



HOW INVENTORY MANAGEMENT AND WAREHOUSE OPERATIONS
HELPS IN MINIMIZING
COST PER SHIPMENT IN FLIPKART

By

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Guided By

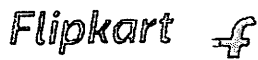
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A DISSERTATION REPORT SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
MBA LOGISTICS AND SUPPLY CHAIN MANAGEMENT

OF

CENTRE FOR CONTINUING EDUCATION

UNIVERSITY OF PETROLEUM & ENERGY STUDIES, DEHRADUN



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Sat, Feb 1, 2020 at 3:03 PM

Dear Sir,

Hope you are doing fine.

As discussed with you earlier, I am willing to work under your guidance for completing my MBA-Supply Chain and Logistics project.

For this reason, I require your acceptance as my project guide.

My registration ID- 500072340.

Major- Supply chain and logistics, CCE.

Attaching my project synopsis for your reference.

I shall be grateful for this help.

An early response will be very helpful for me.

Thanks & Regards

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21K

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Please go ahead.

Regards

Praveen Chandra

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Further, I certify that the work is based on the investigation made, data collected and analysed by her and it has not been submitted in any other University or Institution for award of any degree. In my opinion it is fully adequate, in scope and utility, as a dissertation towards partial fulfilment for the award of degree of MBA.

Signature

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EXECUTIVE SUMMARY

1. Title of the project

“How Inventory Management and Warehouse operations helps in minimizing Cost per shipment in Flipkart”.

2. Introduction including background of proposed study

Now a days inventory is playing a very bigger role in determining the CPS(Cost per shipment) in each and every online business site. Not only online, also offline businesses are also considering this factor.

My study will be on flipkart’s Inventory based model and How both Fixed cost, Variable cost and total qty of inventory determining the CPS. Doing a study on Flipkart is appropriate as Flipkart’s business model’s biggest share is of Inventory only. Approx. 70% of Flipkart business turnover comes from this model only.

In my study, I will also elaborate advantages and disadvantages of Marketplace model and Inventory based model. In Flipkart, larger chunk of budget absorbed by Fixed costs, but Variable cost also plays a vital role in the flipkart day to day warehouse operations. Analysing both the cost in my project will not only help me in my current role but also this analysis will help in expanding my thought process in costing process of any company.

Also, I will give a light on Reinventorization process in Flipkart, as cost saving on this process is ultimately affecting the fixed cost factor and at last Warehouse operating cost getting lowered.

3. Review of literature

a) This study is to find the facts and opinions of inventory management and control at Flipkart India Pvt ltd.

b) In accordance with the present trends it aims mainly at finding out the inventory control procedures at Flipkart India Pvt ltd.

CHAPTER - 01

INTRODUCTION

INTRODUCTION

1.1 Overview

Every enterprise needs inventory for smooth running of its activities. It server as a link between the production and distribution process. The greater a time lag, the higher the requirement of inventory the unforeseen fluctuation of inventory demand and supply of goods, fluctuating inventory prices, necessitate the need for inventory management.

The investment inventory constitutes the most significant part of the current assets inventory of the undertaking. Thus, it is very essential to have a proper control and management of inventory.

There are three basic reasons for keeping an inventory:

1. Time - The time lags present in the supply chain, from supplier to user at every stage, requires that you maintain certain amount of inventory to use in this "lead time".
2. Uncertainty - Inventories are maintained as buffers to meet uncertainties in demand, supply and movements of goods.
3. Economies of scale - Ideal condition of "one unit at a time at a place where user needs it, when he needs it" principle tends to incur lots of costs in terms of logistics. So bulk buying, movement and storing brings in economies of scale, thus inventory.

Meaning and nature of inventory

The general meaning of inventory is stock of goods or list of goods inventory. In accounting language, it means stock of finished goods. For inventory manufacturing concern it includes raw materials, work in progress, consumables finished goods and spares etc.

1) Raw materials

If forms a major input inventory in organization. The quantity of raw materials required will be determined by the rate of consumption.

2) Work in Progress

The work in progress is that stage of stocks, which are in between raw materials and finished goods.

3) Consumables

These are the material, which are needed to smoothen, the process of production. These do not directly go into production, but act as catalyst.

4) Finished Goods

These are the goods, which are ready to sale for the consumers. The stock of finished goods provides as buffer between production and market.

5) Spares

Spares also from a part of inventory.

The stocking policies differ from industry to industry.

Inventories cost account for nearly 55 percent of the cost of production, as it is clear from an analysis of financial statements of large number of private and public sector organizations. So, It essential to establish suitable procedures for proper control of materials from the time of purchase order placed with supplier until they have been consumed properly and accounted for.

Definition

The term inventory refers to assets, which will be sold in future in the normal course of business operations. The assets, which the firm stores as inventory in anticipation of need, are raw materials, work-in-progress/process, and finished goods.

Inventory often constitute a major element of a total working capital and hence it has been correctly observed, 'Good inventory management is good financial management'.

Inventory Management

Inventory management is primarily about specifying the size and placement of stocked goods. Inventory management is required at different locations within a facility or within multiple locations of a supply network to protect the regular and planned course of production against the random disturbance of running out of materials or goods. The scope of inventory management also concerns the fine lines between replenishment lead time, carrying costs of inventory, asset management, inventory forecasting, inventory valuation, inventory visibility, future inventory price forecasting, physical inventory, available physical space for inventory, quality management, replenishment, returns and defective goods and demand forecasting. Balancing these competing requirements leads to optimal inventory levels, which is an on-going process as the business needs shift and react to the wider environment.

Management of the inventories, with the primary objective of determining/controlling stock levels within the physical distribution function to balance the need for product availability against the need for minimizing stock holding and handling costs.

1.2 Background

The urge to make the flow of goods and services more efficient is perhaps identical with the urge of civilization itself. The world's earliest known writing (-5300 years) described inventory owners, amounts, and suppliers (Dr. Gunter Dreyer of the German Institute of Archaeology).

Inventory control goes back further than writing there were simpler inscriptions in Egyptian and Babylonian warehouses and granaries, with pictures that represented the inventory owner and numbers representing amounts in stock and taxes due.

The tomb labels of Abydos and the granary cuneiforms of Babylon were primal versions of the humble SKU, which then inspired the development of methods of tracking and inventory information disbursement. The progression of inventory records shows a drive for greater and greater durability, accuracy, and level of

convenience. The desire for reliable, accurate, and fast inventory accounting has led to the development of inventory accounting software, a mechanized version of the ancient record-keeping scribe who once scratched IDs into bits of bone to assist with a task human memory was unable to handle.

Alexander the Great and his father Phillip were noted for having greatly lightened the old baggage trains that had been the standby of earlier warriors, making soldiers carry their supplies on their own backs, allowing them to march further and faster than the Persians. A superpower is not measured by how many nuclear weapons it can build, but by how much it can manufacture and how fast it can ship stock to all parts of the world.

Barcode scanners went into field use in 1974. By the 1980s the first inventory control computer programs that could run on a PC were starting to see use.

1.3 PURPOSE OF STUDY

Inventory management is designed to meet the dictates of marketplace and support the company's Strategic Plan. The many changes in the market demand, new opportunities due to worldwide marketing, global sourcing of materials and new manufacturing technology means many companies need to change their Inventory Management approach and change the process for Inventory Control.

Inventory Management system provides information to efficiently manage the flow of materials, effectively utilize people and equipment, coordinate internal activities and communicate with customers. Inventory Management does not make decisions or manage operations; they provide the information to managers who make more accurate and timely decisions to manage their operations.

It is strategic in the sense that top management sets goals. These include deployment strategies (Push versus Pull), control policies, the determination of the optimal levels of order quantities and reorder points and setting safety stock levels. These levels are critical, since they are primary determinants of customer service levels.

Despite the many changes that companies go through, the basic principles of Inventory Management and Inventory Control remain the same. Some of the new approaches and techniques are wrapped in new terminology, but the underlying principles for accomplishing good Inventory Management and Inventory activities have not changed.

1.4 Research Hypotheses

A **research hypothesis** is a specific, clear, and testable proposition or predictive statement about the possible outcome of a scientific research study based on a particular property of a population, such as presumed differences between groups on a particular variable or relationships between variables.

