

CHAPTER I

INTRODUCTION

1.1 Background of the Study

Industrialization is an important factor for achieving the basic objective of a country's economic and social progress. Now a day's industrialization is considered as an essential for the economic development of the country. It facilitates on effective mobilization of resource such as capital and skill which might otherwise remain unutilized. It also acts as a vehicle for fostering innovation and technology improvement for industrial development, thus has a multiplier effect on the economy.

For the repaid development of developing countries like Nepal, development in agriculture sector only is not sufficient. It is essential to develop the industrial sector too. Thus, industries have an important role to play industries have an important role to play in accelerating the rate of economic development. At certain stage of country's development, the highest returns may come from the production of particular types of manufacture, agricultural products or services. How to use resource at any time depends on market prospect any costs.

The industrialization started very late in Nepal, only after the second world war. Industrialization is a comparatively new phenomenon in Nepal. Nepal is one of the least developing countries in the world, which is still in its crawling stage of industrial development. The sound economics development of any nations depends upon the higher rate of growing of production activities in the different sector of the country's economic. About four decades age, when the country was under Ran rule for more then a hundred years no significant initiatives were taken to improve the economic condition. There

were few Rana prime ministers who had shown their interest in establishing some industries and public companies for the first time in the country. During the rule of Ranas, few industries were established, for example: Chandra Shamsheer J.B.R. had established means of “Communication and Rope-way transport”. Like wise, Juddha Shamsheer J.B.R. had established the first financial institutions of Nepal, like Nepal Bank Ltd. in 1994 B.S. Morang Sugar Mills Ltd. and Nepal Insurance and Transport Company Ltd. in 2003 B.S. and 2004 B.S. respectively. After the Rana rule in 2007 B.S. and during the three decades of Panchayat System in Nepal, a number of companies industries and financial institutions were established in the country. Democracy was restored in the country on B.S. 2046. After the HMG/ N had adopted a liberalization economic policy in the country, and many industries were established as public and private companies.

It is believed that in order to achieve security, stability and high standard of living, the country must be industrialized. But the industries sector of our country is facing many problems. Such problems arise due to the country being the long lock and underdeveloped, lack of trained and skilled manpower, financial resources, inconvenience in transport and communication, networks, non availability of energy at reasonable rate, Shortage of Capital, small size of the market, unawareness of the industrial potential, higher cost of production, low productivity of inputs, technology, instabilities in government, policies etc (Pradhan, 1994: 181).

Now, Nepal has adopted the policy of economic liberalization and privatization and also got the membership of world trade organization (WTO) through the globalization. For strengthening the economy of any country both the private and public sector should play vital role. Now government is adopting foreign direct investment policy to encourage foreign investors. These policies, create positive impact to the private manufacturing companies for industrial development. Due to the poor performance in term of capacity utilization, productivity, efficiency and profitability of Nepalese public sector manufacturing company needs to take competitive strategy, innovation,

research and development to be alive in competitive environment of globalization today, industries can sustain existence and growth only through a continuous process of innovation in functions, quality and cost product.

Unilever Nepal Limited was formed as a subsidiary company of Hindustan Lever Ltd. of India. The factory is situated at Basmati VDC-5 of Makwanpur District, 6km far from Hetuda of Central development region of Nepal. The corporate office of the company is situated at Heritage Plaza, Kamaladi, Kathmandu. The Unilever Limited was formed as a public limited company in 1993 and production started from December 1994. It was registered under company Act 2053. As a growing manufacturing company, unilever limited has main objective of expanding the domestic business by introducing new brands and categories in the domestic market and import substitution of foreign goods too.

A notice was issued on dated 18th Feb. 2005 (2061/11/07), in Kathmandu Post to inform all concerned about the change name of the company for Nepal Lever to unilever as per the approved decision taken by 11th general meeting held on 13th Dec. 2004 (2064/08/28). Under the special resolution the change name has been approved by the company register office HMG with effect from the 9th Feb. 2005 (2061/10/27). Binding unilever Limited to bear assumes all the tax and other payable liabilities towards all the moveable and immovable assets existing in the company former name.

Despite difficult trading condition, the company's domestic business achieved market growth of 16% during the year 2002/2003 with the market. Especially, in the rural areas affected by the frequent disturbance across the country. However, as indicated in the earlier year, there has been a substantial 37% reduction in exports. As indicated in previous years reports, exports were on decline from 2000/2001. Consequent to the fiscal change introduced in the Indian budget and with the emergence of many new tax-exempt zones in India. Further withdrawal of the rebate on income tax on profits on exports business is unviable. The domestic turnover has increased by 16% the export turnover

issues lower by 37% for the year. Hence, the overall turnover is marginally higher by 2%.

The company received the “First FNCCI national excellence award” for its overall performance. Unilever limited is taking a great corporate social responsibility. It has contributed in various ways to the social sector. Unilever limited is proud of its role in the income and employment generation opportunities in the country. ULL provides direct employment to over 120 Nepalese citizens while generating indirect employment for over 20 times that number through, its networks of suppliers, distributors and ancillaries. It is already one of the largest corporate taxpayers of Nepal.

It involved in various social projects. Unilever Limited employee trusts mobile medical unit, which is extensively used in Makwanpur district for providing emergency medical services. A three months “Sewing machine training program” for 33 women’s has been conducted at Makwanpur district. Periodical health hygiene awareness program were conducted together with health check ups program for local people. Relief goods were distributed to more than 100 victims of Chitwan VDC of Makwanpur district, which have suffered from the landslides and floods during the year. This was funded by one day salary of all the employees with matching contribution of the company. Pepsodent and Nepal dental association together celebrated week health broadcasting, health message in TV, radio and press, a number of free dental check ups clinic were conducted with support of pepsodent. There was also painting competition among school children on health theme, which evoked an excellent response. The miles of healthy smiles programs, the ambitious project for contracting sector through out Nepal to import oral health education, has covered more than 250000 children so far. ULL is initiating an awareness campaign on hand washing through many infomercials and school community contracts in association with UNICEF.

1.2 Focus of the Study

Inventory management is a proper planning of purchasing, handling, storing and accounting of inventory in a systematic way. An efficient inventory management helps to determine what to purchase, how much to purchase from where to purchase and where to stock etc. Inventory is vital element of the firms in the efforts to achieve desire sales level. Inventory can be defined as a stock of any kind of items reserved in a store for a certain period. In an organization, over stocking will mean a reduction of liquidity and high handling cost and under stocking on the other hand, will result in stoppage of work due to lack of inventory. Inventories are stocks of finished product of a company or components that make up the product. Hence, the basic aim of inventory management is to maintain adequate stock of materials at low costs and prices.

In this research work, the researcher is responsible in explaining the statues of inventory management of Unilever Nepal Limited and techniques adopted to manage the inventory. The primary goal of this work is to find out the inventory position of Unilever Nepal Limited. When the inventory is managed efficiently, it becomes possible to minimize the cost of production and carry out the production and operation smoothly.

In this study especially, present position of inventory, practice of requisition collection, purchase and storage of inventory, analysis of inventory management techniques, methods regarding maintaining of stock etc. are examined. All of these above problem are the main focusing points of this research.

1.3 Statement of the Problem

Inventory must be managed in such away that is does not lead to disadvantage of production stoppage. The lower the stocks maintenance, the more susceptible is the business interruption to the manufacturing process by the cessation of the outside supplies (Dwadi, 2000:48) making the smooth flow of production must be the sole objective of ideal inventory policy in the

context of Nepalese manufacturing enterprises. Effective and efficient inventory management system can only yield expected profit of the corporation. The suitable adaptation of inventory level is crucial for an organization. The excessive carrying cost and risk of liquidity where as the inadequacy of inventory causes either product holds up or failure to meet the demand of costumer.

Inventory directly affects profitability of an organization. So managing inventory in a proper way is a great challenge to every organization. The researcher could not dint optimum inventory policies in unilever limited by studying different journal and annual reports of organization. Looking insight into the P/L account of unilever limited of different years, the researcher found the profit is not increasing significantly. In some years its profit margin is in decreasing trend. So the researcher has chosen this topic to provide suggestion for inventory management for profit planning. Some major issues of statement problems are as follows:

- a. How inventories are managed in ULL?
- b. How can the factory reduce inventory cost?
- c. To what extent inventory and sales are related?
- d. Is the inventory management policy ULL sound?
- e. What would be the impact on inventory management on the profitability of the company?

1.4 Objectives of the Study

The main objective of this study is to analyze the inventory management of ULL and its impact on profitability. In order to meet the main objectives the following specific objectives have been proposed.

- i. To examine the existing inventory system applied by ULL.
- ii. To asses inventory planning and controlling systems of the company.
- iii. To analyze the relationship among sales and inventories.

- iv. To examine the techniques being employed to manage the inventory of ULL.
- v. To identify the relationship between inventory management and profit of the company.

1.5 Limitation of the Study

This study attempts to find out the inventory management and impact on the profitability of ULL. Therefore following are the major limitation of the study.

- a. This study focus only an inventory management and its impact an profitability.
- b. This is case study, it is not applicable in general situation or all types of manufacturing enterprises.
- c. This study is based on data provided from companies and other available resources. Hence, this study is based on secondary data as well ass primary data.
- d. The study covers the relevant and information 8 years i.e., fiscal year 2058/059 to 2065/066.
- e. ULL produced different types of products and had diversified product groups. So, this study deals with the corporate product groups namely detergent, toilet soap, personal products, scourers, soap noodles, laundry soaps, tea and vanaspati.

