickup ***warehouse policies, region*** and the ***amount of load*** on the vehicle. The labor rates are usually calculated on per hour basis.

➢ *Maintenance and Repair*

These costs are unavoidable and maintenance directly affects the life expectancy and other estimated costs. Every reefer manufacturers suggest a certain interval of time at which maintenance has to be done. The reefer trucks contain refrigeration units which have coolants, compressors and other electrical equipments. These systems require systematic maintenance after running for certain hours. When it comes to the vehicle, regular engine check-ups, oil change, lubrication, battery change etc has to be done as per the manufacturer's instructions. The major cost which comes is the cost of tyres. These costs are usually unpredictable and tyres often wore off pretty quickly in tough terrains. In addition, the government mandates to keep additional set of tyres in the truck at all times. Various factors such as ***overloading*** of the vehicle, ***irregular tyre pressure*** and ***tough terrains*** can damage the tyres regularly. Operators set standard costs for maintenance per kilometer of distance travelled by the truck. As equipments on reefers have long lasting warranties, the maintenance cost does not vary as much as fuel consumption. But as the trucks become ***older*** and ***operating conditions*** differ drastically, the maintenance cost gradually starts increasing.

➢ *Waiting Charges and other Opportunity Costs*

Waiting charges are considered to be negligible in case of long trips and a larger fleet of trucks. But in case of short distance deliveries/pickups, waiting charges are opportunity costs and the truck can be utilized in any other trip. Similarly, parking charges are also unwanted and unprecedented charges which often transporters and drivers tend to avoid. Any delays for loading/unloading at warehouses can also add to opportunity costs. In this case ***time*** becomes the cost driver and longer the truck remains unloaded, the costs increase. Usually these charges are transferred over to the end consumers.

➢ *Fronthaul, Backhaul and Deadhead Trips*

Fronthaul trips refer to the pickup and delivery of goods from a source to a specific destination and the truck will have to return back empty. Transporters charge a considerable return rate to the consumer in case of Fronthaul trips. Fronthaul is usually preferred in short distance deliveries. ***Backhaul trips*** refer to the pickup and delivery of goods made in a trip back to source. Most of the service providers prefer backhauls as it increases their profitability and eases on the fixed costs. ***Deadhead trips*** are those in which trucks run empty. These trips endure higher costs and hence operators avoid these trips.

6.3 Costs Incurred by Market Players

OPERATOR	LOCATION	VEHICLE CATEGORY	VEHICLE MANUFACTURER	COST/ K.M
FREIGHTLINKS INTERNATIONAL PVT. LTD.	KOCHI	MCV	EICHER	₹28.5
ACCEX SUPPLY CHAIN SOLUTIONS	MUMBAI	MCV	TATA	₹32
SNOWMAN LOGISTICS LTD.	KOCHI	MCV	ASHOK LEYLAND	₹29
BLUE MOON LOGISTICS	KOCHI	MCV	EICHER	₹30.5

The above table depicts the cost/kilometer incurred by various local transporters in cold chain. The data was collected by direct interviews with managers and owners. Although the breakup of the costs is not available, the final cost/kilometer gives an insight on the cost of operating reefer trucks.

7. COST FACTORS INFLUENCING COLD STORAGES

Cold storage facilities are an integral part of cold supply chain and play a major role in curbing the losses in the food industry. Investing in a cold storage facility requires huge amount of capital, high operating costs and reaching the breakeven point shall take longer. Also, the demand for cold storages is limited to certain products like frozen food, dairy products, meat and certain agricultural produce. Most of the agricultural produce is consumed fresh in India and the requirement for cold storages is highly dependent on the location. As a result, investors hesitate in developing dedicated cold storage facilities.

The major expense in a cold storage is the equipment and the infrastructure itself. The refrigerating unit contains several electrical and mechanical parts which require high maintenance. Moreover, the warehouse must be insulated, strict hygiene and safety measures are also to be followed in a cold storage. All these factors add to the expense and involve high fixed cost.

The costing in cold storages is usually done based on its capacity. The various measures in which cost is calculated are as follows:

- ***Cost/ MT***
- ***Cost/ Crate***
- ***Cost/ CFT***
- ***Cost/ Pallet***

7.1 Cost Factors: Fixed Cost

The fixed cost in cold storage is dominated by the equipment and infrastructure costs. Other expenses like safety equipments, training for employee, allied machine components etc are functions of infrastructure. Various fixed costs involved in cold storage facilities are ***warehouse facility, machinery & equipments, warehouse infrastructure, labor charges, material handling equipments, crates/pallets/racks, permits/licenses*** and other ***overhead costs***

.