H1- Does changes in variable cost will help in minimizing cost per shipment.

H2- Does changes in fixed cost will help in minimizing cost per shipment.

H3- Will introduction of 3PL will help in minimizing cost per shipment

H4- Will lean management structure will be helpful in minimizing cost per shipment

CHAPTER - 02

LITERATURE REVIEW

LITERATURE REVIEW

2.1 REVIEW AREA BROAD

What is e-commerce?

ECOMMERCE IS A SHORTENED VERSION OF THE PHRASE “ELECTRONIC COMMERCE” WHICH ESSENTIALLY DESCRIBES ANY TYPE OF EXCHANGE OF CURRENCY FOR GOODS OR SERVICES ONLINE.

Ecommerce is an umbrella term that covers everything there is to do with buying or selling online and can sometimes be otherwise written as “E Commerce,” “e-commerce,” or “eCommerce.” Any variation of the spelling is correct, and it all describes the same act of performing business via the internet.

Since the definition of ecommerce is so open-ended (it literally includes any type of buying or selling of goods or services online) there are so many different types of ecommerce businesses that exist. In this article, we dive deeper into the different options that are available for ecommerce business owners to run ecommerce businesses.

The Types of Ecommerce Business Models

First things first, when you ask yourself, “What is ecommerce?” the best way to begin to describe different ecommerce businesses, and the different types of ecommerce businesses, is to break them down into the types of ecommerce business models that exist.

Ecommerce business models can be differentiated into three main categories:

- What types of products are sold?
- Who the products are sold to?

- Where the products are sold on

Let's look into these three identifiers further:

WHAT TYPES OF PRODUCTS ARE SOLD?

Every ecommerce business can be differentiated by the types of products that it sells. There are four main products that any ecommerce business can sell, and they are:

- Physical Products
- Digital Products
- Services
- Affiliates

Every single ecommerce business online can fit into one or more of these categories, and this basically just tells you what type of products they sell to their customers.

Some ecommerce businesses sell physical products which means that the business has actual tangible products that they ship to their customers, and when their customers open the shipping package there will be a physical product they can touch, feel and see.

Digital products, on the other hand, are something ecommerce businesses can sell online but they're not an actual physical product that can be shipped to their customers. Oftentimes, once a digital product is

purchased online a customer can download the digital files straight away with no need for the business to ship anything to the customer.

Businesses can also provide digital or in-person services that their customers can purchase online. These services can include anything from design services or streaming services (both are digital services) to home improvement services or dog-walking services (which are in-person services). Any business that provides a service, rather than a physical or digital product, can be included in this category.

Finally, ecommerce businesses can also earn commissions via affiliate links which pay them a portion of the revenue for facilitating a sale. Ecommerce businesses that earn affiliate commissions could be blogs, influencer websites, or even websites like Canopy that curate products sold online for consumers. If you're interested in creating your own affiliate ecommerce store, check out our [Beginner's Guide to Creating an Affiliate Ecommerce Store](#) article.

WHO THE PRODUCTS ARE SOLD TO

Next, ecommerce businesses can be differentiated by who the business is selling their products to. While it might be common thinking to assume that all products are sold to consumers, that isn't always the case. Sometimes the "consumer" can be another business. These are the three main categories that ecommerce businesses sell their products or services to:

- B2B:** This stands for Business-to-Business. Ecommerce businesses that sell physical or digital products or services to other businesses fall under this category. For example, this could include manufacturers or suppliers that provide materials or products for other businesses.

- B2C:** This stands for Business-to-Consumer. Ecommerce businesses that sell physical or digital products or services to consumers fall under this category. This includes retailers or ecommerce retailers that sell products to the end consumer.

- B2G:** This stands for Business-to-Government. Ecommerce businesses that sell physical or digital products or services to government institutions or agencies fall under this category. For example, this could include businesses that create specialized software, office furniture, uniforms, etc.

While most businesses generally sell their products to one of these categories, it's entirely possible for ecommerce businesses to sell to more than one category of consumers. It's important for ecommerce businesses to understand who exactly they sell their products to because it impacts important decisions such as their marketing, their branding, their shipping procedures, their mark up, etc.

WHERE THE PRODUCTS ARE SOLD ON

Finally, ecommerce businesses can also be differentiated based on the way they sell their products to their customers. These options are:

- Branded Ecommerce Stores:** These are ecommerce stores that are owned and operated by the founder(s) or creator(s) of the store, and they sell their own products on their own terms to their customer base. These types of stores are generally built on ecommerce platforms such as Shopify or BigCommerce.

- Ecommerce Marketplaces:** Ecommerce businesses can also sell through online marketplaces such as Amazon, eBay or Etsy. For the business, this is kind of like renting space in a mall: The mall handles the marketing and brings in the foot traffic, which means the merchants don't have to invest much time or money bringing customers their shops. They do, however, must abide by the mall's rules such as their opening hours, what products they can and cannot sell, etc.

- Conversational Commerce:** With social media being a main part of consumers' daily routines, social media platforms are making it easy for consumers to shop through the posts on their newsfeed. Instagram, Facebook, Pinterest, and Snapchat all have conversational commerce options that ecommerce brands can sell their products through.

PROS OF STARTING YOUR OWN ECOMMERCE BUSINESS

- Building Something from Nothing:** With ecommerce, you have the ability to take ideas, knowledge, and inspiration and use them to build your own business from scratch.
- Connecting with Your Audience All Over the World:** You're not limited to one area or region when it comes to the customers you can sell to; you can sell to customers all over the world.
- Being Your Own Boss:** When you build your own business, you can be your own boss and have the autonomy to bring the vision of your business to life.
- Selling Online, Offline & Anywhere in Between:** You're not restricted to where you can sell. You can have a brick-and-mortar business and an online business, you can sell at pop-ups, you can sell at festivals, etc.
- Working from Anywhere:** If you have a Wi-Fi connection and some of your systems and processes automated, you have the freedom to work from anywhere at any time.
- Making it Your Full-Time Job or Part-Time Hobby:** You don't have to go all-in on your ecommerce business if you don't want to; it can be your side hustle. But you make the rules so if you want to make it your full-time job and get out of the rat race you can do that, too!

CONS OF STARTING YOUR OWN ECOMMERCE BUSINESS

- No Physical Storefront:** Most ecommerce businesses run solely online, which has its advantages but when you don't have a physical storefront it can be a hurdle to acquire initial traffic or to connect with existing customers.

•**No Face-to-Face Time with Your Customers:** Because you can't see your customers face to face, you aren't able to connect with them personally so to build a very personal brand you'll have to go to greater lengths to connect with your customers.

•**Competition & Standing Out from the Crowd:** There's a lot of competition online and differentiating your ecommerce businesses from others can be a challenge. To stand out from the crowd your ecommerce business needs to offer something that other ones don't, whether that's based on service, selection, price, variety, brand or something else.

•**Time & Money:** While you can start an ecommerce business on a bootstrapped budget, eventually every business need funds to grow and scale.

•**The Learning Curve:** Starting a business, making a website, creating a brand, building a customer-based, etc. takes time and effort to learn how to do properly so at first, it can be a bit of a learning curve. We suggest looking to reputable sources of information online such as our blog, the Shopify blog and Skill share to get started learning about "What is ecommerce?"

2.2 REVIEW AREA NARROW

ABOUT THE COMPANY

Flipkart is an e-commerce company based in Bengaluru, India that was recently bought by American retail titan Walmart. The company was established by former Amazon employees Binny Bansal and Sachin Bansal in October 2007 and launched its own product line called DigiFlip that includes laptop bags, tablets, USB flash drives in addition to selling a huge variety of products online much like Amazon does.

The company is led by Sachin Bansal as chairman and Kalyan Krishnamurthy as its CEO. As of 2016, Flipkart has approximately 30,000 employees and a revenue stream of \$3 billion (£2.2 billion) as of 2017. Its subsidiaries include Mantra, PhonePe, eBay.in, Ekart, Jeeves.co.in and Jabong.com.