1.6 Significance of the Study

Inventory management is one of the most important functions in any organization. Without effective and efficient inventory management, no organization can achieve its goals. A firm can not achieve its goals unless inventories are controlled effectively and capital is allocated efficiently. Proper inventory management helps to increase the profit of the organization. A slight change in the cost of inventories will bring a great change in the firms profitability.

Most of Nepalese manufacturing organizations are suffering from poor inventory management. ULL product are different types of product or diversified product group to meet everyday need of people every where. Being a manufacturing company, it spends a lot of time money and effort in inventory management. Therefore, the researcher is very much interested to examine its inventory management system. So, the researcher has chosen this company for the study. It is hoped that the study may help to provide some guidelines to eliminate the obstacles in inventory management of ULL.

1.7 Organization of the Study

This study has been organized in to five chapters which are as follows: Introduction is in the first chapter, and it includes background of the study, focus of the study, statement of the problem, objective of the study, significance of the study, limitation of the study and organization of the study.

The second chapter, review of literature deals with conceptual review and review of related past studies and research gap.

The third chapter, research methodology it describes the various research methods i.e. research design, population and sample, nature and source of data, data collection procedure, tools and techniques for data analysis.

The fourth chapter deals with data presentation and analysis. Obtained data are presented in the tabular and other forms. Various statistical presentations are used in the analyzing the collected data from different sources. Actual results are obtained after analysis of data by using financial and statistical tools and techniques. Major findings are drawn after analysis of data.

The last chapter consists of summary, conclusions and recommendations.

CHAPTER II

REVIEW OF LITERATURE

Review of literature means taking knowledge from different sources. In this chapter the researcher has received various publication and unpublished materials. Similarly past researchers thesis are received and also books, articles, newspaper are received. The previous study should be reviewed because they provide the foundation to the present study. The review of Literature provides the foundation for developing a comprehensive theoretical framework from which hypothesis can be developed for testing.

“The purpose of reviewing the literature is to develop some expertise in one's area, to see what new contribution can be mode, and to receive some ideas for developing a research design” (Walff and Pant, 1999:30).

There are many researchers made in the field of inventory management of Nepalese manufacturing enterprises. Different authors have approached inventory management in different ways. In this chapter attempts have been made to present the review of literature regarding inventory management. This chapters is divided into two sub-sections. Theoretical concept of inventory management is presented in first part and review of related studies has been presented in the second part.

2.1 Conceptual Review

2.1.1 Concept of Inventory

Inventory is the materials kept on hand either to make a product or to resell it. The stock of different types of consumable goods held by an organization to fulfill the needs of future purpose is called inventory. Inventory is the most important liquid assets to many business concerns. Inventory depends on nature of organizations. Mainly, manufacturing

organization keeps the raw materials, semi finished goods and finished goods inventory.

“Inventory is composed of assets that will be sold in future in the normal course of business operation” (Khomand Jain, 2003:20.3).

“Inventory refers to the physical stocks of goods. Which though remain idle in the store but is essential for smooth selling of the company and hence has economic values” (Kothari, 1990:39).

“Inventory as a current assets, differ from the other current assets because only financial manager are not involved. Rather, all the financial and purchasing are involved. The views concerning the appropriate level of inventory would differ among the different functional areas” (Khan and Jain, 2003, 20.4).

“To understand the exact meaning of inventory the word inventory we may study it from the usage side and from the point of entry in the operation” (Sharma and Gupta, 1984:176).

Thus, inventory means to that part of business activity, which concerns itself with the raising production, processing or fabrications of products. It deals with the determination of optional procedures for procuring stock of commodities to meet future demand. Inventories form a link between the production and sale of the product.

2.1.2 Nature of Inventory

Every business operation however big or small has to maintain some inventory. An inventory serve as cushion to observe the stock in demand forecast and provides more efficient use of resources. Inventory for any organization is necessary thing and require careful planning and formation of policies keeping in view the best interest of organization. Depending upon the nature of the industry and firm inventory may be durable of non-durable, perishable or non-perishable, valuable and inexpensive.

Inventory are stock of the product in a company is manufacturing for sale and component that make up the product. The various form in which inventory exist in a manufacturing industries.

Manufacturing firms generally hold for types of inventories:

- Raw material.
- Work in progress.
- Finished goods.
- Supplies and Spare Parts.

i. Raw Materials

Raw materials are those basic inputs that are converted into finished product through manufacturing process. It is a prime factor of finished goods, which have not gone through any processing. It is purchase and stored for future production. Raw materials are that goods which have not yet been committed are that goods which have not yet been committed to production at goods which have not yet been committed to production at all.

Material used in a factory are traditionally classified as direct material and indirect material. Direct material are generally classified to include all materials and parts that are integral part of finished product and their contribution can be directly identified. Indirect materials are generally defined as materials used in manufacturing process are supported materials only Chemicals and perfumes are the main raw materials used by the company.

ii. Work in Progress

These categories include those materials that have been committed to the production process but have not been completed. Work in progress inventories are semi-manufactured products. They represent products that need more before they become finished product for sale.

“Work in progress includes such items as components and sub assembles that are not yet to be sold” (Hampton, 1990:241).

Work in progress is neither a finished product nor raw materials. It is the product in the middle of raw material and finished product. WIP

inventories are strongly influenced by the length of production, which is the time between placing raw materials in production and completing the finished product. It is very different to separate which materials are WIP as well as finished goods in other industry. It depends upon nature of production. Soap noodles are the WIP materials used by the company.

iii. Finished Goods

These inventories are those completely manufactured product, which are ready for sale. Stock of raw materials and semi finished goods facilities production while stock at finished goods is required for smooth marketing operation. “Therefore finished goods are completely goods a waiting for sale”. (Pandey, 2002:756).

Mainly following types of finished products are produced by ULL:

-) Detergents
-) Toilet soaps.
-) Personal products.
-) Scourers.
-) Laundry soap.
-) Tea and vanaspati etc.

iv. Supplies and Spare Parts

Firm also maintain the fourth kind of inventory of supplies. “It includes office and plant cleaning materials (soap, broom etc), oil, fuel, bulb and like those materials that don't direct enter into production, but the necessary for the production process, usually these supplies are small part of total inventory and don't involve significant investment” (Pandey, 2002:884).

2.1.3 Motive of Holding Inventories

There are three motives of holding inventory. They are transaction motive, precautionary motive and speculative motive.

i. Transaction motive

Inventories are required to maintain business transaction smoothly. A transaction motive emphasizes the need to maintain inventories to facilitate smooth production and sales operations. Shortage of raw materials may interrupt the smooth production that caused the firm may not able to regular supply. Customers may turn to another sources of supply it is a great loss of organization so the firms may avoid these problems by maintaining an optimum level of inventories.

ii. Precautionary Motive

Inventories area also held with a motive to have a cushion against unpredicted business. Precaution means prevention measure taken before accruing any event shortages of materials are many causes some events are predetermined and some are not. It necessitates holding of inventories of guard against the risk of unpredictable change in demand and supply forces and other factors. So, for the precaution to such irregularities the firms required to maintain inventory.

iii. Speculative Motives

The firms may also held inventories to take advantages of price fluctuation. Holding inventories with a motive to sale at a high price in future is called speculative business. If price will expected to increase in near future, some firms hold enough inventories and expect to earn super normal profit. The firm may purchase larger quantities of raw materials that needed for desired production and sale level to obtain quantity discount of bulk purchasing.

2.1.4 Objectives of Holding Inventory

There are many benefits of holding inventories. To hold inventories, the firm is able to separate the process of purchasing, producing and selling. When a customer signed an agreement the firm would not be offered rapid delivery when the scheduled production runs, it would achieve none of the economics that longer run provides. Inventories are used to provide cushion paces. “In achieving the separation of these functions, the firm realizes a number of specific benefits” (Hampton, 1990: 228).

a. Availability of Inventory

There should be a continuous availability of materials in the factory, finished goods for a trade and office supplies for and office so that trader or any form of product is not held up for want of any inventory.

b. Gaining Quantity Discounts

If a firm is willing to maintain large inventories in selected product lines, it may be able to make bulk purchase of goods at large discounts, suppliers, frequently offer a greatly reduce price if the firm orders double or triple its normal requirement. By paying less for its goods, the firm can increase profit, as long as the cost of maintaining the inventories are less then the amount of discount.

c. Avoiding losses of sales

If the firm doesn't have goods available for sale, it will lose sales customers requiring immediate delivery will purchase their goods from the firms competitors and other will decided that they do not need the goods after all, if they must wait for delivery. The ability of the firm to give quick service and to provide prompt delivery is closed tied to the proper management of inventory.

d. Least Investment In Inventory

There should not be unnecessary investment in stock. Blocking of capital in avoidable inventory stock is wastage of resources.

e. Achieving Efficient Production Runs

Once an assemble line or pieces of machinery is prepared to receive certain raw materials and perform selected production operation, a set up cost has been incurred. This cost must be absorbed in the subsequent production run. Inventories assist the firm in making sufficiently long runs to achieve efficient production.

f. Reducing the ordering cost

Every times a firm places an order it incurs certain costs. Forms must be typed checked, approved and mailed. When goods arrive, they must be accepted and counted. The variable costs associated with individual order can be reduced if the firm places a few large then numbers small orders.