➢ *Warehouse Facility*

The warehouse facility is the major fixed cost in developing a cold storage. The cost depends on several factors such as ***location, availability of labor, electricity*** etc. These factors are considered before investing in a cold storage. Location plays a decisive role in the profitability of a cold storage. If the warehouse is located in a place where the demand for frozen products is negligible, then recovering the high fixed costs would be impossible. On the other hand, cold storages near to harbors, urban markets and food processing units are highly preferred and would have continuous flow of materials into them.

➢ *Equipments & Machinery*

The equipments and machinery are the core components in a cold storage. These machineries constitute a huge fixed cost in a cold storage. Various components like ***compressor, condenser, cooling coils, air handlers/fans, humidification & dehumidification systems, fans, defrosters*** and ***insulators*** forms the major part of investment. The maintenance & repair costs are a direct function of these components and require careful handling and operations. There are different standards of these components and each of them has their own merits. As ice creams are required to be stored in a humidity regulated atmosphere, dehumidifiers play a major role in cold storages dedicated for ice creams. The fans are used for pre cooling the cold rooms before storing the ice creams.

➢ *Material handling Equipments*

The material handling equipments involve ***forklifts, pallet jack, trolleys*** etc. These equipments along with certain safety equipments for labors are integral for smooth operation of the warehouse. In some cases, where a warehouse witness seasonal rise and fall in demand, the material handling equipments are rented from various operators.

➢ *Infrastructural Requirements*

This refers to the minor adjustments done in the infrastructure of the warehouse to accommodate products of specific characteristics. In this case, ice creams are required to be strictly stored at certain temperatures and due to this the walls and ceilings of cold storage needs

to be insulated. Insulation is also done in order to maintain rigid health standards inside the warehouse. As the temperature is below freezing, there are chances of bacteria and various other microbes growing rapidly. This would eventually destroy the integrity of the product and certain insulations prevent any entry of unwanted microbes into the storage.

➢ *Labor Charges*

The labor requirements in cold storages are slightly different from that of regular warehousing facilities. The laborers should to be trained specifically in order to handle the cooling systems. Hence, the cost of training and development is significant and is seen as a long term investment.

➢ *Construction of Pallets/Crates/Racks*

The storage facility would require pallets/racks/crates on which materials could be stored. The price quoted to the end consumer usually depends on the number of pallets/rack space/number of crates used for storage.

➢ *Administration and Overhead Charges*

These charges include a fixed cost incurred on a monthly basis to run the office. It involves the cost of stationeries, record keeping, software usage charges etc. Many warehousing agencies make use of sophisticated inventory management software and invest in automating the warehouse.

7.2 Cost Factors: Variable Cost

The variable costs in a cold storage are dominated by the ***maintenance charges*** and ***energy consumption charges.*** Various other variable costs like water expenses, seasonal labor requirements, minor equipments for safety and other operational expenses are also included.

➢ *Maintenance Charges*

The cooling systems and the material handling equipments both require high maintenance and must be maintained effectively. Any damage in the cooling system resulting from poor maintenance or inefficient usage could lead to product damage and uncontrollable repair costs.

Similarly the material handling equipments also should be maintained at regular intervals to get effective results.

➢ *Energy Consumption Charges*

Another major variable expense is the energy consumption charges. In this case, ice creams are highly seasonal and thus the energy consumption during peak times would be higher in comparison to off seasons. The warehouse management must be able to anticipate demand and the electricity consumption per square feet of warehouse should be analyzed. Various techniques in storage as well as efficient usage of cooling systems shall help in reducing the electricity consumption.

➢ *Seasonal Labor*

The requirement of seasonal labor is high during peak season in a cold storage dedicated for ice creams. As the demand for ice creams increase, more labor will be required to efficiently operate the warehouse.

8. CHALLENGES AND RECOMMENDATIONS

"Focusing efforts on securing supplies, manufacturing, logistics and coping with fall in demand"

The above quoted line summarizes the major challenge faced during the unprecedented COVID-19 situation. Even though the basic objective of the project initially was to identify cost cutting opportunities in cold supply chain of Havmor Ice Creams Pvt. Ltd., due to the pandemic the whole dynamics of the project shifted in focusing on maintaining daily operations and uninterrupted coordination with transporters and other stakeholders.