On May 9, Walmart announced its acquisition of 77 per cent of Flipkart for \$16 billion (£11.7 billion) for a valuation of \$20 billion (£14.7 billion), making it the largest online commerce acquisition in history and giving Walmart a key stake in India's fast-growing e-commerce market.

Flipkart valuation

According to **BusinessToday.in**, Walmart's acquisition deal has caused Flipkart's valuation to increase to roughly \$20 billion (£14.7 billion).

Acquisition by Walmart

On May 9, 2018, Walmart announced that it bought a majority stake of about 77 per cent in Flipkart, making it the largest online e-commerce acquisition in the world and giving the U.S.-based retail goliath a key stake in one of the world's largest and fastest-growing online retail markets and delivering a blow to rival Amazon. Alphabet, the parent company of **Google**, is also expected to purchase a small stake in Flipkart, reportedly about ten per cent or so. The news confirms months of speculation that Walmart was in talks to buy Flipkart, though both companies remained mum on any possible talks. Flipkart is India's largest online commerce company but has been fighting off **Jeff Bezos's** Amazon since its entry and subsequent aggression expansion into the Indian e-commerce market back in 2013. Amazon reportedly tried to scuttle the Walmart-Flipkart deal by trying to negotiate its own majority stake purchase of the Indian company but was ultimately unsuccessful. Walmart's acquisition of Flipkart now means that it gains a key foothold in a country where the number of online shoppers is expected to **skyrocket** from 60 million in 2016 to about 475 million in 2026.

2.3 Factors critical to success of study

Key Success Factors

1. **Location:** Location plays an important role in the success and profit of a warehouse. Owner always want their warehouses to be located nearby industrial hubs or consumer ends, ports, railway stations or highway, to have strategic advantage from its competitor. But cost of labor and land near by such areas are always on higher side. So normally it is not possible for owner to have warehouse in such locations. So it is important to choose right location which will be economically beneficial in serving the purpose.
2. **Optimization of warehouse space:** It is always advisable to use each corner of space available of the warehouse. The more optimize use of space, the more will be the revenue. Warehouse design should be given importance, so that storage space can be used properly.
3. **Value added services:** Warehousing sector in India is much unorganized. There are number of players in the market. So to have competitive edge and to charge premium to customer, warehouse should provide value added services like, inventory management, reverse logistics, customer services, distribution services,

customs clearance, other value added services (MRP tagging, bundling, quality check etc.). So by providing such services, player can attract customer and charge them premium.

4. Automation: It is quite clear that manual labor restricts proper utilization of storage space. Manual labor can be optimized by using automation. Automation can be achieved by implementing IT system like warehouse management systems (WMS) and latest machineries like fork lift, cranes, conveyers etc. Availability of storage space means revenue. Each storage space availability will raise the scale. So automation will increase scalability as well as help in managing the warehouse more effectively.

2.4 Summary

2.4 Summary

The e-commerce has transformed the way business is done in India. The Indian e-commerce market is expected to grow to US\$ 200 billion by 2026 from US\$ 38.5 billion as of 2017. Much growth of the industry has been triggered by increasing internet and smartphone penetration. The ongoing digital transformation in the country is expected to increase India's total internet user base to 829 million by 2021 from 636.73 million in FY19. India's internet economy is expected to double from US\$ 125 billion as of April 2017 to US\$ 250 billion by 2020, majorly backed by ecommerce. India's E-commerce revenue is expected to jump from US\$ 39 billion in 2017 to US\$ 120 billion in 2020, growing at an annual rate of 51 per cent, the highest in the world.

The e-commerce industry been directly impacting the micro, small & medium enterprises (MSME) in India by providing means of financing, technology and training and has a favourable cascading effect on other industries as well. The Indian e-commerce industry has been on an upward growth trajectory and is expected to surpass the US to become the second largest e-commerce market in the world by 2034. Technology enabled innovations like digital payments, hyper-local logistics, analytics driven customer engagement and digital advertisements will likely support the growth in the sector. The growth in e-commerce sector will also boost employment, increase revenues from export, increase tax collection by ex-chequers, and provide better products and services to customers in the long-term. Rise in smartphone usage is expected to rise 84 per cent to reach 859 million by 2022.

E-retail market is expected to continue its strong growth, by registering a CAGR of over 35 per cent and to reach Rs 1.8 trillion (US\$ 25.75 billion) by FY20.

Below listed are 6 main factors that affect inventory management.

1. Consumer demand

Maintaining the right stock levels accordance with the consumer demand is a key factor directly affect inventory management flow.

2. Financials

Getting your financials right is crucial when it comes to inventory management as every step of the process involves a great deal of financial risk. Spending too much on inventory can cause money problems and spending too little can create unhappy customer reviews online.

3. Suppliers

Having a reliable group of suppliers is an essential factor to maintain a seamless inventory management without comprising the customer satisfaction. It is huge in order to minimize delays and shortages of stocks which can directly affect on production and then on order fulfillment. No matter how reliable your suppliers are, having a backup supplier will always give you that extra guarantee of a delay-free manufacturing process.

4. Products Amounts

Having the right item in the right quantity in your inventory will enhance not only the smoothness of inventory management but also of the entire supply chain management process.

5. Managing tools and technology

Introducing modern technology to your inventory can save you both time and money while improving the efficiency and effectiveness of inventory management processes. With the right tools and systems in place, you'll be able to streamline your inventory management process further.

6. The smoothness of the supply chain process

Inventory management is a part of the supply chain process of a company. Therefore, any issue or delay in the supply chain management process will affect your inventory management.

CHAPTER 3

RESEARCH DESIGN, METHODOLOGY AND PLAN

RESEARCH DESIGN, METHODOLOGY AND PLAN

3.1 Data Source

1. Flipkart annual cost data.
2. Half yearly cost analysis data.
3. Asset review data of Flipkart.
4. Asset maintenance cost data.

3.2 Research Design

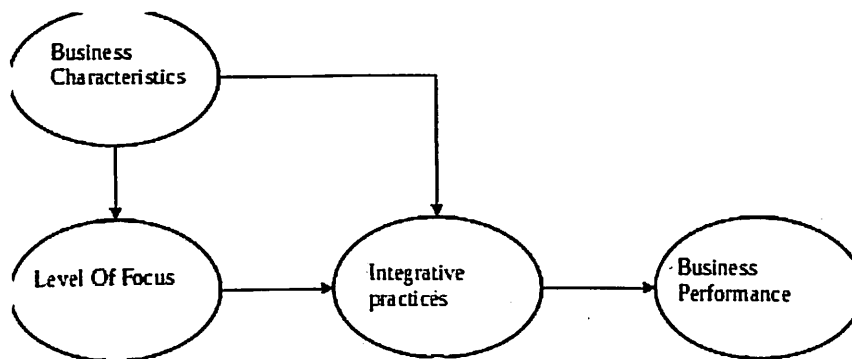


Figure No.:3.1

Integrative practices depend on two factors: business characteristics and the level of focus. Business characteristics (context according to Ho et al., 2002) are related to the nature of the production processes and the nature of the products and markets. These factors influence the need for integrative practices. For example, highly innovative products require a high level of attuning between buyer and supplier (Ramdas & Spekman, 2000). The level of focus relates to how the above factors are combined into shaping the production system and the relationship with buyers/suppliers. In principle, two extreme options exist for the

level of focus. Resources are shared for all products and all buyers, or resources are singled out to supply products for one buyer. It might be clear that the level of focus determines to some degree the limitations and possibilities for integrative practices. Each part of Figure 1 will be further elaborated in the following subsections.

Business Characteristics

The main factors taken into account as business characteristics are: availability of substitutes (limited vs. large), changes in market conditions (rapid vs. slow), changes in technology (rapid vs. slow), market maturity (low vs. high), and product life-cycle length (short vs. Long).

Level of Focus

The basic idea in most contributions is that a focused operation (either manufacturing or supply chain) should be matched to the market requirements. The level of focus will be chosen based on market characteristics and business conditions (as described above) and technology. As with focus in general, this is a strategic decision, that is to some extent restricted by the typical technology employed in a certain industrial sector. Level of focus is also important as it either enables or restricts the possibilities for integrative practices in supplying buyers.

