Dissertation Report on

Optimizing fresh produce Retail supply chain through efficient Outbound Logistics System: A case study

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Certificate from the Institute

This is to certify that the Project Report titled Optimizing fresh produce retail supply chain through efficient Outbound Logistics System: A case study is a bonafide work carried out by Mr. Sumit Dabas of MBA 2012-14 and submitted to Delhi School of Management, Delhi Technological University, Bawana Road, Delhi-42 in partial fulfillment of the requirement for the award of the Degree of Masters of Business Administration.

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DECLARATION

I Sumit Dabas, student of MBA 2012-14 of Delhi School of Management, Delhi Technological University, Bawana Road, Delhi-42 declare that Dissertation Report on Optimizing fresh produce retail supply chain through efficient Outbound Logistics System: A case study submitted in partial fulfillment of Degree of Masters of Business Administration is the original work conducted by me.

The information and data given in the report is authentic to the best of my knowledge.

This Report is not being submitted to any other University for award of any other Degree, Diploma and Fellowship

Sumit Dabas

Place: New Delhi

Date: 03 May 2014

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My parents, to whom, I owe my very existence, are the subtle contributors to my work.

Finally my greatest regards to Almighty for bestowing upon me the ability to accomplish this project successfully.

EXECUTIVE SUMMARY

The research undertaken focuses on outbound logistics of a fresh produce retail supply chain with emphasis on aspects related to transportation planning, the distribution supply chain process flow through a case study of Mother Dairy, SAFAL. There is growing demand for retail chains involved in marketing and distribution of fresh fruits and vegetables, with this view corporate giants like Reliance, ITC, Aditya Birla and other regional groups are investing in their supply chain infrastructure. Outbound logistics in these chains are of even greater importance because of constraints like low shelf life and perishable nature of products. One of the already established player in this market is Mother Dairy, SAFAL established in late 1980s providing services in Delhi & NCR region. SAFAL has well established processes dedicated to downstream supply chain and all those processes have been chalked out in this research, which may serve as a guide for new businesses wanting to establish themselves in metropolitan cities. Topics covered in this research include process flow, route planning, network design, transport management, risk sharing, and logistics information flow.

Safal, the Fruit & Vegetable business initiative of Mother Dairy Fruit & Vegetable Pvt. Ltd has its origin in the Fruit & Vegetable Project established by National Dairy Development Board in 1986 for undertaking integrated marketing of horticultural produce under the brand name "Safal". Safal is the market leader in the organized fruit & vegetable retail business in Delhi NCR where it sells an average of 300 MT/day through a network of 350+ exclusive retail outlets under brand name Safal/ Safal Pure Veg, supported by a state-of-the-art large and ultramodern Central Distribution Facility located in Delhi with an annual capacity to handle and process 2,00,000 MT of fresh fruits and vegetables. Safal today operates the largest number of F&V Stores in Delhi NCR and has further expansion plans in place. To keep pace with the changing market trends and in sync with the customer requirements, 116 Outlets have been rebranded and launched as ‘Safal Pure Veg’ Outlets with a contemporary look & feel. Retail Outlets are also present in Bangalore under the brand name Safal Daily Fresh. Safal has a prominent presence in export market spread across 40 countries.

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Industry profile: Food Retailing in India

As observed and unlikely in the past, the debate today is no longer whether food and grocery retail in India would grow but rather how fast can it grow and what challenges need to be overcome. It is projected that organized F&G retail in India could grow to Rs. 1750 Bn (at current prices) by 2015 representing ~11% of overall F&G sales as per report by Tata Strategic Management Group (TSMG).

Over the past few years, the industry had grown at about 10% a year, exceeding the GDP growth rate. It was also estimated that food retailing sector accounted for slightly over 50% of the overall employment, in line with its revenue proportional to the total retail revenue. Food retail outlets account for one third of all retail outlets and 63% of total retail sales. The traditional food retail industry comprised of two basic formats: kirana (mom and pop) stores and pushcart vendors. The kirana stores were (typically) family-owned, small in size (100 sq. ft. and above), carry a limited number of 2 items, and are run mostly by family members, supplemented with some hired help. There were approximately 12 million such outlets in India with half of them involved in food retailing. But, only 4% of retail outlets are bigger than 500 sq. ft.

India is the second largest producer of fruits and vegetables in the world. Now this is a fact which could have ideally commanded a huge round of applause from all those who have unflinching faith in the Indian economic renaissance as unfolded since early 90's. But is it really the case? Do we really hear the din of accolades on this feat? The answer unfortunately is no. What we precisely instead have is a state of deafening silence. The inefficient supply chain in handling fruits and vegetables is another of those sob stories which still poses a big question mark on our economic management skills. In fact, what could have turned out to be a huge asset for national economy keeps on lingering as a serious weak spot. Cold chains which lie as the fulcrum of an effective supply chain infrastructure in dealing with fruits and vegetables remains a grossly ignored area. It's not only an issue of storage, other functional modalities like facilitating seamless

movement of refrigerated vehicles which has done wonders in countries like China is presently best considered to be a farfetched idea in the country, if not totally utopian. Result: every year we have to suffer nearly 30-40 percent of wastage in fruits and vegetables. Barring a few instances, the much required private entrepreneurship in ensuring smooth flow of goods from the farm gate to at least retail point is altogether missing and government's support to the sector by way of providing subsidies has not paid off. There are serious accusations of these subsidies falling in the hands with no expertise in cold chain management.

Nilgiris, established in 1905 as a dairy farm near Ootacamund in South India was perhaps the first organized supermarket in India which opened another store in Bangalore in 1936 and the next one at Erode (Tamil Nadu) in 1962. It initially focused on dairy products, bakery and chocolates, but in 1945 expanded its range of products to include grocery and other food items. Now, it has more than 90 stores under the brand name ―Nilgiris 1905‖. Another first perishable food retail chain also had links with dairy product retailing. Safal, established in 1988 by the National Dairy Development Board (NDDB), sold fresh fruits and vegetables (FFVs) from Mother Dairy outlets and was the first organized retailing venture for F&Vs in India. The only private corporate retailer before the 2000s was the RPG Group which started with its first outlet in Chennai in 1996 under the banner of ―Food World‖ (Sulaiman et al, 2010). In recent years, a number of corporate players have entered the organized retail sector with various formats, including many in food retailing with specific companies and brands like Spencer's, Reliance Retail's Reliance Fresh (RF), Aditya Birla Retail Limited (ABRL)'s More, Namdhari Seeds Pvt. Limited (NSPL)'s Namdahri Fresh, and ITC's Choupal Fresh (table 1.1). These food retail chains have attempted many changes in the supply chain management and logistics through the use of quasi-formal and formal contracts to ensure timely delivery of products with desired quality attributes. Therefore, they can be viewed as new institutional mechanisms for linking farmers with modern markets and improving supply chain efficiency and farmer livelihoods.

Competing trends toward local food and year-round availability of exotic items make grocery supply chains ever more complex. Add increased regulatory requirements for

traceability and increased demand and labeling for organic and non-genetically modified foods, and the need for a well-integrated grocery supply chain rapidly becomes critical. If you want to capture market share and gain customer loyalty through the provision of the freshest and broadest selections, supply chain and logistics optimization is essential to your market position and perceived value. The typically narrow margins of most grocers can't be forgotten in the drive to quickly deliver the best and freshest products. With increased competition from discount super-retailers, grocers find their margins squeezed even more. To compete effectively, you need to optimize product movement to increase inventory turns, reduce warehouse lead time and eliminate surplus inventory from your supply chain. All this comes from optimized supply chain system and one way to achieve this is to have an efficient outbound logistics system apart from developing sound supply side capabilities including strategic sourcing of fresh produce.

