

A STUDY OF SUPPLY CHAIN MANAGEMENT FOR PERISHABLE PRODUCTS BY SUPERMARKETS IN DELHI/NCR

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ABSTRACT

As the Indian population is increasing, the demand for perishable products i.e. dairy products, bakery products, fruits & vegetables, meat, fish, sea food and poultry are also increasing. Owing to the perishable nature and very short shelf life, these items require proper storage and transportation facilities in order to reach to the customer in fresh state. Supply chain management plays a very vital role in the supply of perishable products. Supply chain management deals with the management of material, information, financial flows in a network consisting of supplier manufacturer, distributor, retailer, and consumer. Supply chain depends on the major drivers i.e. facilities, information, inventory, transportation, sourcing, pricing. Exploratory cum descriptive method of research has been used. The study focuses on the shelf life, lead time, frequency of shipment, mode of transportation, inventory loss of perishable products. Perishable products are divided into the aforesaid category and their analysis is done by the responses taken from various Delhi/NCR supermarkets.

Keywords- supply chain, perishable goods, supermarkets, Shelf life, lead time, frequency of shipment.

INTRODUCTION

“Supply chain management (SCM) is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers”. It comprises all activities associated with the flow and transformation of goods from the raw materials stage to providing it to the end user along with the associated information flows i.e., it deals with the whole process of creating each element of a product to the final consumption of the product. Material and information flow both up and down the supply chain.

The ultimate goal of any company for using the supply chain management would be to reduce the inventory provided that the raw materials we needed are available. As the number of companies interested in improving their supply chain management are increasing many web based application service providers are competing with the software systems provided with web interfaces for the company. These web based application service providers are ready to provide all or part of the SCM services for the companies who hire their services.

There are 3 different types of supply chain management flows:

- ✓ The product flow
- ✓ The information flow
- ✓ The finance flow

There are 2 types of SCM software”

- ✓ **Planning applications**

These applications analyze all the different ways to fill in an order and selects the best way to fill in this order. These applications used advanced algorithms for this.

- ✓ **Execution applications**

These applications mostly deal with the information on the goods like tracking the physical status of the application, managing financial information of all the companies

involved (like payments done, payments pending etc.,) and they deal with the management of the materials.

Lead Time

Lead-time is the interval between the initiation and completion of a process. For example, the lead-time between the placement of an order and its delivery from the supplier is the most common lead-time used in procurement.

Lead Time is the amount of time between process initiation and completion. For customers Lead Time is the time between a confirmed customer order and its scheduled pick up or delivery based on our terms and conditions. This varies based on the customer and the product.

There are several different types of Lead Time, but there are four primary types of Lead Time –

1. Customer Lead Time – the amount of time taken between order confirmation and order fulfillment (either pick up or delivery depending on the agreement with the customer).
2. Material Lead Time – the amount of time it takes to place an order with a supplier and receive it, from confirmed order to having it on hand.
3. Factory/Production Lead Time – the amount of time it takes to build and ship a product if all the materials are available.
4. Cumulative Lead Time – the total amount of time it would take from confirmed order to delivery of product if you had to order all the materials (if none were on hand). It is the summation of material lead-time and factory lead time.

Shelf Life

Shelf life is the length of time that a commodity may be stored without becoming unfit for use, consumption, or sale. In other words, it might refer to whether a commodity should no longer be on a pantry shelf (unfit for use), or just no longer on a supermarket shelf (unfit for sale, but not unfit for use). It applies to cosmetics, foods and beverages, medical devices, medicines, explosives, pharmaceutical drugs, chemicals, tyres, batteries and many other perishable items. In some regions, an advisory best before, mandatory use by or freshness date is required on packaged perishable

foods. The concept of expiration date is related but legally distinct in some jurisdictions.

Shelf life is the recommended maximum time for which products or fresh (harvested) produce can be stored, during which the defined quality of a specified proportion of the goods remains acceptable under expected (or specified) conditions of distribution, storage and display.

Cold Chain

The cold chain refers to the management of the temperature of perishable product in order to maintain quality and safety from the point of harvest through the distribution chain to the final consumer.

The cold chain ensures that perishable products are safe and of a high quality at the point of consumption. Failing to keep product at the correct temperatures can result in a variety of negative attributes. These can include textural degradation, discolouring, bruising and microbial growth. Effective management of cold chain maintains the quality of a product, which leads to a satisfied customer, greater demand, and overall protection of public health. Each sector of the chain, from the point at which product is harvested to the point at which it is sold, shares responsibility. Breaks in the chain may occur just as easily on a warehouse dock as they do on a supermarket floor. If one link breaks, all suffer the consequences of an unsatisfied customer.