Supply Chain Integration

A first natural distinction is the direction of integration: downstream with suppliers, upstream with customers. A second aspect of integration is the number of different areas in which joint activities are developed.

The third aspect of integration is the Level of Integration as to what extent integrative activities within one dimension are developed. This can be measured as the number of activities within one dimension, but the level is also higher if more advanced and demanding practices are used

3.5 Data Analysis Procedures

TECHNIQUE OF INVENTORY CONTROL:

Reduction of surplus stock is an essential requirement effective inventory control. Various techniques of controlling the inventories are as follows: -

- (i) Mini- max plan.
- (ii) The two-bin system.
- (iii) Order cycling system.
- (iv) Fixation of various levels.
- (v) Control ratio.

● **Mini Max Plan**

This is the oldest method of inventory control. In this plan, analysis lays down a maximum and minimum for each stock item. Minimum establishes the reorder point and order is placed for quantity of material, which will bring it to the maximum level.

● **The Two Bin System**

The basic procedure is that for each item of stock, two piles or bundles of bins are maintain. The first bin stocks that quantity of first, which is enough to meet its usage during the period that elapses between receipt of order material and the placing of next door. The second bin is tapped, a requisition for new supply is prepare and given in purchase department.

Order cycling system

In this system, quantities in hand of each items or class of stock are received periodically (30/60/90 days). If it is observed that stock level of a given item will not be enough till the next schedule. Review keeping in view of its entire probable rate of depletion, an order is placed to replenish its supply.

Fixation of various levels

Certain stock levels of fixed level are given below:

i. **Maximum level:** It represents minimum quantity above which stock should not be held at any time.

Stock above maximum leads to a higher, Inventory cost to the organization.

Maximum stock = re-order + reorder quantity (minimum level consumption * minimum reorder period)

ii. **Minimum level:** It represent minimum quantity of stock that should be held at all the time. Stock below minimum level my lead to the interruption in production scheduled.

The minimum level can be calculated by the following formulas: **minimum level = reorder level- (normal consumption + normal reorder period).**

- **Control ratios:** Inventory turnover ratio helps management to avoid capital being locked of unnecessarily. This ratio revels the efficiency of stock keeping. Inventory turnover ratio is given by cost of material consumed / cost of average stock held during the period.

Where cost of average stock = (cost of opening stock + cost of closing stock)/ 2

Calculation in days:

Days during the period/inventory turnover ratio reveals the number of days for which the stocks are held.

Why maintaining optimum level of inventory is important:

The optimal level of maintaining inventory is a subjective matter and depends upon the features of a particular firm:

(i) Trading firm:

In case of a trading firm there may be several reasons for holding inventories because of sales activities that should not be interrupted. Moreover, it is not always possible to procure the goods whenever there is a sales opportunity as there is always a time gap required between purchase and sale of goods. Thus, trading concern should have some stock of finished goods in order to undertake sales activities independent of the procurement schedule.

Similarly, a firm may have several incentives being offered in terms of quantity discounts or lower price etc by the supplier of goods. There is trading concern inventory helps in a de-linking between sales activity and to capitalize a profit of opportunity due to purchase made at a discount will result in lowering the total cost resulting in higher profits for the firm.

(ii) Manufacturing firm:

A manufacturing firm should have inventory of not only the finished goods, but also of raw materials and work-in-progress for following reasons.

(a) Uninterrupted production schedule:

Every manufacturing firm must have enough stock of raw materials in order to have the regular and uninterrupted production schedule. If there is stock out of raw materials in order to have the regular and uninterrupted production schedule. If there is stock out of raw material at any stage of production process, then the whole production may come to a half. This may result in custom dissatisfaction as the goods cannot be delivered in time more over the fixed cost will continue to be incurred even if there is no production.

Further work-in-progress would let the production process run smooth. In most of manufacturing concerns the work in progress is a natural outcome of the production schedule and it also helps in fulfilling when some sales orders, even if the supply of raw materials have stopped.

(b) Independent sales activity:

Inventory of finished goods is required not only in trading concern, but manufacturing firms should also have enough stock of finished goods. The production schedule is a time-consuming process and in most of the cases goods cannot be produced just after receiving orders. Therefore, every firm must maintain minimum level of finished goods in order to deliver the goods as soon as the order is received.

Costs involved in inventory:

Every firms maintains inventory depending upon requirement and other features of firm for holding such inventory some cost will be incurred there are as follows:

(a) Carrying Cost;

This is the cost incurred in Keeping or maintaining an inventory of one unit of raw materials, work-in -process or finished goods. Here there are two basic cost involved.

(i) Cost of storage:

It includes cost of storing one unit of raw materials by the firm. This cost may be for the storage of materials. Like rent of spaces occupied by stock, stock for security, cost of infrastructure, cost of insurance, and cost of pilferage, warehousing costs, handling cost etc.

(ii) Cost of financing:

This cost includes the cost of funds invested in the inventories. It includes the required rate of return on the investments in inventory in addition to storage cost etc. The Carrying cost include therefore both real cost and opportunity cost associated with the funds invested in the inventories.

The total carrying cost is entirely variable and rise in directly proportion to the level of inventories carried.

Total carrying cost = (carrying Cost per unit) x (Average inventory)

(b) Cost of ordering:

The cost of ordering includes the cost of acquisitions of inventories. It is the cost of preparation and execution of an order including cost of paperwork and Communicating with the supplier.

The total ordering cost is inversely proportion to annual inventory of firm. The ordering cost may have a fixed component, which is not affected by the order size: and a variable component, which changes with the order size.

Total Ordering Cost = (No. Of orders) x (cost per order).

(c) Cost of stock out:

It is also called as Hidden cost. The stock out is the situation when the firm is not having units of an item in stores but there is a demand for that Item either for the customers or the production department .The stock out refers to zero level inventory .So there is a cost of stock out in the sense that the firm face a situation of lost sales or back orders .The stock outs are quite often expensive. Even the good will of firm also be effected due to customers dissatisfaction and may lose business in case of finished goods, where as in raw materials or work in process can cause the production process to stop and it is expensive because employees will be paid for the time not spend in producing goods.

The carrying cost and the ordering cost are opposite forces and collectively. They determine the level of inventors in a firm.

Total cost = (cost of items purchased) + (Total Carrying and ordering cost)

Valuation of Inventory:

The methods of valuing inventory are combination of the actual cost and replacement cost plans. The chief advantage of the cost or net realizable value rule is that it is conservative. Hence the methods of Valuation of inventory are quite independent of system of mincing.

In balance sheet closing stock is shown under current assets and is also credited to manufacturing or trading accounts. The inventories are valued on the basis as follows.

- Cost of raw materials in stock may include freight charges and carrying cost. But such cost should not exceed market price,

- Work -in -process is generally valued at cost, which includes cost of materials, labour. And the proportionate factory overhead, as it is reasonable according to degree of completion,
- Cost of finished goods would normally to be total or full cost it includes prime cost-plus appropriate amount of the overhead. Selling and distribution cost is deducted on the other hand work in progress may be valued at work in progress may be Valued at work cost, marginal cost, prime cost or, even at direct materials.

ABC ANALYSIS:

ABC analysis classifies various inventory into three sets or groups of priority and allocates managerial efforts in proportion of the priority the most important item are classified into class-A, those of intermediate importance are classified as "class-B" and remaining items are classified into class-C'.

The financial manager has to monitor the items belonging to monitor the items belonging to different groups in that order of priority and depending upon the consumptions.

The items with the highest value is given top priority and soon and are more controlled then low value item. The re-rational limits are as follows.