Super Market chain in India	No. of stores in India	Owned By	Parent ownership structure
Reliance Fresh	886	A division of Reliance Industries Ltd.	A highly diversified conglomerate founded by Ambani family and now owned by Mukesh Ambani.
More	655	A division of Aditya Birla Ltd.	A highly diversified conglomerate founded by the Birla Group. Entered retail with major acquisition and takeovers of 275 Trinethra and 68 Fabmall in South India
Spencer	241	A division of RPG ltd.	A highly diversified conglomerate funded by the Goenka family. Entered retailing during the 1990s
Fresh@	75	A division of Heritage Foods Ltd.	A dairy and food processing company funded by the Naidu family of Hyderabad. Diversified into retailing. As of 2009, only in South India
Foodworld	67	51% owned by a private consortium of Indian investment banking interests; 49% by Dairy Farm International	Dairy Farm International is a Hong Kong retail giant. Until 2005, the 51% Indian interest was held by RPG and managed alongside Spencer‘s. As of 2009, only in South India
Namdhari Fresh	25	Namdhari Seeds Group	High end stores with salad bar, carry organic range also
ITC Choupal Fresh	8	ITC Group of Companies	Focus on fruits and vegetables (F&V) unlike other stores

Table 1.1: Major food supermarket chains in India

1.1.1 Key Challenges in Food Retailing

Demand Side

a) Penchant for fresh/home-made and value consciousness

The Indian consumer, unlike his western counterpart, has a penchant for freshly cooked food over packaged food. This is a result of dietary patterns, poor electricity supply, low penetration of refrigerators and a family structure where one of the primary roles of the housewife is feeding the family. The Indian consumer is extremely value conscious. A TSMG study indicates that packaged food players need to drive down prices by almost 35-40% to be comparable on cost with homemade food.

b) Diversity of tastes and preferences

Multiple cultures, languages and religions have a huge bearing on the tastes and preferences of the Indian consumer. This will pose a challenge for players aspiring to develop a pan Indian presence.

c) Willingness to travel

Given the current density of retail outlets in India, retailers will have to motivate the consumer to trade convenience with price, range and ambience.

Supply Side

a) Sourcing base and efficiency

The fragmented agri supply base coupled with an inadequate legal framework make it difficult for retailers and food processors to procure quality produce at competitive costs directly from farmers. The small size of the food processing industry further limits the supply options.

b) Real estate availability and cost

Rentals account for 7-7.5% of the total costs for organized retail in India against global benchmarks of less than 3%. Real estate availability and costs will continue to remain a

challenge in the retail industry with factors like adequate parking, ambience and proximity being the key drivers of footfalls.

c) Manpower availability

As organized retail expands, there is expected to be a dearth of skilled manpower. The lack of institutions and courses for different aspects of retail management will have an impact on the overall supply of quality manpower.

1.1.2 Emerging trends in food retailing

a) Big becoming bigger

Globally, retailers have realized that size drives profitability, not just through economies of scale in operations but also through higher bargaining power leading to better margins. While many players are entering the retail space in India currently, the growth stage will be characterized by rapid expansion and consolidation among these players.

b) Rise of organic foods and health and wellness segment

Consumer attitudes and preferences are undergoing a shift owing to factors like increased disposable incomes, changes in lifestyle patterns, shift in age structure, increased number of working women and multi-cultural exposure. These would lead to increasing health consciousness in the future. Organic foods and wellness products would be emerging opportunities in the years to come.

c) Increasing focus on private labels

As competition in the organized retail market increases, discounts and promotions are expected to play a critical part in generating footfalls. To counter the impact on profitability, organized players will find it more attractive to promote private labels or

store brands given their higher margins. The consumer too would benefit from lower prices.

1.1.3 Scope for innovation in food retail

As the organized food retail market matures in India, there would be an increased need for players to differentiate through innovation. Innovations would largely come under two heads –

Innovation on Retail format - Players can innovate on formats in different ways

a) By targeting specific customer segments and serving their needs better e.g. working women, single office goers, etc

b) By changing the product mix e.g. entirely private label stores, exclusively fresh produce stores.

c) By changing the product mix e.g. entirely private label stores, exclusively fresh produce stores

Technological Innovations - Employing cutting edge technology in retail could prove to be the source of competitive advantage for retailers.

a) Self-scan checkouts have the potential of both reducing check-out time manpower cost for the retailer

b) Using RFID tags can help track and reduce in-store inventory management costs and give retailers better insights into customer in-store movement patterns

c) Web-enabled POS systems, e-SCM systems, e-Procurement systems and warehouse management systems will enable food retailers in integrating the entire agri-value chain leading to efficient procurement and supply chain management.

d) Use of cutting edge analytics can bring insights into customer buying behavior with implications on store layout, pricing and promotions

1.2 Organization profile

Safal, the Fruit & Vegetable business initiative of Mother Dairy Fruit & Vegetable Pvt. Ltd has its origin in the Fruit & Vegetable Project established by National Dairy Development Board in 1986 for undertaking integrated marketing of horticultural produce under the brand name "Safal". Safal was established with a noble objective of facilitating a direct link between Fruit and Vegetable Growers and Consumers thereby achieving its vision of providing quality produce, products and services aimed at delighting the consumers and improve quality of life of farmers and producers by providing them fair & optimum price realization for their produce and the expert guidance, thereby creating a better and meaningful living for all in the society.

The brand name “Safal” originates from unit’s core business “Sabzi (Vegetables) & Phal (Fruits)”. Over the years, the brand “Safal” has become a synonym to Quality, Trust & Value Creation in the space of fresh and processed Fruit and Vegetable business domain. Safal’s robust backend processes, state-of-the-art processing facilities and strong forward linkage with consumers have been recognized, acclaimed & benchmarked, nationally and internationally. Safal has become a cradle of knowledge and best practices for the Fruit and Vegetable industry in the country. Safal is ISO 9002: 2008 & HACCP certified.

Safal is engaged in procurement, processing and marketing of Fresh Fruits & Vegetables, Processed & Frozen Products, Pulp and Concentrate, Neem based Agri products, etc with operations spread in Delhi NCR, Maharashtra, Karnataka and Gujarat. The brand became a household name in category of Fresh Fruits, Vegetables & Frozen Peas and over the years the product portfolio has grown remarkably, comprising a wide range as follows:

• Fresh Fruits and Vegetables

• Frozen Range like Peas, Corn, Mixed Veg, etc.

• Juices, Nectars & Fruit Beverages

• Processed Products like Jam, Pickle, Tomato Ketchup, etc.

Safal's Back-end is managed by qualified agriculture experts, imparting knowledge to the farmers to adopt Good Agricultural Practices. The entire Procurement Network is spread over 16 states with more than 50000 Farmer Members. Operational Aspects between Procurement and Distribution & Sales are taken care of by its state-of-the-art facilities located in Delhi, Mumbai, Bangalore and Anand (Gujarat).