OBJECTIVES OF THE STUDY

- ✓ To analyze the process of supply chain of perishable products in supermarkets of Delhi/NCR.
- ✓ To analyze the effectiveness of supply chain of perishable products in supermarkets of Delhi/NCR.
- ✓ To analyze the shelf life of perishable products in supermarkets of Delhi/NCR.
- ✓ To analyze the lead-time for supply of perishable products in supermarkets of Delhi/NCR.
- ✓ To analyze the frequency of shipment and inventory level period of perishable products in supermarkets of Delhi/NCR.
- ✓ To analyze the inventory loss of perishable goods and strategies used by Delhi/NCR supermarkets.

SCOPE OF STUDY

The scope of this research is on the supply chain system for perishable products offered by supermarkets of Delhi/NCR, while considering the shelf life of the product, lead time required for supply of perishable goods, frequency of shipment, inventory level period, inventory loss, mode of transportation. The study covers only supermarkets of Delhi/NCR.

LIMITATIONS OF STUDY

- ✓ It is based only on the supermarkets of Delhi/NCR.
- ✓ It is based on the responses of supermarket managers.
- ✓ Approximate figure are given by supermarket managers.
- ✓ Due to confidentiality of information, only limited information was provided by the supermarket managers.
- ✓ Limited questionnaire time was given by the supermarket managers.
- ✓ Due to covid-19 limited supermarkets were covered.

RESEARCH METHODOLOGY

1. **Research Problem:** To know how supply chain of perishable products is managed in supermarkets of Delhi/NCR..
2. **Research Question:**
 - ✓ Which kind of perishable products are there in the store?
 - ✓ What is the average shelf life of perishable goods?
 - ✓ What is the lead time required for supply of perishable goods?
 - ✓ What is the treatment of goods after their shelf life?
 - ✓ What strategies are used to minimize perishable goods loss?
 - ✓ How often are shipments of perishable goods received?
 - ✓ What is the average time for inventory level of perishable goods?

- ✓ What mode of transportation is used for perishable goods?
- ✓ What % of inventory of perishable goods is lost due to decay?

3. Type of Research:

- ✓ Exploratory
- ✓ Descriptive

4. Data & Data Sources:

- ✓ Primary (questionnaire from respondent of supermarket of Delhi/NCR region.)
- ✓ Secondary (collected from journals, books, internet)

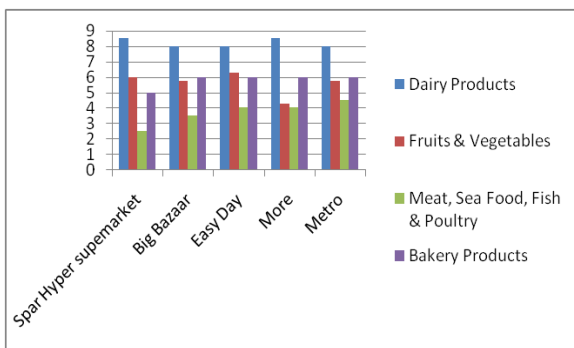
5. Tools for Analysis:

- ✓ Mean/Average computation
- ✓ Graphical Presentation

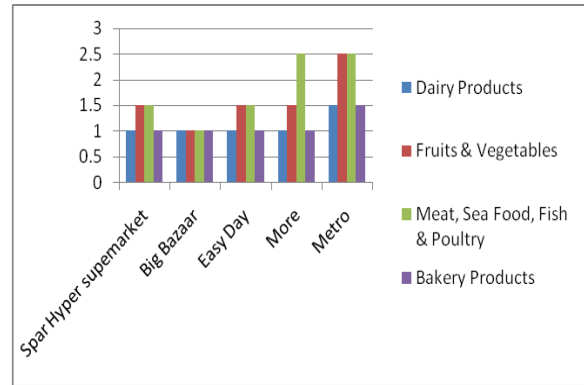
DATA INTERPRETATION

An assessment is based on the following factors i.e. shelf life, lead time, frequency of shipment, inventory loss, inventory time period, mode of transportation. Perishable products are divided into categories i.e. Dairy products, Fruits & Vegetables, Meat, Fish, Sea food & Poultry, Bakery Products.