Category	% of Items	% of total materials
A	5-10	70-85
B	10-20	10-20
C	70-85	5-10

Table No:3.1

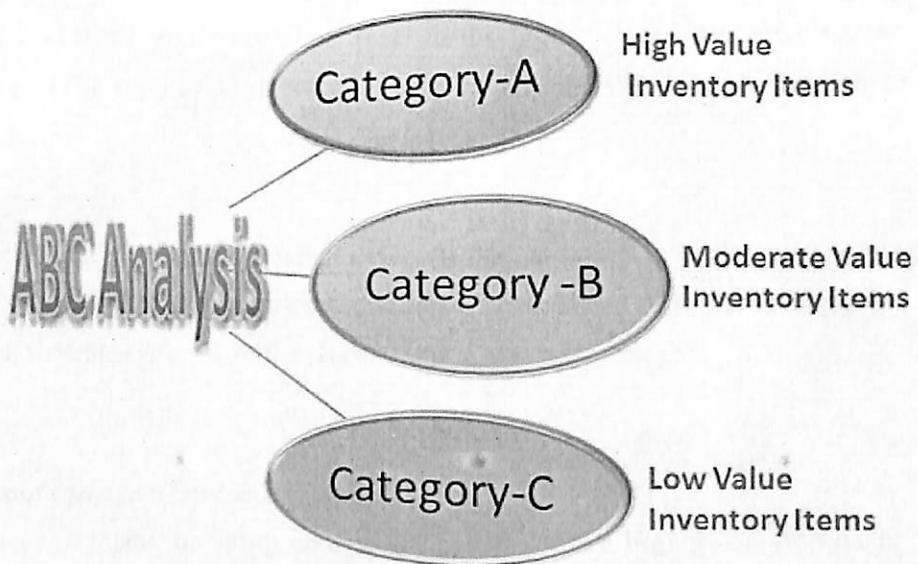


Figure No:3.2

Procedure:

- (i) Items with the highest value is given top priority and soon.
- (ii) There after cumulative totals of annual value of consumption are expressed as percentage of total value of consumptions,
- (iii) Then these percentage values are divided into three categories.

ABC analysis helps in allocating managerial efforts in proportion to importance of various items of inventory.

ECONOMIC ORDER QUANTITY:

After various inventory items are classified on the basis of the ABC analysis the management becomes aware of the type of control that would be appropriate for each of the three categories of the inventory items.

The determination of the appropriate quantity to be purchased in each lot to replenish stock as a solution to the order quantity problems necessitates resolution of conflicting goals. Buying in a higher average inventory level will assure.

- (i) Smooth production / sale operation and
- (ii) Lower ordering or setup costs. But it will involve higher carrying costs. On the other hand, small orders would reduce the carrying cost of inventory by reducing the average inventory level, but the ordering costs would increase, as there is a likelihood of interruption in operations due to stock-outs. A firm should not place either too high or small orders on the basis of a trade-off between benefits derived from the availability of inventory and the cost of carrying that level of inventory, appropriate or optimum level of order to be placed should be determined. The optimum level of inventory is popularly referred to as the economic order quantity or economic lot size. It may be defined as that level of inventory order that minimizes the total lost associated

with inventory management. It is based on some assumptions, which are restrictive.

- a. The firm knows with certainty the annual usage of a particular item of inventory.
- b. Rate at which the firm uses inventory is steady over time.
- c. The orders placed to replenish inventory stocks are received at exactly that point in time when inventories reach zero.

EOQ can be illustrated by

- (i) Trial and error approach,
- (ii) Mathematical approach.

Trial and Error approach:

In this approach the procedure of procuring the inventory is assumed the smaller the lot the lower is average inventory and vice versa and high average inventory would involve high carrying costs. This approach is used for determination of EOQ uses different permutations and combinations of lots of inventory purchases so as to find out the least ordering and carrying cost combinations. The carrying cost and acquisition cost for different sizes of order to purchase inventories are computed and the order size with lowest total cost of inventory is EOQ.

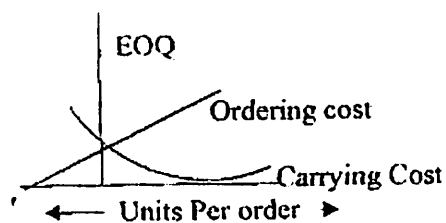


Figure No. 3.3

Mathematical Approach:

The EOQ quantity can use a short-cut method calculated by following

$$EOQ = \sqrt{\frac{2AB}{C}}$$

Where,

A = Annual usage of inventory

B = Buying cost per order

C = carrying cost per unit

Limitations:

While using EOQ it should be noted that it suffers from shortcomings, which are mainly due to the restrictive nature of the assumptions on which it is based.

The important limitation is assumption of a constant consumption usage and, the instant replenishment of inventory is of doubtful validity

There may be unusual and unexpected demand for stocks to meet such [contingencies the firm has to keep additional inventories like safety stocks. Another weakness is to assume known annual inventories is open to question and there is likelihood of a discrepancy between the actual and expected demand leading to wrong estimate of EOQ.

THE RE-ORDER LEVEL:

The re-order level is the level of inventory at which the fresh order for that item must be placed to procure fresh supply.

The re-order level depends upon

- a) Length of time between the placement of an order and receiving the supply.
- b) The usage rate of the item. The inventory is constantly being used up. The rate at which the inventory is being used up. The rate at which the inventory is being used up is called the usage rate.

The reorder level can be determined as follows:

$$R = M + tu$$

R = Reorder level

M = Minimum level of inventory

T = Time gap / delivery time

U = Usage rate

The reorder level and inventory patterns have been shown as follows:

The figure shows that if the usage rate is constant, the orders are made at even intervals for the same amounts each time and the inventory goes to zero just before an order is received.

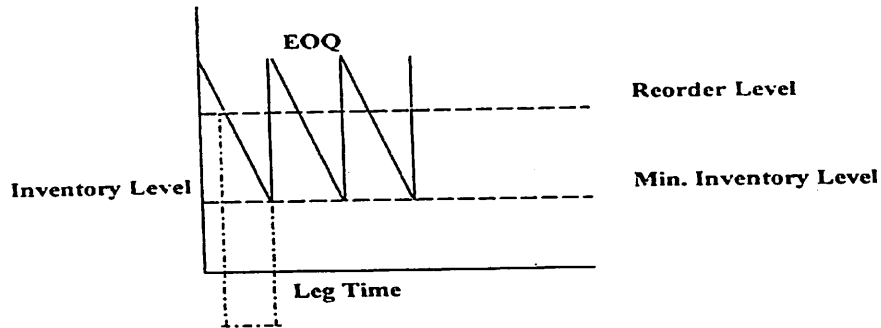


Figure No: 3.4

Safety Stock:

The safety stock protects firm from Trade-offs due to unanticipated demand for the items level of inventory investment is however increased by the amount of safety stock. Safety level is ascertained in inventory as a part because there is always an uncertainty involved in time lag usage rate or other factor.

Usually smaller the safety level greater the risk of stock-outs. If stock-levels are predictable then there is a chance of stock out occurring. However, stock inflows and outflows are unpredictable or lesser predictable it becomes to carry additional safety stock to prevent unexpected stock outs, so usage rate is estimated if cost is low then no safety stock is needed.

JUST-IN-TIME INVENTORY:

The basic concept is that every firm should keep a minimum level of inventory on hand, relying suppliers to furnish stock just in time as and when required. JIT helps in emphasizing sufficient levels of stocks to ensure that production will not be interrupted. Although the large inventories may be bad idea due to heavy carrying JIT is a modern approach to inventory management and the goal is essentially to minimize such inventories and there by maximizing the turnover.

JIT system significantly reduces inventory-carrying cost by requiring that the raw materials be procured just in time to be placed into production. Additionally, the work in process inventory is minimized by eliminating inventory buffers between different production departments.

If JIT is to be implemented successfully there must be a high degree of coordination and cooperation between the supplier and manufacturer and among different production centres. JIT does not appear to have any relation with EOQ however it is in fact alters some of the assumptions of EOQ model. The average inventory level under the EOQ model is defined as

Average inventory = $1/2$ EOQ + safety level JIT attacks this equation in two ways.

- (i) By reducing the ordering cost
- (ii) By reducing the safety stock.

The basic philosophy in JIT is that the benefits, associated with reducing inventory and delivery time to a bare minimum through adjustment in the EOQ model; will more than offset the costs associated with the increased possibility of stock-outs.

WAREHOUSE COSTS

FIXED COSTS

Fixed costs are predetermined expenses that remain the same throughout a specific period. These overhead costs do not vary with output or how the business is performing. To determine your fixed costs, consider the expenses you would incur if you temporarily closed your business. You would continue to pay for rent, insurance and other overhead expenses.