2.1.5 Importance of Inventory Management

Inventory in any organizations play a vital role. If organization is not paying attention to inventory management, it will affect the efficiency and profitability of the organization. Whether product or service oriented, inventory control touches almost every step of operation. Inventory management helps to reduce total cost of production and facilitate uninterrupted production and smooth running of business as well.

Importance of inventory management can be written as follows:

- a. Inventory provide service to the customers immediately or at a short notice.
- b. Inventory helps in maintaining the economy by absorbing some of the fluctuation when the demand for an item fluctuates or is seasonal.
- c. Inventory helps in smooth and efficient running of business.
- d. Inventory also reduces products cost because there is an additional advantages of batching and long smooth running production runs.

- e. Due to absence of stock, the company may have to pay high prices because of piece-wise purchasing. Maintaining of inventory may earn price discount because of bulk purchasing.
- f. Pipeline stocks (also called process and movement inventories) are also necessary where the significant amount of time is consumed in the transshipment of items from one locality to another.

2.1.6 Types of Cost Associated with Inventory

Two types of costs are associated with inventory: carrying cost and ordering cost. Carrying costs are associated with physically storing product, while ordering costs are the costs of placing an order. These two inventory costs are having an increase relationship. A firm can carry more inventories and order less often or order more often and carrying fewer inventories. While carrying cost increase, ordering fall and vice versa. The problems is to find the lower total cost (Bloomberg and Hanna, 2003:159).

Mainly there are two types of cost:

2.1.6.1 Ordering Cost

Ordering Cost consist of order costs, set up costs or both ordering cost could include preparing and processing the order request, selecting a checking the stock, preparing the payment and receiving inventory levels. Set up costs refers to modifying the manufacturing process to make different goods. They include personal costs, as well as capital equipment costs, many firms use blanket orders to reduce order costs (Bloomberg and Hanna, 2002:161).

The term ordering cost is used in case of raw materials and includes the entire cost of raw materials. They include cost incurring in the following activities.

-) Requisition
-) Transportation
-) Clerical and Staff
-) Order placing

) Receiving inspecting and storing

Everette . E. Adem, J.R. Ronald, Ebert Said that inventory costs or cost associated with inventory included following five types of relevant costs (Adam and Ronald-1992).

Elements of Ordering Costs:

i. Cost of Item

The cost or value of item is usually its purchasing price. The amount paid to the supplier for the item. In some instances, however, transportation, receiving or inspiration costs for example, may be included as part of the cost of item. If the cost of item per unit is constant for all quantities ordered, the total cost of items purchased during the planning horizon is irrelevant to the operating doctrine. If unit cost varies with the quantity ordered, a price reduction called a quantity discount, this cost is relevant.

ii. Carrying (Holding) Costs

Carrying cost is incurred for keeping stocks in the store. Typical costs are insurance, security, warehouse, rental, heath, light, taxes and losses due to pilterage or breakage. The cost of typing up capital in inventory is also considered a carrying cost.

iii. Procurements Costs

Procurement costs are the cost of placing a purchase order or the set up costs if the items are manufactured at the facility. These costs vary directly with each purchase ordered placed, procurement costs includes cost of postage telephone calls to the vendor, labour costs in purchasing in accounting, receiving costs, computer items for record keeping and purchase order supplies.

iv. Shortage (Stock out) Costs

Stock out refers the shortage of stock to meet the demand of customers. In other words, stock out costs are those that carry due to the depletion of

stock and results in lost sales and back order cost. It also includes loss of goodwill, loss of profit, expenses incurred for receiving the stock from supplier the customers when goods have arrived.

v. Cost of operating the information processing system

The system in which inventory levels are not recorded daily, the cost is primarily incurred in obtaining accurate physical count of inventories. Frequently, those operating cost are more fixed than variable over a wide quantity range. Therefore, since fixed costs are not relevant to the operating doctrine. We will not consider them further.

2.1.6.2 Carrying Cost

Carrying cost are associated with physically goods, once the goods have been accepted they become part of firm inventories prior to the recent period of high interest rates a number of studies determined that the annual cost of carrying a production inventory ranged between 10 and 34 percent of the value of the inventory, with the model figure running at approximately 25 percent. The escalating cost of money since 1979 however has increased the typical annual inventory carrying cost to approximately 30 to 35 percent of the value of the inventory. Five major elements make up these cost in the following manner:

1.	Opportunity cost of investment funds	12 – 20%
2.	Insurance costs	2 – 4 %
3.	Property Taxes	1 – 3%
4.	Storage costs	1 – 3%
5.	Obsolescence and deterioration	<u>4 – 10%</u>
	Total carrying cost	20 – 40%

(Sources: Dobler – 1992)

Total carrying cost vary in proportion to the value of inventory usually they are computed from the following formula.

$$\text{Total carrying cost} = \text{Average inventory} \times \text{carrying cost per unit}$$

Elements of carrying cost:

i. Opportunity cost of Investment Funds

This consists of expenses of rising funds (interest on capital) to finance the acquisition of the inventory. This is an opportunity cost of funds or the financial cost and component of the cost. Capital cost or opportunity cost compares investment to what the firm could earn from other capital investment.

ii. Insurance cost

In spite of best precautions, firm must protect themselves against such hazard as fire or accident in the warehouse. Larger amount of inventory require large amount of insurance. The insurance premium represents a carrying cost of inventory. (Hampton, 1990:19)

iii. Property Taxes

As with insurance, property taxes are levied on the assessed value of the firm assets, the greater the inventory value, the greater the assets value and consequently the higher is the firms tax bill. (Dobler, 1992:19)

iv. Storage cost

The firm must provide for storage space, usually through the operation of a warehouse or supply room. The firm must employ workers to more cleanly, count, record and protect the goods. All of activities dealing with the physical holding of the goods are considered storage costs (Hampton, 1992:233).

v. Obsolescence and Deterioration

In the operation, a certain percentage of inventory items spoils is damaged is pilfered or eventually become obsolete. No matter how diligently warehouse manager's guard against this occurrence, a certain amount always takes place with new products being introduced at an increase rate, the probability of obsolescence is increase accordingly. Consequently the large the inventory, the greater is the absolute from source.

2.1.7 Methods of Inventory Computation

We can calculate inventory by different methods. Mainly the organization can compute inventory by following methods. (Welsh, Hiton and Gorfan, 2001:61)

1. Average Sales Method

This method can be divided into two categories:

a. Average Sales Method

Under this method inventory is calculated with average sales of certain time period.

$$\text{Inventory} \times \frac{\text{Yearly sales / total sales during the time period}}{\text{No. of time period or 12}} \mid \text{required stock of period}$$

It is stable and suitable to basic product but it can't be used in big organization.

b. Moving Average Method

It is based on of period mostly 3,5, or 7, under this method inventory can be calculated as:

$$\text{Inventory} \times \frac{\text{sales (previous months } \Gamma \text{ current month } \Gamma \text{ next months)}}{\text{Total No. of time period}} \mid \text{required no. of months}$$

Under this method both inventory and production are fluctuating. It is appropriate in those organizations, whose sales are highly seasonal.

2. Sales to Turnover Ratio

This method is also two types:

a. Historical Sales Turnover Ratio Method

This method is also called HSTR, turnover method or withdrawn method. Under this method inventory is calculated on the basic of historical ratio sales to inventory.

Inventory = sales for the period \times HSTR or multiplier

where, Historical Sales Turnover Ratio

$$\times \frac{\text{No. of month in a year or 12(N)}}{\text{Turnover Time(TT)}}$$

And
$$X \frac{\text{Sales(historical) for the year}}{\text{Averageinventory}}$$

Average Inventory
$$X \frac{\text{Opening Inventory} \Gamma \text{Closing Inventory}}{2}$$

It is stable and shows the relationship between sales and inventory.

b. Turnover Time Method

Under this method, inventory can be calculated as:

$$\text{Inventory} X \frac{\text{Total sales / Budgeted sales for the year}}{\text{Turnover Time}}$$

Mostly it is used for suitable inventory policies.

3. Proportional Sales Method

It is not widely used. Mostly it is used in small industry or basic product / commodity or monopoly market, which has certain sales. Under this method inventory can be calculated as:

$$\text{Inventory} = \text{sales for the month} \times \text{given ratio}$$

2.1.8 The Inventory System

The inventory accounting systems can be "Periodic System" or continuous inventory system.

*** Periodic Inventory System**

It is a physical count of items in inventory at periodic intervalb, weekly, monthly in order to decide for how much to order each type of item.

The figure no. given below shows the periodic inventory system T denotes the time periods weekly or monthly.