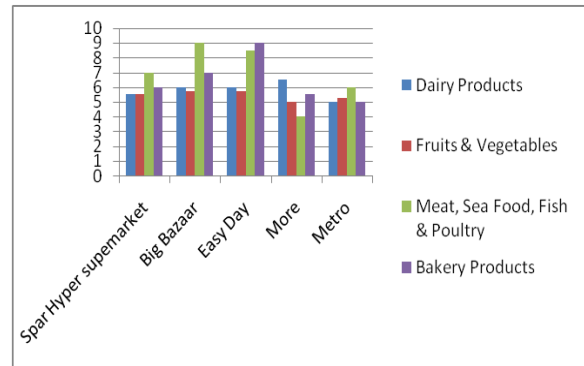
SHELF LIFE-



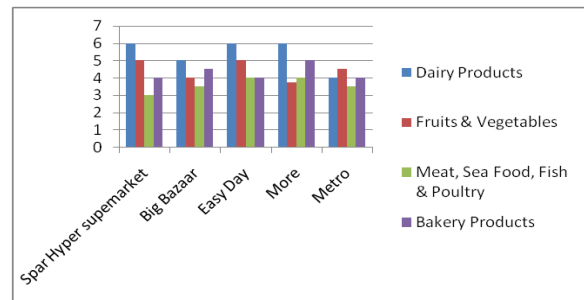
LEAD TIME-



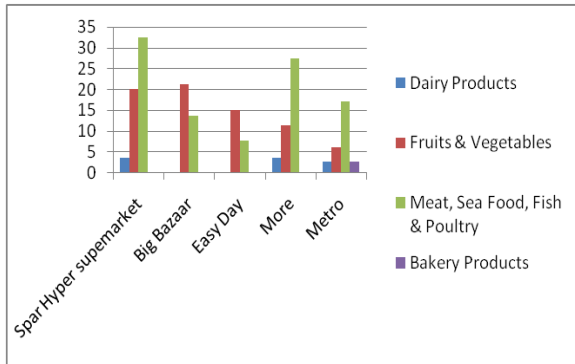
FREQUENCY OF SHIPMENT-



INVENTORY TIME PERIOD-



Inventory Loss-



Findings-

1. Average shelf life of perishable goods-
 - ✓ Dairy products- 8.2 Days
 - ✓ Fruits & Vegetables- 5.6 Days
 - ✓ Meat, Fish, Sea food & Poultry-3.7 Days
 - ✓ Bakery Products-5.8 Days
2. Average lead time required for supply of perishable goods –
 - ✓ Dairy products- 1.1 Days
 - ✓ Fruits & Vegetables- 1.6 Days
 - ✓ Meat, Fish, Sea food & Poultry-1.8 Days
 - ✓ Bakery Products- 1.1 Days
3. Average frequency of shipment of perishable good-
 - ✓ Dairy products- 5.8 Times
 - ✓ Fruits & Vegetables- 5.45 Times
 - ✓ Meat, Fish, Sea food & Poultry-6.9 Times
 - ✓ Bakery Products-6.5 Times
4. Average time period for inventory level of perishable goods –
 - ✓ Dairy products- 5.4 Days
 - ✓ Fruits & Vegetables- 4.45 Days
 - ✓ Meat, Fish, Sea food & Poultry-3.6Days
 - ✓ Bakery Products- 4.3 Days
5. Average Inventory Loss due to decay are –

- ✓ Dairy products- 1.9%
- ✓ Fruits & Vegetables- 14.7%
- ✓ Meat, Fish, Sea food & Poultry-19.6%
- ✓ Bakery Products-0.5%

6. Mode of Transportation used for supply of perishable goods is Refrigerated Truck in order to maintain the quality and standard of goods.

CONCLUSION

- ✓ Shelf life of dairy product is larger while the meat, sea food, fish and poultry product have shorter shelf life it means dairy product can be stored for a longer duration of time without become unfit for use.
- ✓ Lead-time of dairy product and bakery product is short while for fruits & vegetables, meat, seafood, fish have longer time period.
- ✓ Meat, fish, seafood, poultry and Bakery product shipment frequency is high due to shorter shelf life while Dairy products and fruits & vegetables have less shipment.
- ✓ Inventory period of dairy product is longer while meat, fish, sea food, poultry have shorter inventory period.
- ✓ Meat, fish, seafood and poultry products incurred high loss while in dairy products and bakery products loss is nil or very less.

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