Some examples of fixed costs include:

- Rent
- Telephone and internet costs

- Insurance
- Employee Salaries
- Loan Payments

VARIABLE COST

Variable costs, however, change over a specified period and are associated directly to the business activity. These are based on the business performance and the volume of services the business generates.

Some examples of variable costs include:

- Direct labour
- Commissions
- Taxes
- Operational expenses

All companies with warehouses incur the same elements of cost, but they compile them differently. However, a costing system can be used to compare costs of one warehouse to another, or one company to others.

Some warehousing costs tend to be ignored or misallocated because the analyst does not recognize where they belong. In any costing system, allocation of overhead costs is a matter of judgment, and no specific formula will be correct for every user. The cost models shown here have been designed to ensure that no item is overlooked.

Each user should customize the models and make individual judgments regarding allocation of administrative costs.

4 categories of warehouse costs

1. Handling: All expenses associated with moving product in or out of the warehouse should be included in the handling cost centre. The largest component is the labour used to handle the product that moves through the distribution centre. It includes receiving, put-away, order selection and loading. It also may include labour to re-warehouse, repackage or refurbish damaged product.

Handling also includes all costs associated with the equipment used to handle product in the warehouse, such as the depreciation of equipment cost and the cost of fuel or electricity to power the equipment.

Other handling expenses are the detention of truck or rail cars, operating supplies and trash disposal. In effect, handling includes all those costs that are associated with "goods in motion."

2. Storage: Storage expenses are costs associated with "goods at rest." These costs would be incurred whether or not any product ever moved. Because storage expenses are related to the cost of occupying a facility, and these costs are normally accumulated each month, storage is expressed as a monthly cost.

If an entire building is dedicated to an operation, storage expenses are the total occupancy cost for that facility.

3. Operations administration: These expenses are incurred to support the operation of the distribution centre. Closing the facility would eliminate these costs. Included are costs for line supervision, clerical effort, information technology, supplies, insurance and taxes.

4. General administrative expenses: Expenses not incurred for a specific distribution centre are included in this category. General management, nonoperating staff and general office expenses are examples. Allocation of such expenses to each warehouse is a judgment call.

Productivity improvement

Most warehousing costs, particularly storage and handling, can be influenced by improvements in productivity.

Improved methods and equipment may enable the operator to increase the number of units moved without increasing labour, resulting in a higher number of units handled per hour. Changes in inventory, storage layout or equipment may enable the operator to expand the number of units stored in the same number of cubic feet of storage space.

The risk factors

Cost per unit is escalated when a distribution centre is not fully utilized. Fixed costs always will be influenced by the rate of utilization.

Variable costs, such as labour, never are quite as flexible as they seem. Management may be reluctant to eliminate experienced workers, particularly when they will be needed for a coming busy season. The same is true for forklift trucks and other materials handling equipment. Therefore, the primary risk in controlling costs is the rate of utilization.

Errors represent another unknown risk. People make mistakes, which may result in product damage and errors, or shipping errors.

Just as the insurance underwriter factors in the risk of loss, the warehouse operator must make a realistic estimate of risk costs. Risk may be expressed as a percentage of total warehousing costs. It should be based on past experience. Methods to reduce risk should be explored.

The simplest way to calculate the risk factor is to include it in the size of the mark-up. Many time and material agreements have a low percentage of profit, but the unit pricing agreement must factor in a higher profit percentage that reflects the substantial risk of changing volume.

As you contemplate the risk factor, consider the position of the buyer. With a time and material agreement, the buyer agrees to pay for all space and labour that is used, which often includes the rent for a building that is dedicated for the buyer's use. In contrast, the buyer of a unit price agreement pays only for services that are used. Expansion and construction can be challenging, as well as costly.

A good analogy is the difference between a hotel and an apartment. When you stay in a hotel, the price per square foot of space occupied is higher than the cost of leasing an apartment. You pay the premium because you want the flexibility of occupying the space only on the days you need it. While the apartment may be cheaper, you pay for it whether it is in use.

Developing a handling price

A building-block approach using the four categories of warehousing costs can be used to develop an hourly selling price. First, all the costs listed in Section 1 (Handling) are totalled. Next, a portion of the costs in Section 3 (Operating Administrative Expense) and in Section 4 (General Administrative Expense) are added to direct handling expense, in order to develop a burdened handling expense.

An additional percentage of profit is added to develop a handling sales price. This figure is divided by the hours billed, to convert the figures into a handling fee per man-hour. While you may not invoice your customers by the hour, the hourly fees can be used to check the validity of current pricing.

Creating a storage price

A similar building-block approach is used, but the result is expressed in square feet, rather than hours. Since storage costs increase with time, this storage fee is expressed on a per month basis.

The first step is to total all costs listed in Section 2 (Storage). Following the handling example described in this article, a portion of operating and general administrative expenses must be added, in order to develop a burdened storage expense. Then, a desired profit margin percentage is added to create a price per square foot per month. That price determines the storage rate per unit.

The importance of inventory turns

Because storage costs are calculated on a monthly basis, the total cost of storing an item depends on how long it will be in the warehouse.

In the past, each unit received for storage had an anniversary date with renewal storage charges added each month afterward. Later billing systems were designed to simplify the clerical task by charging a half month for items received after the 15th of the month, and a full month for everything in storage on the first day of the succeeding month.

Regardless of the system used, an inventory that turns 24 times per year should cost less to store than one that turns six times per year. For that reason, the inventory turn rate is a critical data point in creating storage prices.

The "make or buy" factor

Nearly all services available from a logistics service provider can be replicated by an internally managed project. The buyer who knows the amount of space needed and has estimated the number of people required to staff the operation, should be able to simulate the "do-it-yourself" cost of providing comparable logistics services.

This cost is then compared with the prices offered by a logistics service provider. In this situation, the risk factor is critical. The do-it-yourself option is full of risk, unlike a unit price agreement that provides maximum flexibility because the risk is absorbed by the logistics service contractor.

Simulating a logistics service provider

Some private warehouse operators treat their operations as if they were public warehouses. Transfer costs for internal storage and handling prices are determined, and the warehouse manager is held accountable for profitable operation at the established rates.

CHAPTER 4

FINDINGS AND ANALYSIS

FINDINGS AND ANALYSIS

4.1 Descriptive Statistics

1. According to Mini Max plan: -

Already Flipkart has adopted this model where in the central planning team uses certain software to determine the minimum and maximum level of stock of a particular FSN/SKU. According to the forecast maximum and minimum level of stock is maintained.

2. According to two bin system: -

In Flipkart, two bin system is not maintained. Mainly this sort of bins is used in manufacturing plants. As Flipkart doesn't manufacture anything, so this method is not is used.

3. According to Order cycling system: -

For maximum selling articles, Flipkart uses this principle. They have a billing cycling of 30/60/90 days, where the vendor automatically pushes the maximum selling articles in flipkart inventory. Here purchase orders are initiated pro-actively for reducing the process time rate and billing payment lag.

4. According to fixation level

This method is somewhat similar to the mini max plan but in Flipkart we maintain it according to the Peak Inventory to be maintained in the total warehouse. Whereas in minimax max plan we are doing it for particular sku.

5. According to Control Ratios

Inventory turnover ratio helps management to avoid capital being locked of unnecessarily. This ratio revels the efficiency of stock keeping.

In Flipkart, unused inventory for a long period is shifted to different warehouses PAN India according to their demand in that area.

6. According to ABC analysis

In Flipkart, ABC analysis is implemented in a different manner, we differentiate the Inventory according to their saleability and Put that inventory accordingly i.e in racks, in which floor of rack or in ground inventory.