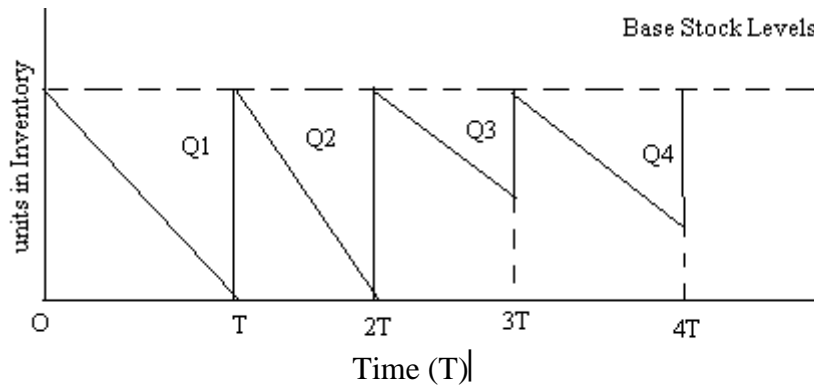


Figure 2.1: Periodic Inventory System

The objective is to count the items physically and maintain at base to stock level, $Q_1, Q_2, Q_3, Q_4 \dots$ way not be same during, the course of time T .

* **Continuous Inventory System (Perpetual Inventory System)**

This system keeps track of removals from inventory (usage rate) on a continuous basis that provides the information on the current level of inventory for each item. When the quantity reaches predetermined level a fixed order quantity Q is ordered. The figure no. 2.2A given below shows two cases when the usage rate is constant and variable.

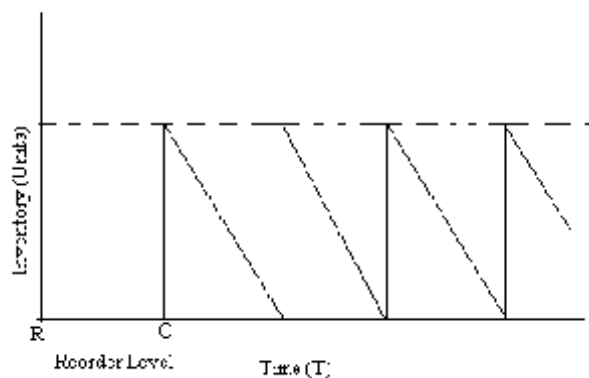


Figure 2.2 A: Continuous Inventory System (Constants Usage Rate)

In this case, the lead time is supposed to be zero, that is, the quantity is immediately received after order is placed.

Again, the figure no. 2.2B given below, the usage rate is variable, R is the Re-Order-Level and Q is the quantity to be ordered L_1, L_2, L_3 are the lead time which are also different.

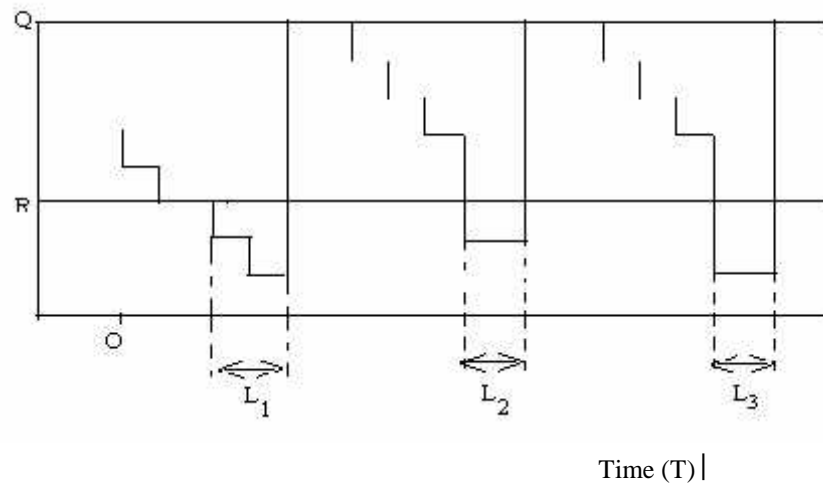


Figure 2.2. B: Continuous Inventory System (Variable Usage Rate)

As the lead time varies, the time interval between order varies, but a remain same. (Ibid PP. 323-325)

2.1.9 Techniques of Inventory Management

To manage inventories, the firm's objective should be inconsonance with the shareholders wealth maximization principle. To achieve, the firm should determine the optimum level of inventory. Efficiently controlled inventories make the firm flexible. Inefficient, control result in unbalanced inventory and flexibility the firm may sometimes run out of stock and sometimes may pile up unnecessary stock. This increase the level of investment and the makes the firm unprofitable.

"The financial manager should aims at an optimum level of inventory on the basic of trade off between cost and benefit, to maximize the owner's wealth. May sophisticated mathematical techniques are available to handle inventory problems. But they are more approximately a part of production management." (Khan and Jain, 2002:211)

To manage inventories efficiently, answer to be sought to the following two questions:

- How much should order?
- When should it be ordered?

"The question, how much to order related to the problems of determining economic order quantity and is answered with an analysis of costs of maintaining, certain level of inventories. The second question, when to order, arises because of uncertainty and is a problem of determining the re-order point." (Panday, 2002:902)

In every aspect of inventory management, there is necessary control of inventory. There are various techniques of inventory control to avoid excess cost, physical loss, damage theft, over inventory and lower inventory, some of these techniques are discussed below.

2.1.9.1 Economic Order Quantity (EOQ)

EOQ refers to the order size that will result in the lower total ordering and carrying cost an item of inventory, if a firm places unnecessary orders. It will incur unneeded order cost. If it places too few orders it must maintain large stocks of goods and will have excessive carrying costs. By calculating an EOQ, the firm identifies carrying cost, by calculating an EOQ, the firm identifies the number of unit to order that result in the lower total of these two costs. (Hamptom, 1990:231)

EOQ is important concept in the purchase of raw materials and storage of finished goods and transit inventories. To determine the optimal order quantity for a particular item of inventory, given its forecasted usage ordering can mean either the purchase of the item or its production. (Van Horne, 2003:377)

How much to produce or order is one of the main problems of inventory management. That is the determining of a quantity for which the order should be placed is one of the important problems concerned with inventory management. The correct quantity to buy is the quantity at which

the cost of acquisition equals the cost of possession. This is technically known as the economic order quantity or re-order quantity. EOQ refers to size or quantity which minimize the total inventory cost. Ordering or set up cost and holding or carrying cost constitutes the total cost of inventory excluding material cost. Increase in ordering numbers increase the ordering cost, but decrease the holding cost and vice-versa. Therefore, it is necessary to calculate order quantity which minimizes carrying cost and ordering cost. Re-order quantity is such that when it is added to the minimum stock, it should not exceed the maximum stock.

Assumptions

The EOQ model relies on several assumptions:

- i. There is a continuous, constant and known demand rate.
- ii. The constant purchase price is independent of the amount ordered.
- iii. The lead-time cycle is known and constant.
- iv. There is no inventory in transit.
- v. No stock outs are permitted.
- vi. All inventory parts are independent of each other.
- vii. The planning horizon is infinite.
- viii. Transportation costs are constant no matter the amount moved or the distance traveled.
- ix. There is no limit on the amount of capital available.

These assumptions often stay far from real life. Demand is rarely continuous, constant and known, lead-time, transportation cost and price vary. Stockouts happen, planning horizons are limited and volume discounts can be significant. Also, many products are independent. Planning horizon is limited, as is capital available. EOQ is most widely used single inventory model. It is simple to use and it produces an exact answer.

2.1.9.2 Approaches to set EOQ

EOQ model can be determined by following methods:

- i. Mathematical or formula method.
- ii. Trail and error approach.
- iii. Graphic method.

i. Mathematical or formula method

Mathematical models are also available to calculate economic order quantity. There are numbers models exist, as the field of inventory management and can be studies in college programs such operation research and production management. Even many mathematical models exists, the main objectives of this model is to reduce, minimizes the inventory cost or total cost.

Without getting into highly refined decision models we can illustrate the concept of EOQ with a basic mathematical model. We calculate EOQ by using the following formula:

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

where,

A = Annual demand / requirement / sales

O = Ordering cost per order

C = Carrying or Holding cost per unit per year

ii. Trail and Error Approach

This is another approach to calculate economic order quantity. A firm has different alternatives purchase policy of its inventory, it can purchase its requirement own one single lot. Alternatively, the firm can purchase its inventory is small lots periodically say weekly, monthly, bimonthly, half yearly and so on. It means more than on time the firm can place and order to purchase inventory. The smaller lot sizes the lower average inventory and vice-versa. How inventory holding are associated with high ordering cost and low carrying cost. This approach to the determination of EOQ uses different

permutation and combination of total cost inventory purchase so as to find the total cost.

According to this approach the carrying and ordering cost for a different size of order to purchase inventories computed and the order size with the lower total cost (ordering + carrying) of inventory is the economic order quantity. (Khan and Jain, 2003:20.7)

A table arrangement of data relating to items of material may allow them determination of appropriate EOQ. In this approach following points are included.

- a. No. of order = Increase no. of order decrease order size
- b. Ordering size = Annual requirement divided by no. of orders
- c. Average inventory = Equal to half of order size
- d. Ordering cost = no. of order \times ordering cost per order
- e. Carrying cost = Average inventory \times carrying cost per unit per year
- f. Total cost = ordering cost + carrying cost

iii. The Graphic approach

The economic ordering quantity can also be found graphically. Figure 2.4 given below illustrates the EOQ function. In the figure, carrying, ordering total costs are plotted on vertical and horizontal axis is used to represent the order size. Total carrying increases as the order size increases, an average, a large inventory will be maintained and ordering cost declines with increase in order size because large order size means less number of orders. The behavior of total cost line is noticeable since it is a sum of two types of costs, which behave differently with order size. The total cost declines in the first instance, but they start rising when the decrease in average ordering cost is more than offset by the increase in carrying costs. The EOQ occurs at the point Q where the total is minimum. Thus, the firm's operating profit is maximized at a point Q.