Safal is the market leader in the organized fruit & vegetable retail business in Delhi NCR where it sells an average of 300 MT/day through a network of 350+ exclusive retail outlets under brand name Safal/ Safal Pure Veg, supported by a state-of-the-art large and ultramodern Central Distribution Facility located in Delhi with an annual capacity to handle and process 2, 00,000 MT of fresh fruits and vegetables. Safal today operates the largest number of F&V Stores in Delhi NCR and has further expansion plans in place. To keep pace with the changing market trends and in sync with the customer requirements, 116 Outlets have been rebranded and launched as 'Safal Pure Veg' Outlets with a contemporary look & feel. Retail Outlets are also present in Bangalore under the brand name Safal Daily Fresh.

Safal has a prominent presence in export market spread across 40 countries viz., USA, Europe, Russia, Middle East, Asia and Africa and exports Fresh Fruits & Vegetables (Grapes, Banana, Gherkin, Onion, etc.), Fruit Pulp & Concentrate, Frozen Fruits & Vegetables, etc. A state-of-the-art fruit processing plant of fruit handling capacity of 15,000 MT annually, set up in 1996 at Mumbai supplies quality products in the international market. With increasing demand another state-of-the-art fruit processing plant has been set up at Bangalore with fruit handling capacity of around 50,000 MT annually.

Safal intends to move on the continuous path of growth and innovations while adding economic value to all its stake-holders.

1.3 Objective of the study

The objective is to study the outbound logistics system of Mother Dairy Safal with special focus on outbound warehousing and transportation.

Through this study I intend to answer following questions –

1. Perspectives involved in the outbound operations of a typical fresh produce retail supply chain.
2. Significance of IT systems that act as enablers in these outbound processes.
3. Management of risk in distribution of perishable products.

2. THEORITICAL BACKGROUND OF THE PROJECT

Although this project is confined to study of outbound logistics processes in a fresh produce retail chain with aim to come up with best of the practices and systems for downward supply chain it is important to define logistics & components, its objectives, industry followed practices along with challenges in Indian context and various package solutions available for logistics managers.

2.1 Logistics

Logistics is a process of movement of goods across the supply chain of a company. However, this process consists of various functions that have to be properly managed to bring effectiveness and efficiency to the supply chain of the organization. The major logistical functions are shown in figure 2.1

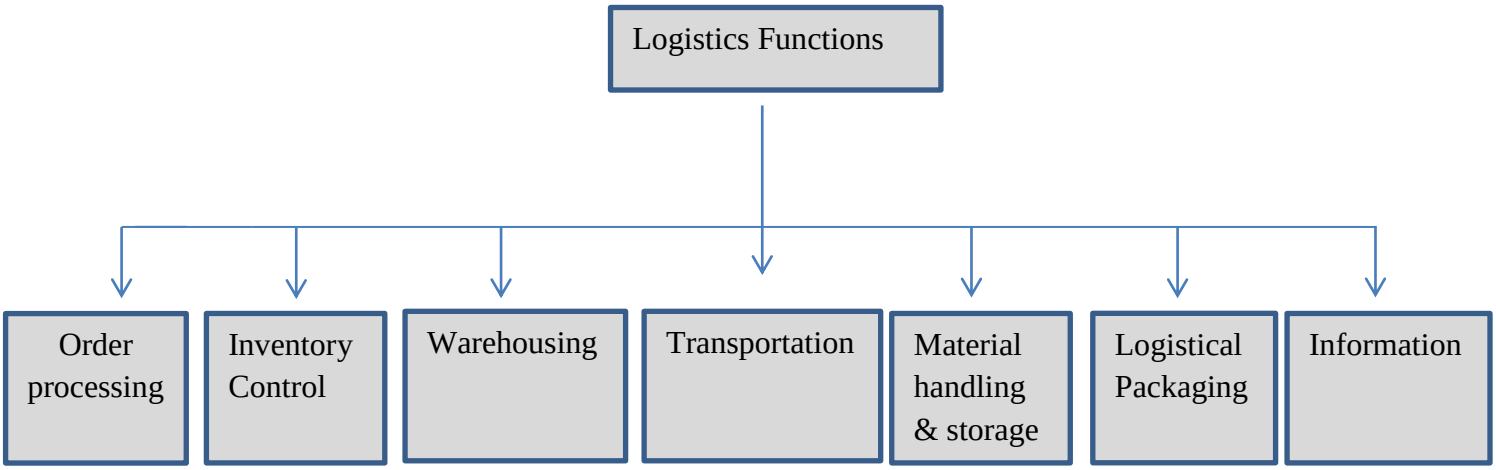


Figure 2.1

Every function is critical to supply chain efficiency and the focus point in the project is transportation.

Transportation

For movement of produce from suppliers viz. farmers to central distribution facility and from CDF to retailers, transport is most fundamental and important component of

logistics. For low unit value products like fruits and vegetables, the transportation cost component is 20 percent of the product cost. In logistics costs its share varies from 65 to 70 percent in the case of mass consumed very low unit-priced products. The consideration of whether the firm should have its own fleet or go in for outsourcing depends on investment, operations costs, expertise and reliability.

Logistical Packaging

Logistical packaging is a critical element in the physical distribution of a product, which influences the efficiency of the logistical system. It differs from product packaging, which is based on marketing objectives and of not so much consideration in distribution of fresh vegetables and fruits. However, logistical packaging plays an important role in damage protection, ease in material handling and storage space economy. The unitization of load has a major bearing on logistical packaging with regard to the packaging cost.