A	Highest selling SKU	In ground location
B	Medium selling SKU	In first two floors of rack
C	Lowest Selling SKU	Between 3rd and 5th floor of rack

Table No. 4.1

7. Cost analysis below explained

Flipkart's warehousing costs

I. Fixed Costs: -

- Rent
- Facility management
- Security
- Utility
- Depreciation
- IT
- On roll
- Zonal
- Central

2. Variable Costs:

- Off roll salary
- Staff Welfare expenses

CHAPTER:5

INTERPRETATION OF RESULTS

INTERPRETATION OF RESULTS

5.1 INTERPRETATION OF RESULTS

Please find below monthly total cost according to region:

Furniture						
Zones	Variable Cost	Fixed Cost	Total Cost	Units Dispatched	VCPU	FCPU
North	18,52,032	56,83,250	75,35,281	6,888	269	825
East	-	-	-	-	-	-
West	11,91,003	80,76,322	92,67,324	5,341	223	1,512
South	38,71,797	1,36,14,578	1,74,86,375	12,532	309	1,086
Total	69,14,831	2,73,74,149	3,42,88,980	24,761	279	1,106

Table No. 5.1

Please find below monthly expenses of north furniture warehouse:

Fixed cost	
Particulars	Amount
Rent	3247587
FM	546466
Security	408456
Utility	405687
Depreciation	432487
IT	54947
OnRoll	471149
Zonal	14624
Central	101846

Table No. 5.2(a)

Variable cost	
Particulars	Amount
Off roll salary	1282885
Staff Welfare	569147

Table No. 5.2(b)

Please find below month wise expenses of

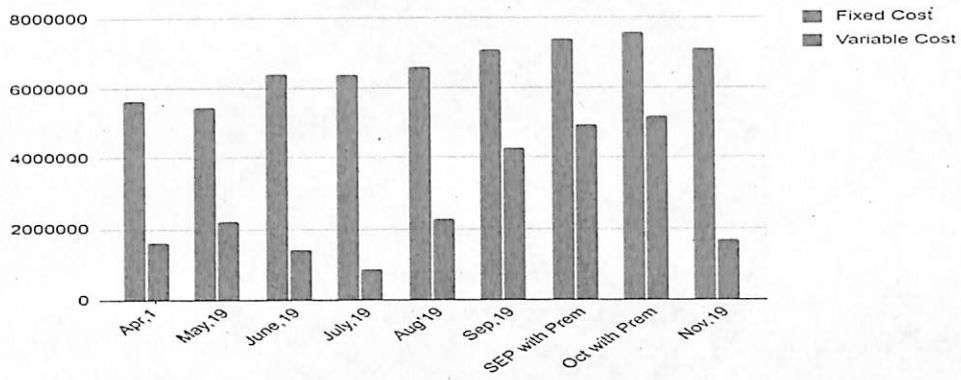


Figure No. 5.1

Percentages of Fixed costs per month

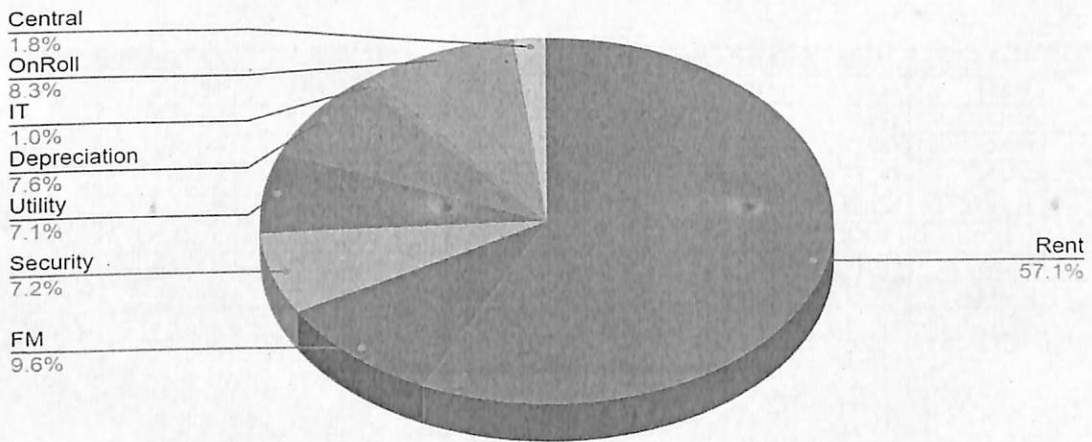


Figure No. 5.2

Percentage of Variable costs per month

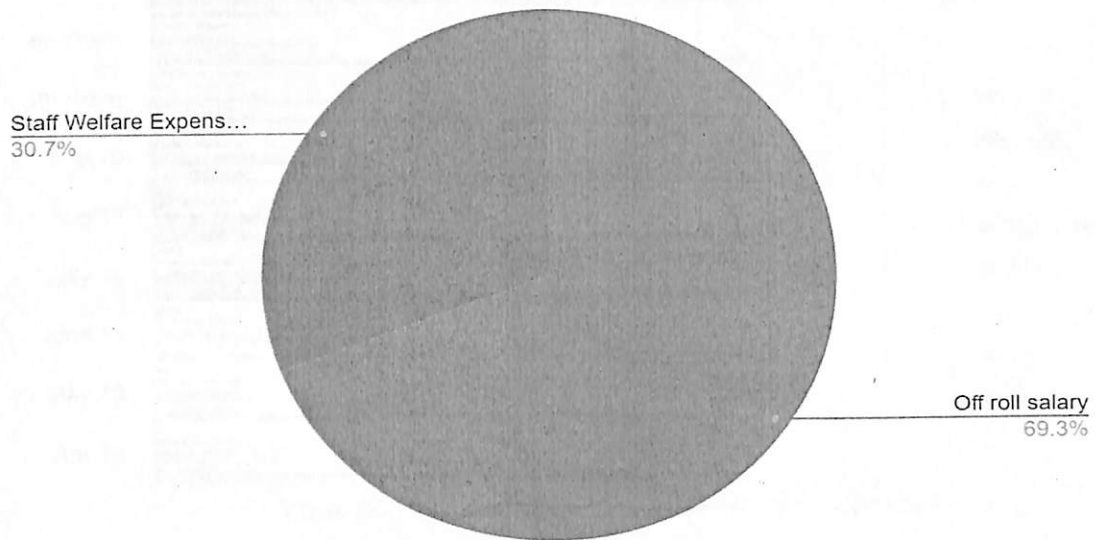


Figure No. 5.3

Month Wise Fixed Cost:

Month	Rent	FM	Security	Utility	Depreciation	IT	OnRoll	Zonal	Central
Apr,19	32,47,587	5,46,466	4,08,456	4,05,687	4,32,487	54,947	4,53,863	14,401	1,01,846
May,19	30,98,880	5,46,466	1,70,494	5,47,255	4,49,072	36,464	4,80,082	24,908	1,10,319
June,19	33,81,702	5,32,857	3,83,065	9,51,418	4,40,018	39,199	4,32,543	1,02,607	1,64,012
July,19	30,62,352	4,95,125	4,49,571	10,92,542	6,40,389	34,160	4,29,059	29,904	1,63,526
Aug'19	32,53,824	5,30,000	4,93,268	8,79,581	5,87,572	45,080	4,60,754	2,26,271	1,29,341
Sep,19	31,44,082	5,20,597	6,02,549	9,45,001	5,76,699	39,160	5,02,540	2,32,927	5,29,305
SEP with Prem	32,53,824	6,30,339	6,14,980	9,75,876	5,90,979	40,432	5,14,789	2,36,257	5,34,581
Oct with Prem	32,53,824	6,51,062	6,90,087	9,17,438	4,59,037	37,365	4,35,271	1,62,464	9,82,662
Nov,19	32,53,824	6,14,798	6,47,230	7,75,894	4,85,907	33,249	5,10,210	1,03,520	7,14,220