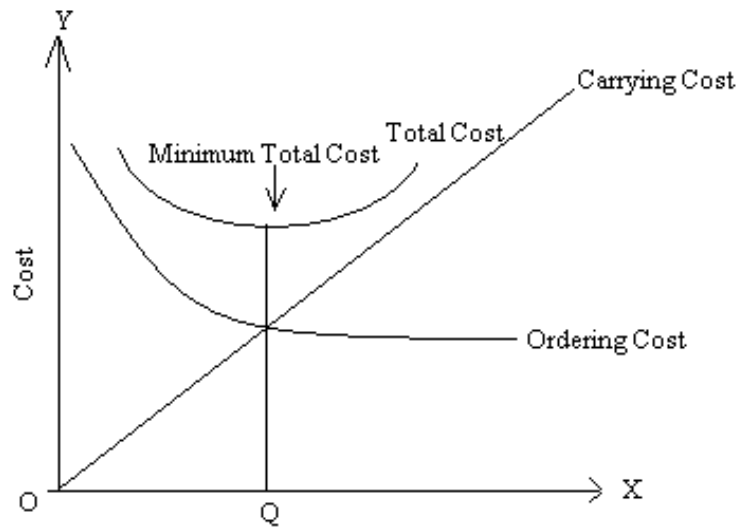


Figure 2.3: Graphic Approach of EOQ

It should be noticed that the total cost of inventory are fairly insensitive to moderate changes in order size. It may be appropriate to say that there is an economic order range, not a point. To determine this range, the order size may be not change very significantly, the firm can change EOQ within range any loss. (Panday, 2002:888)

2.1.10 Inventory Management Procedures

These procedures of inventory management cover the activities such as purchasing, receiving and store keeping, issuing and pricing the inventory items.

2.1.10.1 Purchasing

Purchasing means procurement of goods and services from some external agencies. In other words, purchasing means procurement of materials, parts and components to produce desired goods and services in organization. The main objective of purchasing is to purchase or procure correct equipment, materials, parts, components and supplies in the right quantity of right quality from right origin at right time and cost. Purchasing

management should be effective otherwise it hampers the quality of production.

In a large manufacturing concern, a separate purchase department is set up with the object of effecting all purchases. The top management lays down the purchase policy and accordingly necessary materials are purchased by the purchase department to decide, what to purchase, when to purchase, from where to purchase, how to purchase and finally at what price the material should be purchased. (Sarma, 1984:47)

Purchasing activities relating to procuring materials and supplies consumed during production. The purchasing function, which provides material, supplies and services from outside vendors. Accordingly, "Purchasing is an important boundary function that supports operation by acquiring major resources for the conversion process." (Hampton, 1990:228)

For the most organization, supply management means purchasing that is, firm buys goods to resell, to carry out operation or to manufacture products. Supply management is usually given the broadest definition, encompassing and activity involved in moving goods into a firm. Other terms have similar meaning. "Regardless of the term, supply management or purchasing aims at anticipating requirements, sourcing and obtaining supplies, moving supplies into the organization and monitoring the status of supplies as a current asset." (Bloomberg and Hanna, 2002:16.3)

Purchasing now has become a specialized function in many organizations. Visiting expresses that purchasing is a managerial activity that goes beyond the simple act of buying and includes the planning and policy objectives covering a wide range of related and complementary activities included in such activities are the research and development required for the proper selection of materials and sources from which these materials may be bought. Thus purchasing in modern sense is a strategic management function and any negligence will ultimately result in a decrease in profit.

Objectives of purchasing

The responsibility of the purchasing department is to buy materials of the right quality in the right quantity at the right price from the right sources and delivery at the right place. This is the way of starting the objective of sound purchasing management.

The major objectives of scientific purchasing may be state as follows:

-) To support company operation with an uninterrupted flow of material and service.
-) To develop reliable alternate sources of supply.
-) To buy competitively and wisely.
-) To develop good vendor relationship and good continuing supplier relationship.
-) To achieve maximum integration with the other department of the firms.
-) To thain and develop highly competent personal who are motivated to make the firm as well as their department succeed.
-) Maintaining continuity supply to insure production schedule at a minimum investment.
-) To develop policies and procedures, which permit accomplishment of the proceeding several objectives at the lowest reasonable operating cost.
-) Creation of goodwill for the company through dealing with suppliers.
-) Developing fullest co-operation and co-ordination and maintenance of internal relationship among various department of the company.

Purchasing Procedures

"Effective purchasing means learning the purchase, identified qualified sources of supplies, minimizing the total cost of supplies and administrating the purchase." (Adamand Ronald, 1992:221). While individual purchase may appear quite different, this is general underlying purchasing process. The process is described below. (Bloomberg and Vanna, 2002:451)

a. Recognized Needs

In organization, needs are recognized in many ways. A department may contract to buy new production equipment. Purchasing may be notified of an order for component parts by the materials requirement planning system and simply reviewed by purchasing. Each of these methods starts the purchasing process at same level.

b. Identifying a supplier

Identifying the supplier may be as simple as making sure the e-mail address is correct an electronic order of as complex as asking for pre-bid proposals on major capital equipment, conducting a bidders meeting and evaluating many detailed proposals. To some extent, this depends on the type of purchase new but straight is buy or partial re buy and the product or service being purchased. Once the potential suppliers have been identified, one or more will be chosen to provide the goods.

c. Monitoring and Managing the Delivery process

Primarily, purchasing makes sure the correct goods were delivered in the correct quantity at the right pace. If, not purchasing takes some action to fill the gaps.

d. Qualifying and Placing an order

Once a supplier has been identified, the order must be initiated, contract signed or some steps taken to get the goods delivered or services provided. Purchasing is usually then responsible for determining if order are filled correctly, if contract item are met, if goods meet standard and supplies performs satisfactory.

e. Evaluating the purchasing and the suppliers

Must purchasing organization summarize the accumulated experience with a suppliers through many transaction and many purchase when one transaction goes away, purchasing may contract the suppliers to avoid future

problems, when many transactions fail to meet standards, purchasing then seeks new suppliers.

2.1.10.2 Receiving and Store Keeping

The purchasing department at the time of delivery received at item and received items are compared with purchase order and actual materials received should be entered in goods received note. Then all items received by the purchasing department should be passed into store for protection against deterioration and pilferage. They are stored in such a way that, their location is easily identified at the time of issue. "The store function involves both keeping and store of materials and keeping the store records, the former being physical task and the latter being accounting task depending on the nature and requirement of the organization. The stores are classified as centralized and decentralized store." (Agrawal, 2000:21)

In the words of Maynard, the duties of store keeping are to receive materials to protect them while in storage from damage and unauthorized removal to issue the materials in the right quantity at right time, to right place and to provide these services promptly and at least costs.

The problems of storage is not solely that of safe keeping stores must be quickly and conveniently available to the consumers. The optimum location is often adjacent to there, where the materials are actually used. This reduces delay and cost of handling and relieves internal traffic congestion. For, this reason, decentralized storerooms are often provided near various production centers. In some cases, materials are stored without protection on the production floor, immediate accessibility being important than possibility of loss.

In the light of the above explanation storekeeping can be described as the keeping of materials in a scientific and systematic way.

Objectives of Store Keeping

The major objectives of store keeping may be stated as follows:

-) Using the storage available space and labor effectively.

-) Deceiving handling and issuing goods economically and efficiently.
-) Minimizing the investment on inventories.
-) Maintaining regular supply of raw materials of all times when properly authorized.
-) Protection of all goods in stores against all those from fire, theft, and obsolesce.
-) Minimizing the inventory handling cost.
-) Facilitating ordering of required materials.

To achieve the above said objectives and firm generally uses different types of controlling devices like:

i. Bin card

A bin card makes records of receipt and issue of material is kept for item of stores carried. The storekeeper maintains these cards and storekeeper is answerable for any difference between the physical stocks and the balances shown in the cards. These cards are used not only but recording receipt and issues of store but also assist the storekeeper to control the stock.

For each item of stress, minimum quantity, maximum quantity and ordering quantity are stated on the cards. By seeing the bin card the storekeeper can bend the materials requisition for the purchase of materials in time.

Sample of Bin card

Bin card No.	Bin No.
Name of the Articles:	Maximum Quantity
Code No.	Minimum Quantity
Store ledger folio:	Ordering Qty.

Date	Receipts		Issues		Balance	Date of Checking	Remarks	Goods on order		
	Goods rec. note no.	Qty.	Store requisition note no.	Qty.				Qty.	No. and date of order	Qty.

--	--	--	--	--	--	--	--	--	--	--	--	--

ii. Store ledger

This ledger is kept in the costing department and is identical with the bin cards except that receipt issues and balanced are shown with their money values. This contains an account for every time of stores and makes records of the receipt, issues and the balances, both in quantity and value. Thus, this ledger provides the information for the pricing of materials issues and the many values at time of each item of stores (Jain and Narang: 1991).