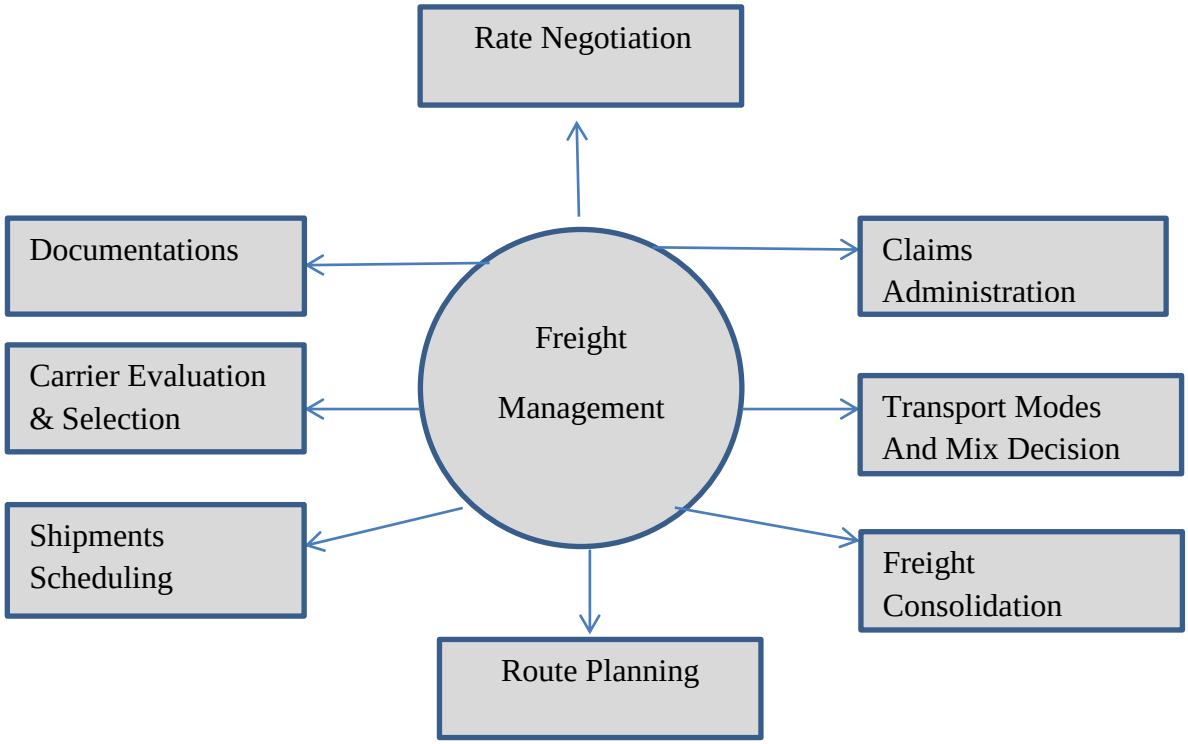
Information

Logistics is basically an information-based activity of inventory movement across a supply chain. Hence, an information system plays a role in delivering a superior service to the customers. Use of IT tools for information identification, access, storage, analysis, retrieval and decision support in logistics is helping business firms to enhance their competitiveness.

2.1 Logistics Management – Objectives

To achieve efficiency in supply chain following subsets of logistics management need to be achieved:

Inventory Reduction, reliable and Consistent Delivery Performance, freight Economy, minimum product damages and quick Response.



Freight

It is a major cost element in logistics cost. This can be reduced by adopting measures such as freight consolidation, transport mode selection, route planning, load unitizing. And all these will be a part of this project focus. Logistics manager has to achieve objectives of freight cost reduction, speed and reliability in delivery. However the freight cost is influenced by the following factors – volumes, distance, product density, product shape and type, and market dynamics.

Route Planning

For the conservation of precious fuel and saving the transportation time, route planning exercise is of utmost importance to the carrier owner. Route planning may be advisory or statutory. The main objective of route planning is to cover the distance between two points with the shortest distance, ensuring operating economy resulting into lowest

transportation cost. The planning task becomes complicated in case of perishable commodity having short shelf life.

For a typical state run co-operative dairy in India, milk is collected from 500 to 800 pickup points once or twice a day. Amul for example collects milk from 10,000 suppliers from 1,000 collection centers. The milk pickup vans ply on 50-100 routes daily. The share of transportation cost in total cost of dairy operations is 17-18 percent. Even a few percent reductions in transportation cost by proper route planning may reduce the number of vehicles and trips helping in improving the bottom line considerably.

2.2 Outbound Logistics

Inbound and outbound logistics are vital parts of supply chain process. Once a good is produced/processed and is ready for distribution, company needs to find the most cost effective way to facilitate supply across all distribution channels. Many companies focus more upon outbound systems because of the costs involved and because managing the outbound system well make it easier to achieve and sustain market share.

Efficient management of outbound transportation is a critical activity for many companies, especially distribution companies who have to deliver the correct product in the correct quantity at the correct time to its customers. For the most part, outbound logistics is a very simple concept. The field is centered on two concepts, storage and transportation. The storage portion of the field uses warehousing methods to keep the finished product safe and accessible. At any moment, the product may need to move out to a customer, so organization is key to success. While this part of the field is based on storage, having as little product stored as possible is generally desirable, as stored materials aren't making any money.

The transportation portion is generally the more involved and complex part of outbound logistics. In this field, it is important to move the product from one place to another in the best way possible. Factors need to be taken into account that covers all possible

scenarios in order to find the best movement methods for goods. For example, delaying one shipment may cost the company money, but if that means it may be combined with a larger shipment, that may end up being more efficient in the long run.

There are various packaged IT solutions for managing all aspects related to outbound logistics, fleet management. Most of the solutions available are by names transport management system, which may be a part of ERP package, standalone package or in the form of software as a service.

A transportation management system (TMS) is a subset of supply chain management concerning transportation operations and may be part of an enterprise resource planning system.

A TMS usually "sits" between an ERP or legacy order processing and warehouse/distribution module. A typical scenario would include both inbound (procurement) and outbound (shipping) orders to be evaluated by the TMS Planning Module offering the user various suggested routing solutions. These solutions are evaluated by the user for reasonableness and are passed along to the transportation provider analysis module to select the best mode and least cost provider. Once the best provider is selected, the solution typically generates electronic load tendering and track/trace to execute the optimized shipment with the selected carrier, and later to support freight audit and payment (settlement process). Links back to ERP systems (after orders turned into optimal shipments), and sometimes secondarily to WMS programs also linked to ERP are also common.

These systems have been offered with different types of licensing arrangements. The four main offerings are:

- On-premise licensing (traditional purchased license)
- Hosted licensing (remote, SaaS, Cloud)
- On-premise hosted licensing (a blend of 1 and 2)
- Hosted - TMS free of licensing (same as 2 but free with no license requirements)

Transportation management systems manage four key processes of transportation management:

Planning and decision making – TMS will define the most efficient transport schemes according to given parameters, which have a lower or higher importance according to the user policy: transport cost, shorter lead-time, fewer stops possible to ensure quality, flows regrouping coefficient, etc.

Transportation Execution – TMS will allow for the execution of the transportation plan such as carrier rate acceptance, carrier dispatching, EDI etc.

Transport follow-up – TMS will allow following any physical or administrative operation regarding transportation: traceability of transport event by event (shipping from A, arrival at B, customs clearance, etc.), editing of reception, custom clearance, invoicing and booking documents, sending of transport alerts (delay, accident, non-forecast stop)

Measurement – TMS have or need to have a logistics key performance indicator (KPI) reporting function for transport.

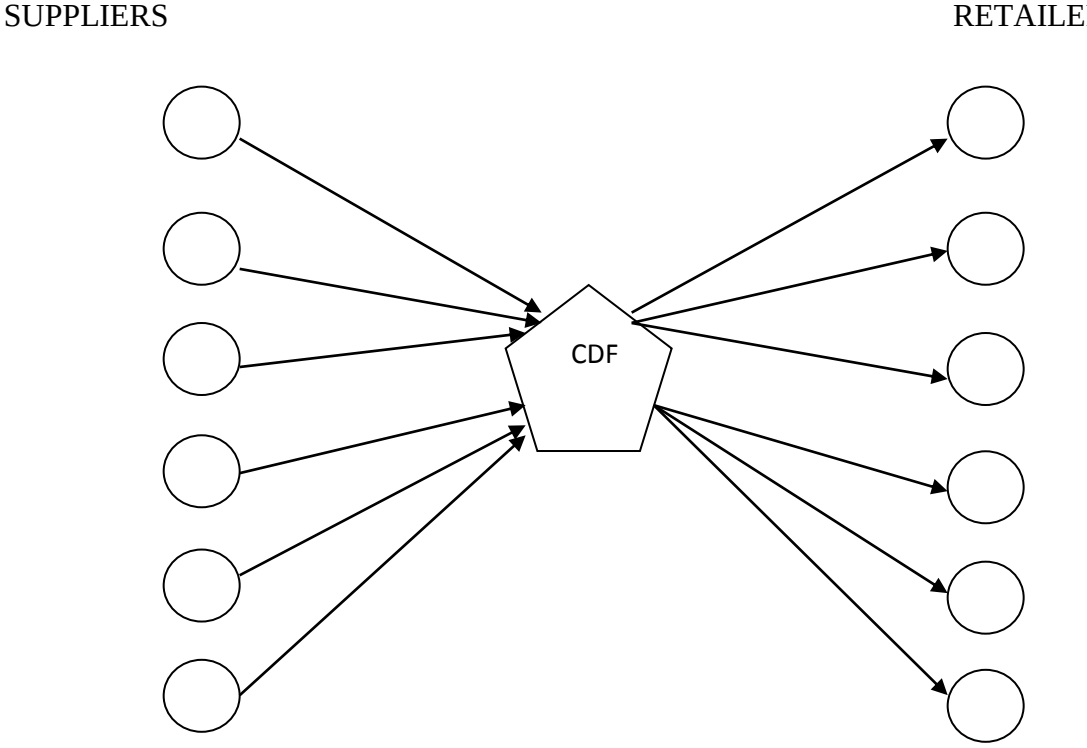
1. Various functions of a TMS include but not limited to:
2. Planning and optimizing of terrestrial transport rounds
3. Inbound and outbound transportation mode and transportation provider selection
4. Management of motor carrier, rail, air and maritime transport
5. Real time transportation tracking
6. Service quality control in the form of KPI's (see below)