8.1 Challenges Faced by Havmor

- ***Fall in Aggregate Demand***

As India moved on to a complete lockdown due to the existing pandemic crisis, the demand for ice cream fell sharply. As people were forced to stay inside their homes, the consumption of ice creams which is often considered as a luxury product in middle class Indian homes spiraled down. The stigma related to consumption of cold products during the pandemic season further deflated the consumption. Several competitors like Amul and Mother Dairy who sell essential commodities like milk and other dairy products at their retail outlets had an obvious competitive advantage and were able to sell their ice cream products through their dedicated stores. The drawback for Havmor was that as a company solely focused on ice cream and allied products which were not termed as 'essential products', the company had to suffer the demand shock.

- ***Reduction in Consumer Income***

The reduction in consumer income as another major impact which reduced the ice cream consumption nationwide. As people started working from home and many more people lost their jobs a significant reduction in employee income reduced the demand. As mentioned in the previous section, ice cream is seen as a luxury product in many middle and lower middle class Indian families. This reduction in demand resulted in increased inventory levels at retail outlets and distribution centers.

➢ *Infrastructural Challenges and Employee Safety Concern*

As government regulations were eased, the production facility was opened for manufacturing with limited number of employees. As ice cream manufacturers, close contact between employees during production is inevitable. With rising concern on the safety of employees, major infrastructural changes had to be implemented at the facility. Physical separation between workers was ensured by building curtains between them. Regular monitoring of employees was done and this attracted more costs.

➢ *Increasing Liability on Fixed Costs*

As the manufacturing facilities remained closed for over two months, the need to retrieve the fixed costs of machineries and other infrastructure mounted. This resulted in terminating and amending certain contracts with third party service providers. Transport providers and warehouse service providers were also hit with a similar situation and were unable retrieve their fixed costs. As a result, certain contracts with transporters had to be revoked and a new set of transporters adhering to certain conditions had to be found out.

8.2 Recommendations for Improving Operational Efficiencies

➢ *Operating warehouses at most efficient configurations*

The cold storage facilities are one of the most cost consuming areas in a cold supply chain. Any reduction in cost incurred at these warehouses would drastically reduce the overall cost incurred. Each equipment used in a cold storage has a sweet spot that is its most efficient operating state. The equipments must be configured to those states and should be maintained at regular intervals.

➢ *Insulation of the Warehouse*

The cold storage insulation is another part which plays a major role maintaining the product integrity. Strict standards in maintaining insulations must be implemented. Standard insulations complement the cooling system and help operate efficiently. Any kind of leakage in the insulation would result in an increased load on the cooling system which would then result in increased energy consumption.

➢ *Lighting System inside Cold Storage*

Light as we know is a source of heat, cold storage systems work at specific temperatures and light will act as a constant source of heat in the storage rooms. This again would result in increased energy consumption. To overcome this situation, sensor controlled lighting systems shall be adapted. In these systems, the lights would be turned ON only when there is movement inside the storage rooms and automatically turns OFF when there is no movement. Thus would also eventually lead to reduction in energy consumption.

➢ *Revision in Contract Terms with Service Providers*

Under the current norms, long term contracts having caps on monthly distance travelled prevails on transport. Under the current system of contracts, the company is liable to pay certain amount to the service providers even if there have been limited transportation requirements. Under the current economic situation these are huge costs and a revision to short term contracts based on number of trips made/distance covered would be effective.

PART- C: LEARNINGS FROM SUMMER INTERNSHIP

➢ *TEAM WORK AND DEDICATION*

"A team that works together, achieves together", this saying came to life at the summer internship project. The current economic crisis had helped me realize the importance of team work in an organization. As a supply chain intern, I think the operations department is one of the most critical part of any organization in the current situation. As parts of supply chain started to disrupt without any notice, mutual support and integrated thinking of every person in the operations team, helped reduce the impact of such disruptions and the manufacturing was resumed without any particular difficulties.

➢ *A LEADER NEEDS TO BE ON FIELD WITH THE EMPLOYEES*

The supply chain lead who was also my mentor throughout the internship period was a real example of a leader. When the supply chain department started facing unprecedented problems due to the pandemic, he did not hesitate to work on field with the employees, talking to new transporters, coordinating the entire logistics operations and also facing new challenges hands on. As a leader he showed that providing solutions to problems is only half job done and executing it with the team members under challenging situation is absolutely necessary. He made me believe that leaders are people who work alongside the employees and not the ones who dictate solutions and commands.

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DECLARATION

I, Srinivas Padmanabhan, hereby declare that this Summer Internship Report is an authentic work done by me. It is to the best of my knowledge and belief. This is to declare that all my work indulged in the completion of this Summer Internship Report such as research and analysis is a profound and honest work of mine.

(Signature)

Srinivas Padmanabhan

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