Sample of Store Ledger

Name of Article Maximum Quantity
 Code No.: Minimum Quantity
 Bin No.: Ordered Quantity

Date	Receipts				Issues				Balance				Remarks
	S.No.	Qty.	Rate	Amount	S.No.	Qty.	Rate	Amount	S.No.	Qty.	Rate	Amount	

2.1.10.3 Pricing and Issuing

The primary basis of accounting for inventory is cost, which has been defined generally as the price and to consideration given to acquire assets. As applied to inventories cost means principle the sum of applicable expenditure and charges directly or indirectly in bringing an article or indirectly in bringing an article to its existing condition and location.

Pricing the inventory is one of the most interesting and widely used subject matter in accounting process. Many organizations are interested in the various methods of pricing inventory because it has a direct effect on the net income. Inventory valuation approach in important in the aspect of income tax problem. One method of inventory valuation may lead lower tax liability than other inventory valuation method. There are a number of methods which may be employed for the inventory valuation but must significant method is cost and other method is lower of cost or market. Both method gives different results.

Theoretically the value includes all expenses up to the point of placing materials at the processing plant. Therefore, the value includes the invoice price less trade discount, the freight, cartage and insurance on incoming materials and expenses of purchase, receiving, storing and record keeping and carriage from the stores upto the process plant. Hence, in order to work out correct cost of job or work order, all these types of expenses should be included in the value of materials issued. However, in practice, it is a difficult task because the clerical work involved in making minute calculation for the inclusion of these expenses will be much more than the benefit derived (Jain and Narang, 1991: P2.61).

Conceptually, the process of valuation the inventory is simple. We can calculate inventory value that multiplying physical quantity of goods by cost per unit. But in practice, many organization's purchase different types of raw materials at different price and different time.

It is not always possible to identify the industrial particular purchase group. at that solution firms have faced difficulties in valuation the inventories. In this situation there are many methods which are based on historical cost used in determining the value of inventory are:

a. Specific Identification Method

The specific identification method requires that each unit in inventory be identified with the particular time, it was purchased. In this method, the item have serial number or are distinguishable by model, color or size to identify the particular items but specific items separate at first and record in stock book. This method is more suitable to low volume high cost item such as automobiles. It is not very practical when the firm purchase large quantity of identical units of various time and prices.

b. Weighted Average Cost

It assumes that goods are removed from the beginning inventory and purchase group in proportion to the number of units, in these groups consequently; cost of the ending inventory also represents a proportional

distribution from the beginning inventory and various purchase groups. The weighted average cost computed by dividing the total cost goods available for during the period (Laughin, 1990: 221).

$$\text{Weighted Average Cost} = \frac{\text{Total Cost of goods available for sale}}{\text{Total units available for sale}}$$

The method is widely used by organization that hold item of inventory long period of time because it average out of the effects of price increases and decreases. In addition, weighted average process is satisfactory when there are both increases and decreases in organization uses this method which purchases the inventory items frequently interval because it does not require that the ending inventory cost be associated with any particular purchases group. A common criticism of the methods is that in attaches no more significance to current price then to price that prevailed several months earlier.

c. First in First out (FIFO) Method

In this method is commonly known as FIFO. The principle is that issues are priced in chronological order of the purchase and at their cost price. The materials received first are to be issued as soon as the material requisition is received (Sharma, 1984:75).

FIFO method is based on the assumption that the materials first received are the first to be issued. The materials received and changed on each invoice are changed out from the inventory are the price stated on that invoice until the lot has been exhausted. The units on hand at any time are assumed to be the units last purchased because all issues of materials have been made from the earlier issues. The FIFO method is used in the balance of stores record.

d. Last in First Out (LIFO) Method

The method is commonly known as LIFO and it is based on the assumption that the last item purchased and received in store are to be issued first the price of the materials to be issued would be the cost price of the last

lot of materials purchased. While the method ensures that the materials are issued at the most recent prices, the more historic prices are applied for valuing the closing inventories in the balance sheet (Sharma, 1984:76).

The last in first out method which is frequently known as the “Replacement Cost” method receives its support from the theory that goods sold are those issued from stock in accordance with the last in first out plan. The cost of the last lot of materials received is used to price requisitions until that consignment is exhausted, then next lot pricing is used and so on through successive lots. The use of this method tends to level of equalize profits and losses during successive periods of rising and falling prices, it decreases profit figure during periods of rising prices and increases profit during periods of falling prices (Blocker and Weltmer, 1992: 62).

e. Base Stock Method

The base stock is valued at the cost prevailing at the time firm began or when the method was adopted. Any additional layers materials in the inventory of close belong beyond the unit. The base may be on the basis of FIFO, weighted average etc. method.

All method has their advantage and disadvantage. However, the method chosen is significant for efficient inventory management especially in its financial dimensions.

2.1.11 Role of Inventory in Overall Planning of the Organization

Profit planning and control (PPC) is important approach developed for effective management system mainly in profit oriented organization. Simply planning is the process of forecasting for future time period. It shows the direct for the organization where to go and how to go accomplish the certain objective made by the organization without making appropriate plan the organization can't reach it's destination. A profit plan or budget is comprehensive and coordination plan, express in financial term for the operation and resources of an enterprise for some specific period in future.

Profit planning is the part of overall planning PPC includes comprehensive, coordination, financial term, resources plan, time etc.

For appropriate profit planning of organization it has to prepare different budget like sales budget, production budget, material purchase budget, labour budget, flexible budget, capital expenditure budget, cash budget, budget income statement, budget sheet, activity based budget, cost volume profit analysis etc.

2.1.11.1 Inventory and Production Budget

Production management deals with inventory because first thing for production is the raw materials. A firm can't achieve its goal unless inventories are controlled effectively. Therefore study on inventory is the necessary thing for the company. Therefore study on inventory management is a great important.

Simply production means the creation of utilities is goods and services. The organization has to produce different goods and services mainly for production and sales. Inventory budget is one of the important components of production budget. Future is uncertain so production has to be made inventory also. Inventory has direct relationship with production budget. Without making appropriate inventories policies, the organization can't prepare production budget.

Production Budget

Sales Units for the period	XXX
(+) Closing inventory	<u>XXX</u>
Total requirement for the period	XXX
(-) opening inventory	<u>XXX</u>
Production units for the period	XXX

2.1.11.2 Inventory and Purchase Budget

In order to maintain company, co-ordination between materials usage, inventory level of raw materials and raw materials/ parts purchase, the

organization has to plan and control material. For this the organization has to prepare materials usage or materials consumption budget and materials purchase budget. This inventory has also direct relationship with materials purchase budget. The organization can't purchase budget. The organization can't purchase materials whenever it is needed. So organization has kept sufficient stock or inventory of materials for smooth operation of the organization.

$$\text{Materials Usage} = \text{Production Budget} \times \text{Standard Usage Rate}$$

Material Purchase Budget

Material Usage Units for the period	XXX
(+) closing inventory of materials	<u>XXX</u>
Total requirement for the period	XXX
(-) opening inventory of materials	<u>XXX</u>
Materials purchase units for the period	XXX

Similarly, for non-manufacturing organization, it has to prepare material. Purchase budget and open to buy budget.

Where,

Purchase Budget = Sales + Stock at the end + reduction (discount, markup, loss on storage, damage, demurrage, water, paste, mice, obsolesces, shoplifting, etc) – stock at the beginning.

Open to buy budget = stock needed – stock available

Where,

Stock Needed = EOM + planned sales + planned reduction – (Actual sales + Actual reduction)

Stock available = BOM + Merchandise received + stock delivery – (Actual sales + Actual reduction)

2.1.11.3 Co-ordination between sales, production and Inventory

The manager must plan an optimum co-ordination between production inventory and sales. An efficient co-ordination production plan is necessary

for optimum production and sales. There may be high pressure from both sales and manufacturing for high inventory level. The production budget and inventory policies provide the basis for obtaining this co-ordination.

Production manager must translate the quantity in the sales budget into unit production requirement for the budget period for each product while considering the management product while considering the management of inventory policies. An efficient plan should represent the optimum co-ordination between sales, budget, essential inventory levels and production levels.

2.1.12 Inventory Control Techniques

Inventory control or stores control, as commonly known, refers to the techniques used to ensure that stocks are kept at levels, which provides maximum services at minimum cost. The main objective of inventory control is to ensure that “Stock Out” does not occur and that surplus stocks are not accumulated a carried. many mathematical or statistical models with various degree of sophistication have been develop discussion on such statistical techniques or models being outside the scope of this text, we shall only discuss some very popular and easy to understand techniques for inventory control

Stock Level

Stock levels are established for standardized materials, which are regularly used by the firm so that inventory holding can be controlled.

Re-order Level

This is the level at which shopkeeper initlated purchase requisition or replenishment order for fresh supplies of materials Re-order level takes into account the maximum usage and unexpected delay in receiving fresh supplies. The level is such that even with maximum consumption during lead-time unusal delay in replenishment, stock does not reach zero level. Re-order leve is calculated as below.

Re-order level = maximum re-order period \times maximum usage

Re-order Level = Minimum level + (Normal usage \times lead time needed).

Re-order Point = Lead time \times Average usages

Minimum Stock Level

This is the lower limit below which the stock of any item should not normally be allowed to fall. Carrying of minimum stock avoids a situation of stock out resulting in the stoppage of production. This stock is a buffer stock or safety stock to be used only under abnormal condition or in an emergency. In the determination of minimum stock level, the following points are taken into consideration.