    - Vehicle Load and Route optimization
    - Transport costs and scheme simulation
    - Shipment batching of orders
    - Cost control, KPI (Key performance indicators) reporting and statistics
    - Typical KPIs include but not limited to:
    - % of On Time Pick Up or Delivery Performance relative to requested
    - Cost Per Metric - mile; km; Weight; Cube; Pallet

- Productivity in monetary terms, e.g. cost per unit weight or shipping unit
- Productivity in operational terms, e.g. shipping units/order or weight/load

For a company that distributes fruits, vegetables and other similar products to more than 2,00,000 customers in a large metropolitan area, strategic supply chain analysis involves an economic rationalization of the number and location of retail points. The goals are to achieve an appropriate balance between minimizing total cost and maximizing customer service.

Wholesaling and retailing companies typically have very large outbound transportation networks. For a agri-product retailer company with one vast DC, 100 product families and 400 retailers, the network will have hundreds of links even when obviously uneconomic origin and destination combinations are eliminated.



2.2 All shipments via DC (Mother Dairy SAFAL model)

3. RESEARCH METHODOLOGY

The comprehensive view of methodology adopted for the investigation is explained in this chapter viz., scope of study, the significance of the study, data collection under the same headings.

3.1 Scope of the Study

The theoretical analysis of this research is the subject of downside supply chain in fresh retail chain with emphasis on Mother Dairy SAFAL. The basic aspects of outbound logistics (transport planning viz. route planning, shuffling, document preparation, communication with other functional units, distribution network designing, leveraging IT tools) are presented and analyzed subsequently.

Through this study I intend to answer following questions –

1. Perspectives involved in the outbound operations of a typical fresh produce retail supply chain?
2. Role of IT systems in outbound logistics
3. Risk management in distribution of perishable products?

3.2 Significance and beneficiary of the study

The outbound warehousing and logistics processes are critical to success of every supply chain and they become even more crucial for perishable products supply chain. Fruits & vegetables retail chains are a growing need of increasing middle income segment of India. Mother Dairy, SAFAL is an established player in this industry majorly present in Delhi & NCR market and its well established processes could serve as a prototype and benchmark for new players entering in the segment. The present study is an analysis of their key processes in managing outbound warehousing and distribution. It would help SAFAL, Mother Dairy to review their strategic and tactical decisions pertaining to downside supply chain, and if required alter them to be more competitive in this growing segment.

The research may prove helpful to supply chain consultants offering various solutions to similar players in the market, also to the existing players and new entrants like ITC Chaupal Fresh, Namdhari, Reliance Fresh, Tesco, and Sainsbury.

3.3 Data Collection

Data collection can rely on many sources of evidence. According to Yin, there are six important sources; these are documentation archival records, interviews, direct observation, participant-observation, and physical artifacts. There are two types of data generally: primary data and secondary data. Concept of primary data implicates the collection of information through direct observation, personal interviews, and conducting conversation. The concept of secondary data means the study of document; biographies, web-sites and other historical and documentary records relevant for the studied issue. We will have both types of data collection in our thesis and it's an exploratory research.

3.4.1 Primary Data

The capturing of primary data was conducted through both personal interviews and observations. Interviews were unstructured and structured both. As most of the time was spent working at Mother Dairy SAFAL, CDF facility, this gave the opportunity to ask questions as they arose. By going through an introduction of the company background, the organizational structure got a clear picture of their originations structures and general information of different business processes. In all, being situated in the CDF facility got a great advantage in acquiring first-hand information.

3.4.2 Secondary Data

The secondary data consists of textbooks, journals, research papers, articles and company files and reports. They are collected from the library, target companies and through Internet. They comprised few chapters from Logistics Management by V V Sople. They were applied in identifying evaluation parameters, classifying outbound logistic characters and analyzing logistic solutions.

4. DATA ANALYSIS, INTERPRETATIONS AND FINDINGS

This chapter presents the theoretical aspects and analysis in line with the objectives of the study under following headings.

4.1 What are the common processes in the outbound operations of a typical fresh produce retail supply chain?

4.2 What are the IT systems that act as enablers in these outbound processes?

4.3 How risk is managed in distribution of perishable products?

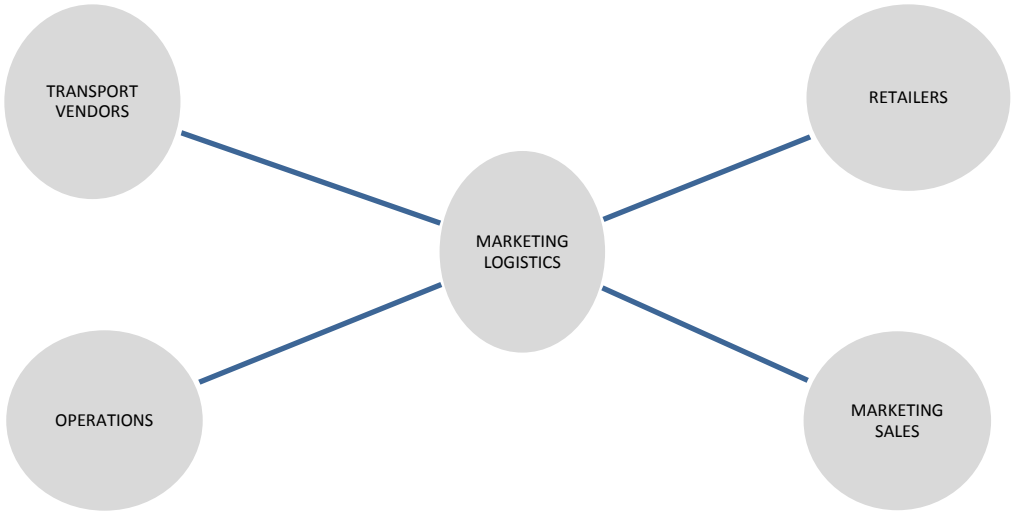
4.1 Common processes in the outbound operations of Mother Dairy, SAFAL

4.1.1 Overview of the process

Its logistics operation is the featured center piece of its global business system, with its collection and distribution facility; one located at Mangol Puri, New Delhi that link to point-of-sales which includes approximately 350 retail outlets and various institutions and hotels. Collection and distribution facility operates as logistical control point, consolidation centre, and transit hub. It plays a proactive part in the integration of supply and demand, anticipate retail demand, and eliminate storage.