Table No. 5.3

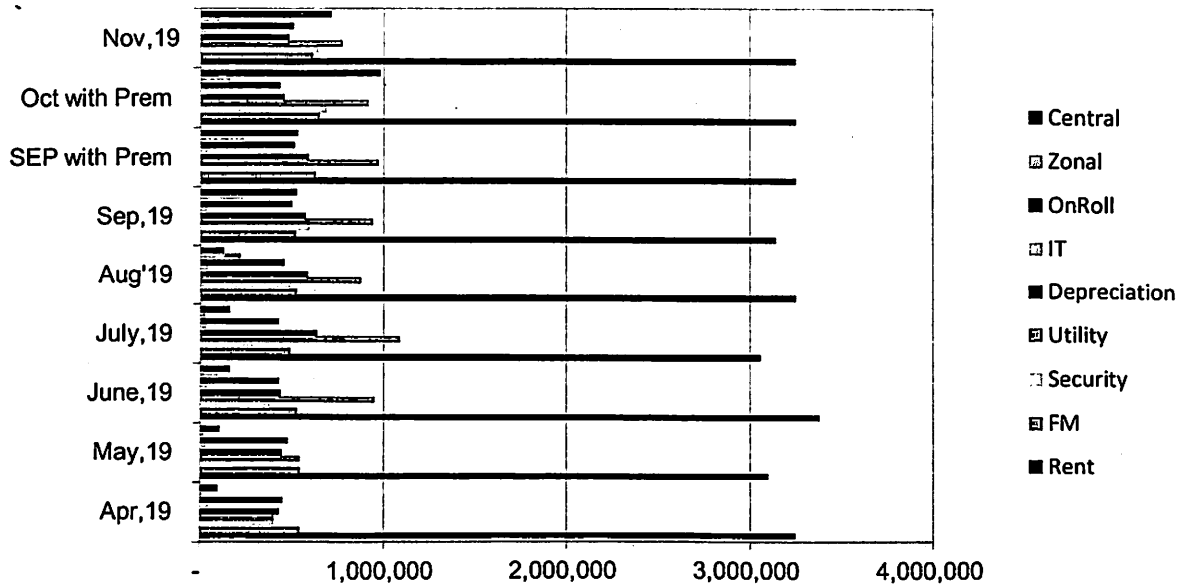


Figure No. 5.4

Month Wise Variable Cost:

Month	Offroll MH	Offroll DEO	Incentive	Staff Welfare
Apr,19	6,88,998	3,40,358	-	5,69,147
May,19	10,69,157	3,96,836	99,000	6,39,325
June,19	7,77,135	3,70,566	-	2,79,154
July,19	3,59,487	2,76,709	-	2,29,793
Aug'19	12,60,959	5,69,201	-	4,50,178
Sep,19	28,19,075	6,30,787	-	8,15,966
SEP with Prem	30,79,859	7,00,268	-	11,59,933
Oct with Prem	31,85,727	8,28,798	-	-
Nov,19	10,64,842	3,05,151	-	-

Table No. 5.4

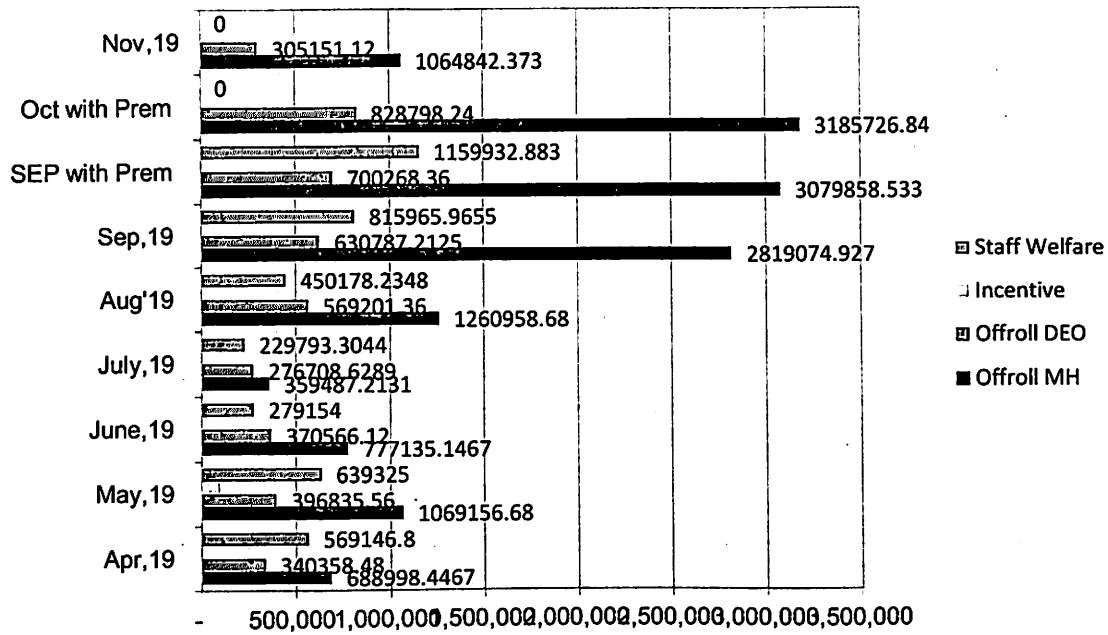


Figure No. 5.5

5.2 Comparison of Results with Assumptions (Hypotheses)

- H1- Does changes in variable cost will help in minimizing cost per shipment.
- H2- Does changes in fixed cost will help in minimizing cost per shipment.
- H3- Will introduction of 3PL will help in minimizing cost per shipment
- H4- Will lean management structure will be helpful in minimizing cost per shipment

None of the above hypotheses will be able to provide an alone positive result. But if we will adopt a mixed approach where in all the integrations will be done keeping specific points of above hypothesis. That will be a successful model for minimizing cost per shipment.

CHAPTER:6

CONCLUSIONS AND SCOPE FOR FUTURE WORK

CONCLUSIONS AND SCOPE FOR FUTURE WORK

Inventory management is one of the important key activities of business logistics. Because of its role in business organizations, inventory is one of the most important instruments of logistics planning and control. Inventory on work in process is linked to the production process, physical inventory on stock or in buffer storage is unnecessary from the standpoint of added value and is considered as waste of time and money.

It might seem axiomatic that inventory control is efficient if inventory level is going down. But the fact is that, if inventories are minimized without adequate operations, inventories have been mismanaged rather than controlled efficiently. Thus, the basic objectives of inventory management appear to be conflicting in nature. Inventories should increase or decrease in amount or time as related to sales requirements and production schedules.

Cutting costs without compromising service is a standing challenge for any manufacturer, regardless of industry. While the economy has been challenging, to say the least, in recent quarters, there are glimmers of hope that the beginning stages of a potential recovery could be on the horizon. With the lessons learned from recent hardships, now more than ever, manufacturers should look to outside relationships for non-core operations to reduce costs and increase cash flow. This is especially true for companies that have reduced expenditures on personnel and resources because of shrinking demand. Scaling back might have saved money in the short term, but when consumers begin to reengage the marketplace, some companies might be left behind without the capacity to meet this surge.

Supply chain management is an extremely complex function that commands a significant amount of resources, requiring sophisticated equipment and technology processes, backed by skilled labour that is cost prohibitive for many organizations to retain internally. In order to have a strategic supply chain operation that is cost effective, a qualified third-party logistics (3PL) partner with specific industry expertise should be closely considered by forward-thinking organizations.

With a 3PL partner, the supply chain cost structure can be transitioned from primarily fixed to variable, avoiding the fixed investment in material handling equipment, real estate and IT systems that are inherent to an "in-sourced" operation. Plus, the expense of labour, along with overhead, can be reduced without compromising the ability to fulfil customer obligations. Highly skilled supply chain professionals from the distribution centre to the executive suite require extensive overhead investment to retain, from recruitment, to training, to salaries and benefits. This spending is typically not cost effective for manufacturers to maintain on a full-time basis. Supply chain expertise may only be necessary on a periodic basis. When demand and volume inevitably fluctuate, the reduced capacity and associated downtime can lead to a drain on operating costs.

Acquiring and implementing sophisticated IT systems hinge upon the investment of millions of dollars in equipment and the associated infrastructure. The integration process can also require an extended amount of time to achieve "go-live" status. Systems including inventory management, order management, warehouse management and transportation management can command, at a minimum, nine months to be operational, coupled with up to a year for training and post implementation.

As we have less control over the fixed costs, as a Warehouse management personnel we should focus in decreasing the variable costs by taking corrective measures.

While calculating the throughput of a warehouse we should always keep in mind regarding full utilization of your manpower. If somehow you see some underutilization, you should right way take corrective action of assigning additional work. Decrease in any cost whether it is fixed or variable, it will have a significant impact on the cost per shipment. Constant decrease in the cost per shipment signifies the quality of maintaining cost in an ideal warehouse.

CHAPTER 06

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