- i. Re-order level
- ii. Average rate of consumption and
- iii. Average lead time: The period of time between ordering and replenishment (Re-order period).

Formula for the calculating of minimum stock level is:

Minimum stock level = Re-order level – (Normal Consumption \times Normal re-order period)

Maximum Stock Level

It is a stock level that can be maintained on the basis of requirement. It is a quantity that can be maintained on the basis of need. It is the stock level above which stock should not be allowed to rise. It is an upper limit beyond which the quantity of any item is not normally allowed to rise. Holding of stock more than limit will increase material and storage cost, tie up working capital unnecessary. The maximum stock level is affected by availability of financial resources, store space, lead time and nature of material reasonability of materials and government control. The maximum level is fixed by considering the following points.

- i. Re-order level
- ii. Minimum Consumption rate during lead time.
- iii. Minimum lead time or re-order period

iv. Re-order quantity

Formula for the calculation of maximum stock level is:

Maximum Stock Level = Re-ordering level + re-ordering quantity –
(Minimum Consumption × Minimum re-order period)

Average Stock Level

An average stock level indicated the average stock held by the firm. It is calculated by the following formula.

Average stock Level = (Minimum level + Maximum level)/ 2

A more commonly used method of measuring average stock level is the one involvement re-order quantity.

The formula is:

Average stock level = Minimum stock + ½ (Reorder quantity)

Danger Stock Level

This is a level of which normal like of the materials are stopped and issued are made only under specific instruction. The firms will make special arrangement to get the materials which reach at their danger level so that the production may not stop due to shortage of materials. Formula for the calculation of danger stock level as:

Danger Stock Level = Average Consumption × Maximum re-order Period.

Danger Level = Normal Consumption × Maximum emergency re-order period.

2.1.13 ABC Analysis (Selective Inventory Control)

ABC analysis is the application of stock holding of pareto's law which shows that the majority of inventory value will be represent by relatively few items (Ibid, p.78).

The first step in the inventory control process is classification of different type of inventories to determine the type and degree of control required for each. The ABC system is widely used classification technique to identify various items of inventory for purpose of inventory control. This

techniques is based on the assumption that a firm should not exercise the same degree of control on all items of inventory. It should rather keep a more rigorous control on items that are (i) the most costly and the slowest turning, while items that less expensive should be given less control effort (Khan and Jain, 2003: 20.5).

It is very difficult to monitor and control the enormous number of stock items. As such manufacturing organization find it useful to divide inventories into three categories for the purpose of exercising selective control on inventories. ABC analysis items into sub classification and uses different control system for each group of inventories. Under this techniques of inventory control, inventories are listed in A, B, and C group in decending order based on money value of consumption as follows (Ibid, p.20.5).

- i. High price inventories - A
- ii. Medium Price Inventories - B
- iii. Low Price Inventories - C

The items included in group A involve largest investment and would be under tightest control by management. Therefore, inventory control should be must rigorous and intensive and the most sophisticated inventory control techniques should be applying these items. The 'C' group consists of items of inventory which involve relatively small investment although the number of items fairly large. These items deserves minimum attention. The lower level of mangers may given authority to exercise control over these items. The 'B' group stands mid way. It deserves less attention than 'A' but more than 'C'. The 'B' items fall in between these two categories and the responsibility to control these inventories may be given to middle level managers. It can be controlled by employing less sophisticated techniques. The typical break down of inventory item is as shown given table below.

Group	Number of items (%)	Inventory Value %
A	15	70
B	30	20
C	55	10
Total	100	100

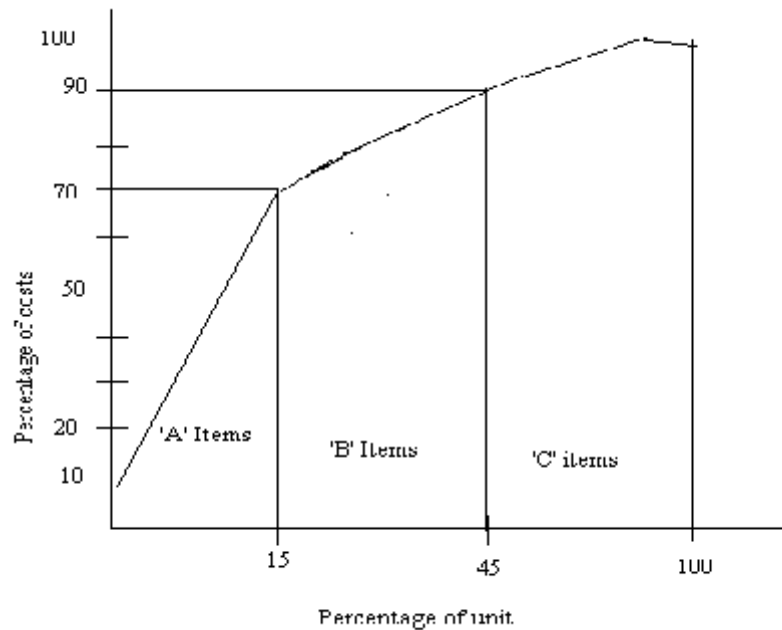


Figure 2.4: ABC Analysis

Some point stand out table given above while group 'A' is the least important in terms of the number of items, it is by far the most important in terms of the investment involved. With only 15 percent of the number, it account for as much 70 percent of total value of inventory. The firm should direct most of its control efforts to the items include in this group. The items comprising B group account for 20 percent investment in inventory, they deserve less attention then 'A' but more than 'C' which involves only 10 percent of the total value although numberwise its share is as high as 55 percent.

2.2 Review of Related Studies

Above, we have emphasized on the review of text books only attempt is also made to review the related studies conducted by different agencies, expert, scholars related with inventory management of manufacturing enterprises in Nepal.

Some studies have been made in the subject of inventory management but few studies are review in this chapter.

Pandey (2000) has conducted a research work on the topic of “Inventory Management: A Case study of Gorkhapatra Corporation.” The main objectives of the study was to collect information which would assist in describing the current position of Gorkhapatra as a means of mass communication in Nepal to identify its development messages and to measure its effectiveness. She found that the corporation was not using EOQ formula, re-order point formula methods and ABC classification of inventory. She suggested the corporation to use EOQ formula and to use ledger cards for balancing receipt and issuance.

Baral (1994) has also made study regarding “Inventory Management: A Case Study of Gandaki Noodles Pvt. Ltd.” The main objectives of his study were to highlight the company's policies and objectives, functions and activities regarding inventory management. Finally he come to know that the factory is following neither economic order quantity model in its purchasing decision nor ABC analysis in inventory management.

Bilika (2003) has studied about the “Inventory problems of Hetauda Cement Industry Limited” to find the present inventory position and problems in managing inventory. After his studies has revealed that there is no proper system for material purchase in the industry. The price and quantity of collected materials are fluctuating from year. The company is not following EOQ model in purchasing decision. The investment in inventory stock of HCIL is in large amount. The value of inventory is increasing from year to year.

Saru (2007) carried out the study on the topic “Planning and controlling of Inventory of manufacturing Industries Goshali House.” The basic objective of study were to identify the authorize person for inventory planning and controlling, to analyze the tools used in planning and controlling of inventories, to analyze the materials purchasing techniques to analyze the inventory turnover ratio of Goshali Packaging House. During the study the found that the top level management has not paying more attention to make inventory planning and controlling. No separate section of purchasing,

production and sales department, no preparation of complete inventory planning diversified purchasing methods are used to procure materials, the company has not determining EOQ, ROL, maximum and minimum stock level while purchasing and sale, FIFO methods have applied for the inventory issued and use, perpetual inventory system is adopted, inventory turnover ratio is not satisfactory.

She has recommended to the company top level management should paying more attention to prepare the planning and controlling of inventories policies, should have prepare purchase budget, should have follow the scientific tools and techniques for inventory planning, inventory should be classified according to ABC system.

Sigdel (2007) has conducted the research work regarding “Inventory management of Agriculture Input Corporation” stated that AIC is not using scientific model of inventory management. Although they don't calculate EOQ for the supply of chemical fertilizer, they order lots of 1000 to 2000 M. ton. There is no evidence of taking discount by AIC. Lead time is not calculated properly. Re-order is also not fixed. Regarding buffer stock, it remains out of stock in season and overstock in out of season. AIC is not using ABC analysis also.

Dhital (2000) has conducted the research work on the topic of “Inventory Management: A case study of Nepal Food Corporation.” The main objectives of his study were to highlight the NEC policies related variables like purchase, sales, sales food quantity of NFC. The findings of Mr. Dhital are under food grains purchasing the domestic purchase are more in fluctuated and greater than import. The relationship between edible careal production and requirement is negative. The total food grains quota is fluctuated in year after year because of production fluctuation in Nepalese kingdom.

Tiwari (2009) carried out a study on the topic “Inventory Analysis of Nepalese Public Enterprises: A Case study of Salt Trading Corporation Limited.” The objectives of the study were to analyze the performance of corporation on the basis of selling and cost price of inventory, to analyze

inventory turnovers ratio to reveal the goods purchasing policy, to identify the present practice of procurement of various inventories, to compare between profit and purchasing cost of various inventories and analyze the present inventory position of the corporation. During the study, he has found that the selling price and the cost price of the products are in increasing trend. Due to the traditional marketing, corporation not earn target profit, EOQ model is not followed while purchasing, the margin of safety stock, maximum stock and minimum stock level is only in paper not in practice, investment on inventory stock is in large quantity due to defective purchasing policy. The inventory turnover ratio is satisfactory.