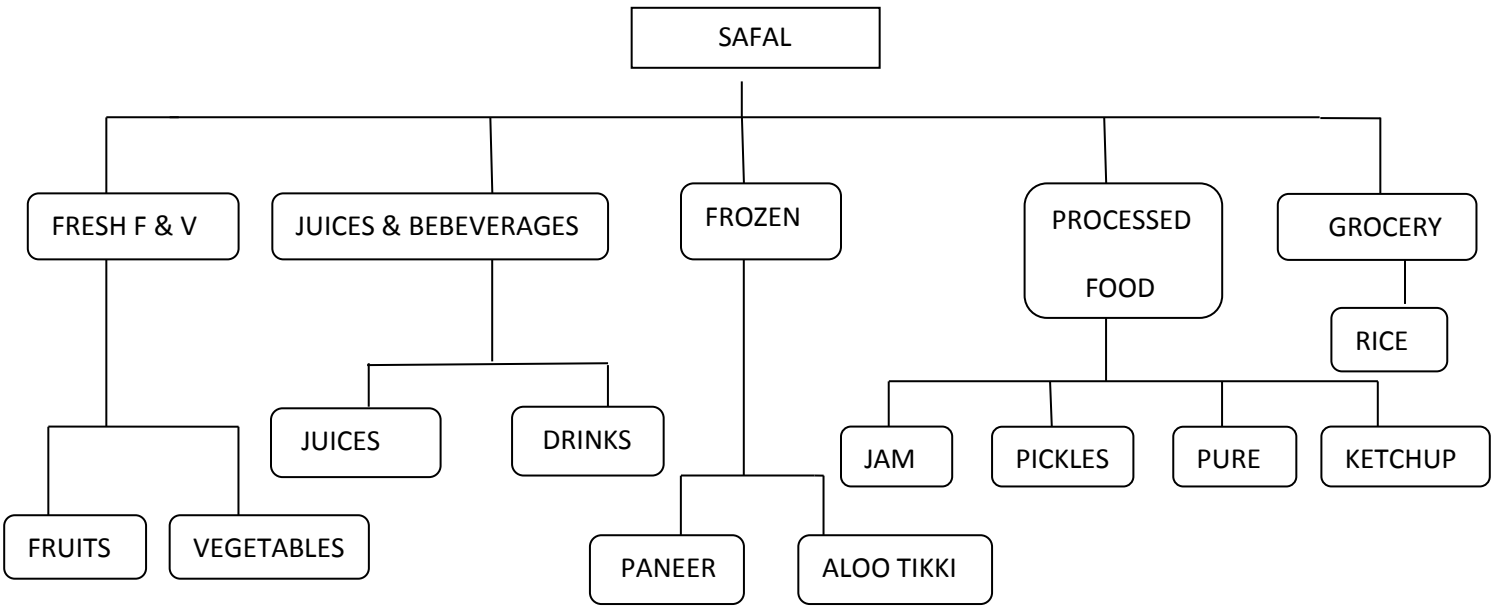
Outbound logistics of Mother Dairy Safal is handled by marketing logistics Department working from the Collection and Distribution Facility, New Delhi. The department is responsible for time bound supply of fresh fruits and vegetables, various FMCG products from CDF to 350 retail shops named as booths, more than 30 institutions and hotels spread across Delhi NCR.

Success of any supply chain depends upon how integrated and how well is the communication between different functional teams. The various teams with which marketing logistics interact on daily basis are shown in figure 4.1.



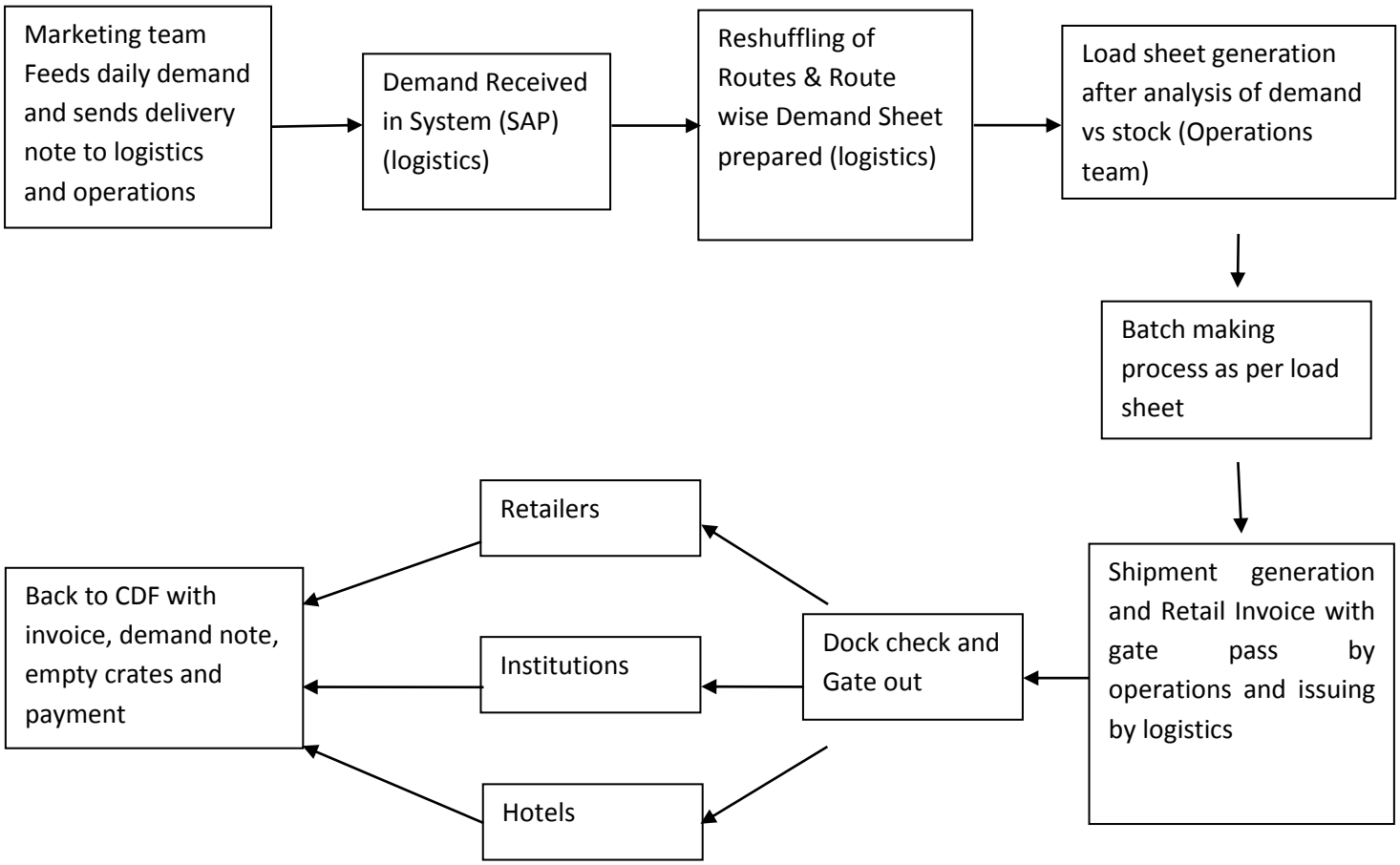
4.1 Interface with functional Department

Mother Dairy, SAFAL is involved not only in marketing and distribution of fruits and vegetables but other food items like jams, pickles, ketchup, frozen items and as well as few grocery items. A product chart is displayed in figure 4.2.



4.2 Portfolio of products handled by Mother Dairy SAFAL

HOLISTIC VIEW OF THE DISTRIBUTION PROCESS



4.3 PROCESS FLOW OF OUTBOUND LOGISTICS OPERATIONS

4.1.2 Distribution Planning: Scheduling deliveries to retails points

Unit works on a beautifully designed three tier supply system which has evolved over the years. Daily average demand of 400000 (4 lakhs) kilograms is managed through this three tier supply system (commonly referred as in Mother Dairy, SAFAL).

Morning supply	Retailers receive demand stock during 4.00-7.00 A.M.
TST supply	Retailers receive demand stock during 3.30-6.30 P.M.
Evening Supply	Retailers receive demand stock during 10.30 P.M.-1.30 A.M.

Table 4.1

Why a three tier supply system is required for outbound supply of Fresh fruits, vegetables, dairy products -

- Cost reduction
- Optimum utilization of resources (manpower, plant , vehicle)

Consumers/customers of SAFAL expect the best of quality fruits and vegetables at all times and to maintain the quality the stock needs to be replenished at regular intervals. Every retailer gets stock delivery twice a day. For the aim of cost reduction, optimum utilization of resources is must. If there is a single supply window there would be increased inventory and warehouse costs, increased labor costs. All these factors combined have led to the evolvement of three tier supply system. Such system can prove beneficial and cost reduction option for retail chains which are involved in distribution of products where low shelf life and timely delivery are constraints.

4.1.3 Scheduling Delivery and route planning

Mother Dairy Safal has approximately 360 leased and rented retail shops across NCR called as booths. In order to cover supply to all these retailers and institutional sale points, routes have been designed for the purpose of route optimization and capacity utilization of vehicles. Due to perishable nature of these agri-products there is a three time supply from CDF to retailers. Summarized in below table

SUPPLY TIME	ROUTE SERIES	REPORTING TIME AT DOCK FOR VEHICLES	DISPATCH TIME FOR VEHICLES
MORNING	101001-101050	1.00-1.30 a.m.(slot 1) 1.30-2.30 a.m.(slot 2)	2.30-3.00 a.m. 3.00-3.30 a.m.
EVENING	101051-101099	7.30-8.00 p.m.(slot 1) 8.00-8.30 p.m.(slot 2)	9.00-9.30 p.m. 9.30-10.00 p.m.
TST	102001-102050	11.30-12.00 p.m.(slot 1) 12.00-12.30 p.m.(slot 2)	1.00-1.30 p.m. 1.30-2.00 p.m.

- Table 4.2

NOTE: Route series 101101 onwards is for Hotel and Institution routes (approximately 25 routes).

BOOTH (Retail Shops) SERIES

81(0)- - 81(1)--	South Delhi
81(2)- - 81(3)- - 81(4)- -	Central Delhi
81(5)- - 81(6)- -	North & West Delhi
81(7)- -	Trans Yamuna
81(8)- -	Noida, Gr. Noida & Ghaziabad
81(9)- -	Gurgaon & Faridabad
82- - -	Rented shops across Delhi NCR
88- - -	Joint Booths (Milk and Safal)

Table 4.3

An average of 400000 kg agricultural product is being supplied from CDF to retailers across NCR every day. Supply to retailers is a complex job which the logistics department here has been handling with least errors possible. Since the products are highly perishable and for the same reason retailers do not maintain a stock, therefore there is a three time supply from CDF to all retailers. This three time supply cannot be achieved without optimization of routes and proper capacity planning.

Before designing an optimized route department considers following parameters

- Running distance of the route
- Inter booth distance i.e. distance between two sale points
- Total demand on the route

4.1.4 VEHICLE CAPACITY UTILIZATION

With universal aim of achieving minimum cost spent on logistics, it is vital that vehicle capacity is utilized to the maximum else there would be extra vehicles used adding extra cost. At Mother Dairy Safal all fresh fruits, vegetables, dairy products are loaded into vehicle in big crates, small crates, insulated boxes, bags, cartons (various sizes), boxes.

Without a conversion basis number of crates, cartons, boxes a vehicle can carry cannot be calculated.

The standard conversion rule used –

100 SCR = 60 BCR

4 BIG BOXES = 8 BCR

Average Utilization/route = Total sale / Total capacity

Where total sale = actual demand sent to retailers

Total capacity = vehicle capacity which is 3200 Kg per vehicle.

The average weight that comes in a big size crate is 10 kg which is the basis for capacity planning and utilization. (Crate weight varies from 2 to 20 Kg because of product differentiation and this is the reason for 10 kg average)

No. of big crates in a vehicle = Total capacity of vehicle/Average BCR weight

i.e. 3200/10= 320 BCR

It is known to capacity planner that maximum a vehicle can carry 320 BCR. And at the time of reshuffling planner reshuffles the route as per demand on the route and capacity of vehicle.

4.1.5 Route reshuffling for load matching

Reshuffling process – Addition/removal of booths i.e. retail points when a demand on existing route exceeds vehicle capacity i.e. 320 BCR.

Once the demand is received in system, logistics personnel are engaged in route planning and reshuffling. Reshuffling takes place twice a day – for each supply leaving from CDF.

Route demand cannot be constant as demand changes frequently.

Factors leading to demand variation -

- Different demand in different seasons
- Change in demand because of calendar festivals
- Change in demand due to concessional rates on weekend
- Push from sales team

Though logistics is equipped with SAP system, reshuffling process is done manually.

Making use of load unitization, the stock is loaded in different packaging forms, general packaging forms and terminology -

“X”- BCR

“Y” - SCR

“Z” - Big boxes

“P”- cartons

“S” - small boxes

4.1.7 PROCESSES AFTER ROUTE RESHUFFLING

Operations and logistics team work in full coordination. When logistics team is finished with route making, operations get engaged in preparing load sheet which loading team further uses for batch making. And then operations staff generates retail invoice and gate pass for each route. Batches are arranged at the docks which will be loaded into vehicles as per retail invoice.

4.4 LOADING AREA

Logistics and operations team ensure that the right material and right quantity is loaded into the vehicles as per the retail invoice. When the material is loaded then a gate pass is issued to each vehicle for each route.

4.2 IT SYSTEMS ACTING AS ENABLERS IN OUTBOUND LOGISTICS

4.2.1 Route shuffling achieved through SAP transportation module -

The software takes the location of retailers, shipment size, desired delivery times, information on the transportation infrastructure (such as distance between points) and vehicle capacity as inputs. These inputs are formulated into an optimization problem whose solution is a set of routings and a packing list for each vehicle that minimize costs while meeting delivery constraints.

After reshuffling and route planning process, final route list is forwarded to operations team.

4.2.2 Accounts receivable process made simpler

Software/ Technology Used – SAP ECC 6.0

- How do retailers make payment

The vehicle carrying shipment carries the retail invoice against which retailers make payment to Mother Dairy Safal. Vehicle driver hands over the payment to logistics team which ensures if the payment received is as per the retail invoice and then the payment is handed over to sales team.

- Transport vendors accounts settled through logistics

Payment to transporters is made fortnightly. Each transport vendor is assigned a unique vendor code and the payment is issued against these codes only.

ERP system SAP has helped in transparent and efficient payment process.

4.3 Cost & Risk Management

Every department has fixed budget which gets approved in beginning of year. To ensure logistic department is not over spending following parameters are monitored continuously.

- Average utilization per route
- Cost per kg
- Cost per route

The objective is to minimize cost per kg which usually floats at 85 paise/kg. Average utilization per route should be achieved close to 1. Reports of last two years were

studied and analyzed to arrive at the calculations. Details were not presented due to confidentiality clauses.

The chief risks when transporting a shipment from CDF to retailers:

- The risk that the shipment is delayed
- The risk that the shipment does not reach its destination because of disruption by external forces.

In each case it is important to identify the sources of risk and their consequences and plan suitable mitigation strategies.

Mother Dairy Safal has over the period able to minimize these risks by designing the best of the routes and not just the routes, also the alternate routes.

These delays have been mitigated by making use of outsourced fleet. Contracts include penalty clauses for all the types of risks involved. There are clauses for reverse logistics wherein if the material is sent back due to poor quality and this poor quality can be due to various reasons example delay in supply, poor quality loaded from CDF itself. Identifying the real cause is a challenge and once identified necessary action is taken against the transport vendor or the quality team.

4.3.1 Fleet outsourcing makes sound business sense

A company that sells items that need to be transported to other locations or end customers may use a shipping service or opt to own their own vehicle fleet. Depending on the number of customers, the location of those customers, size of the items to be transported, and the availability of a shipping service, a company will make a decision on owning their own vehicle fleet.

A company may make a decision to have an in-house vehicle fleet based on the needs of the company to get goods to customers as quickly as possible. However the convenience of having a vehicle fleet to transport items at a moment notice comes at a considerable

price. The cost of operating a vehicle fleet is often compared to using a third party transport service, but often the decision to have an in-house fleet is not always based on cost. The costs of owning and operating a fleet is often more than a company is aware and the hidden costs sometimes can mean the difference between owning a fleet or hiring a transportation service

Vehicle Costs – The cost of purchasing or leasing a vehicle is very expensive. New vehicles cost more than used, but require less maintenance and will usually offer greater mile per gallon. Alternative fuel vehicles should also be considered as government tax relief may be available, reducing the overall cost of the vehicle.

Insurance – For vehicles used in commerce your company needs to invest in business insurance for vehicles. It is important to have full coverage otherwise any accident could lead to damages against the company.

Fuel Costs – Commercial vehicles can use a lot of fuel when fully loaded and with fuel prices for diesel steadily rising past in India. As fuel prices fluctuate it is difficult to budget each month for the fleet.

Vehicle Maintenance – Owning a fleet of vehicles means that those vehicles need to be maintained. Regular maintenance includes oil changes, tire replacement, air filters, brake pads, and transmission fluid. Apart from the regular maintenance items, there are always unexpected maintenance and repairs, as well as accident repairs that may be needed.

Transportation Employees – Operating a fleet means that a company must either employee drivers or use contract drivers. Employee drivers not only have a payroll liability to the company, but there are other costs for employees such as worker's compensation insurance, taxes, and health insurance. Contract drivers can provide a similar service at a lower cost, but hiring contract drivers can have led to liability problems if the contract drivers do not have the necessary insurance.

Employee Training – New drivers need to be trained and that is an additional cost to the company. The cost of either purchasing training or developing the courses in house are further hidden costs.

Unforeseen Issues – Sometimes drivers are taken ill and that can affect the delivery schedule if no back-up drivers have been employed. The cost of a missed delivery can impact customer satisfaction and potential new sales. A company can hire back-up drivers or temporary contract drivers in case of illness and employee vacation.

For a company to own and maintain its own fleet of delivery vehicles is a great expense. However the convenience of being able to make emergency deliveries and having control of the transportation of your finished goods can outweigh the cost of maintaining the fleet. Contract transportation companies will offer very competitive rates and can be held to very strict service level agreements whereby penalties are imposed if the level of service falls below a certain standard.

Due to high costs of owning transport assets, Mother Dairy has signed contracts with the third party for transportation capacity. Around 30 different transport vendors have been assigned these contracts which in total are providing approximately 100 vehicles for the outbound supply. Having multiple vendors have helped the logistics team achieve timely supply, minimized risk, zero monopoly of third party vendors.

5. RECOMMENDATIONS AND CONCLUSIONS

5.1 Recommendations

After studying the down-stream supply chain of Mother Dairy primarily concentrating on process flows, apart from chapter wise analysis few recommendations could be made-

- Though distance covered on routes is in small range of 30-60 kilometers but for better traceability of vehicles which is needed to ensure on time delivery, use of GPS tracking should be a part of monitoring system. Effective use of this system can help tracking any non-conformity to schedule and route, leading to better management of distribution functions. Vehicles are already equipped with the devices but continual tracking needs more attention.

- Selection of transport vendors is through open tenders, which is a manual affair. E-tendering system can be more effective in vendor selection because of the benefits like ease of process, past track record of fleet providers and their service levels. These systems are available in many forms and as low cost services, as per the size of operations and frequency of tendering process, service can either be through an online platform, software as a service or part of some package.

- Efforts can be made for better and faster communication of demand levels from demand side professionals, so that shipment deliveries can be better planned based on actual demand levels as route reshuffling requires considerable time for route planners.

- Once a fleet provider is selected, routes are assigned and vehicles/fleet service provider works on same routes throughout the year. They should rather be rotated or assigned to operate on different routes, changed at least every six

months. This would ensure that vehicle staff (includes driver) are familiar with more number of routes.

- The manual tracking of the goods from the warehouse could be avoided. The bar coding available from the warehouse also could be made use of and the other modes of tracking of the goods such as the RFID systems can be implemented if the testing of these proves to be effective. Implementation Guide: Traceability for fresh fruits and vegetables from GS1 can be referred for checking feasibility in Indian market.

5.2 Conclusion

In conclusion this research shows that Mother Dairy has effective downside supply chain processes but there is still a scope for improvements in the areas of tracking vehicles, better collaboration in forecasting and communicating demand so logistics can plan deliveries well in advance. One of the major takeaways of the project as such is the fact that the retail industry has been evolving over the years and will continue to do so and the new technology will be implemented to facilitate the growth. The shift in the supply chain and their strategies has been caused by various factors which include government regulations, new trade practices and the shifting business conditions. The supply chain utilization and efficiency can be improved by better adapting to growing business needs and complexities. In chapter 4 common outbound logistics processes have been chalked down. This document can be used as a manual for setting up downside supply chain for new retail chains wishing to operate at city or state level.

The supply chain model of SAFAL, Mother Dairy has proved beneficial for both farmers and consumers. Farmers associated with it have benefited because of constant demand from SAFAL, better prices, hassle-free shipment of produce from farm to CDF. The consumers get high quality fresh fruits and vegetables at better prices.

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6. LIMITATIONS AND FUTURE SCOPE OF THE STUDY

The process flow of downstream supply chain is explained in this research but role of IT systems is not discussed in detail. The primary data came was collected through structured and unstructured interviews with logistics executives working at central distribution facility. A separate research can be carried out for studying the efficiency of transportation tool from SAP. Most of the daily operational level work is being done through the system; few activities like route reshuffling are done manually. Possibility of a system capable of embedding this feature can be brought forward.

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