He has recommended to the corporation, EQO model should be applied while purchasing should extent its hand to rural areas, should have prepare purchase plan and sales planning strategies.

Pradhan (2006) has conducted a study on “Significant of Inventory Management of Nepalese Manufacturing Enterprises.” He had studied the ratio of inventories to total assets computed for selected non-financial Nepalese enterprises. One of the important findings was to invest on average, about 22 percent of total assets in the firm of inventories in 2005/06 by Nepalese enterprises indicates that larger amount of money has been invested in the firm of inventory. Hence, the inventory management has greater significance.

Bhandari (2005) has carried out a study on the topic f “Inventory Management and Control: A Case Study of Royal Drugs Limited.” The main objectives of the study were to analyze present position of inventory management other specific objectives were to assess the techniques being employed to manage the inventory by this enterprise and to assess the types of inventory maintained in this enterprise. She used descriptive and analytical research design. Her findings were that, required raw materials for the production of different types of drugs was imported by the company from India, China and other third world countries on global tender agreement. The company has purchased raw materials more then requirement for the

company. The value of closing inventory of raw materials was increasing from year to year. The company has not determine the re-order level, maximum, minimum stock level. The company has prepared purchase budget of raw materials but it is highly differ from the actual purchase. So, she suggested that purchase plan should be prepared of different types of raw materials with proper co-ordination among planning, purchasing, stocking, production, marketing and sales department to avoid the excessive investment on inventory. Selective inventory model (ABC) should be apply by the company for control the inventory in the store. Minimum, maximum, ROL for each types of material should be fixed by the company to avoid the over stocking of different types of materials. She also recommended that, the frequent change in top level management create the unstable environment in the company, which leads the company backwards be professionalized.

2.3 Research Gap

Research gap is the difference between previous works done and the present research work. There are various studies carried on inventory management of public limited companies. Most of the studies indicate that the inventories management in Nepal have not followed a sound principle of inventories policies and its management.

This study tries to explore the determinants of inventory management of Unilever Nepal Limited with current year data. Further this study has been helpful to the interested groups of the selected companies. At last this study has been different from the previous in term of sample, companies data presentation and analysis.

CHAPTER III

RESEARCH METHODOLOGY

Research methodology is the process of arriving at the solution of a problem through a planned and systematic dealing with the collection, analysis and interpretation of the facts and figures. The objectives of this study are to analyze the inventory management of Unilever Nepal Limited.

For the purpose of achieving the objectives, the following research methodology has been proposed to follow which includes research design, population and sample, nature and sources of data, data gathering procedure, tools and techniques for data analysis and limitation of the methodology.

3.1 Research Design

Research design is a framework that keeps the researcher in a particular track. “A research design is the arrangement of conditions for the collection and analysis of the data in a manner that aims to combine relevance to the research purpose with economy procedure” (Kothari, 1990:39). Research design is the plan, structure and strategy for investigation of the facts in order to arrive at a conclusion. This study is entitled, “Inventory management” of Unilever Nepal Limited. Only material collection consumption and inventory position of product groups are variables under the study. The study is based on case study research design. In this respect, the study has followed descriptive as well as analytical research design.

3.2 Population and Sample

Public enterprises in Nepal has been established in various sectors like manufacturing sector, trade sector, public utility and social sector, financial insurance sectors etc for the overall development of the country. In Nepal 64 public enterprises have been established during the period of B.S. 2013 to B.S. 2047. But, after the restoration of democracy more than 15 public

enterprises have been privatized for achieving the all round economic development of the private sector in the operating of such enterprises. All public enterprises, which belongs to public utility and social sector has been selected as population. The researcher has used to convenience sampling method. This study is a case study. So, only one organization is selected for research. Therefore, total population and sample size are not mentioned.

3.3 Nature and Source of Data

Primary and Secondary data has been used in this study. Primary data based on personal interviews as well as unstructured dialogues and discussion with staff of Unilever Nepal Limited. While secondary data has been collected from the following sources:

-) Previous studies and reports.
-) Published and unpublished documents related ULL.
-) Books articles, magazines and official records of ULL.
-) Website:<http://www.nepalstock.com>.

3.4 Data Collection Procedure

The secondary data are directly obtained from various sources mentioned above for the purpose of data analysis are taken from officials records, websites. The researcher had to visit the head office of Unilever Nepal Limited and get data from the records.

For primary information, with a view of collecting the additional information, informal interviews with the officials have been taken. All the gathered data have been used according to need and requirement of the study.

3.5 Tools and Techniques for Data Analysis

Inventory management is the major function of general management. In order to achieve the organizational goal, these is a need of effective inventory management system. In this study, the bibliography cards have been prepared first on the basis of available literature, formulas, reports and data. Then the accumulated literature, reports and data were reviewed and tabulated

accordingly with the objectives. To analyze the collected facts and figures, various accounting tools are used for effectiveness of inventory management. The techniques included are statistical tools, such as percentage, graphs, Karl Pearson coefficient and correlation and accounting or financial tools as well as inventory management techniques such as EOQ, Inventory turnover ratio, Different stock levels and ABC analysis, are applied in this study.

3.5.1 Statistical Tools

In this study, statistical tools such as percentage coefficient of correlation have been used.

Coefficient of correlation

Correlation is defined as the relationship between two variables. In the case of highly correlated variables, the effect on one variable may have effect on other correlated variable. Under this topic, Karl Pearson's coefficient has been used to find out the relationship between the different variables. The formula for computing Pearson's correlation coefficient (r) using direct method is as follows:

$$r = \frac{N\phi XY Z\phi X.\phi Y}{\sqrt{N\phi X^2 Z(\phi X)^2} \cdot \sqrt{N\phi Y^2 Z(\phi Y)^2}}$$

Where,

Y = Dependent Variable

X = Independent Variable

r = Correlation coefficient

T-test

When the sample size (n) is less than 30 and the standard deviation is not known, the test statistic which is applied in case of small samples is called t-test. The test statistic is as follows:

$$T = \frac{\bar{X} - \mu}{\frac{s}{\sqrt{n}}} = \frac{\bar{X} - \mu}{\frac{\sqrt{\frac{\sum (Z_i - \bar{Z})^2}{n-1}}}{\sqrt{n}}}$$

Where,

r = correlation coefficient

n = sample size

3.6 Limitation of the Methodology

As started earlier, this study is particularly concerned with the inventory management of ULL. So, this study covers the financial aspect specially inventory management of ULL. Unilever Nepal Limited has been produced product or diversified product group to meet every need of people every where but this study only deals with the corporate product groups namely, detergent, toilet soap, personal products, scourers, soft noodles, laundry soaps, tea and vanaspati ghee. So, this study was limited within the jurisdiction of ULL.

Different models, tools and techniques which are used for data collection in the research work are not completely free from the criticisms. So, it also imposes to draw the line of limitation. Finally, the different tools and techniques are used to analyze the collected data, which are based on certain assumption. The result of the study is based on the using of given tools and techniques of data analysis.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

The main objective of this study is to examine in present practices of inventory management system in ULL. To achieve the said objective, collected data are analyzed in this chapter by applying inventory management tools and techniques.

On the basis of official recorded data of ULL, the researcher has tried to explain the existing problem of inventory management and cost of system. The researcher had made analysis and diagnosis of the collected data to provide the suggestions and recommendation to the ULL.

4.1 Purchasing Procedure Practice in Unilever Nepal Limited

Purchasing is the first important function of inventory management in any manufacturing company. So, ULL also requires different types of raw material such as oils, lauric acid, caustic soda, sorbitol, salt, palm, fattyacid, sulphuric acid, galaxy, chire, clay etc. for the production of different types of products.

ULL needs regular supply of different types of raw materials and WIP materials (soap, noodles) for the continuous production operation. Required raw materials for the factory are purposed by using following purchasing procedures.

4.1.1 Collection of Requisition

Purchasing manger of purchasing department of ULL collects the purchase requisition slip from the store department for all items.

4.1.2 Decision for Purchase

When the purchase requisition is received by the purchasing manager, then he decides what, when and how much to buy.

The level of purchasing of raw materials directly affects the investment on inventory and cost associated with inventory which ultimately affect the profitability rate of the company. So, the company should determine appropriate purchase quantity of raw materials to minimize the investment on inventory and cost associated with it. To cope with this situation the company may apply the EOQ model to determine the appropriate purchase quantity of material. But in ULL, EOQ model of inventory management is not in practice.

4.1.3 Selection of Suppliers

Unilever Nepal Limited is a subsidiary company of Hindustan Level Ltd. (HLL) so, the requirement of all materials is purchased from Hindustan Lever Ltd. of India. Therefore, ULL has adopted centralized purchasing procedure.

4.1.4 Purchase order

In case of centralized purchasing, ULL purchasing department prepares orders and sends to the HLL to supply a specific quality and quantity of materials at the stipulated terms at the time and place mentioned.

4.1.5 Receiving and Inspection of Materials

When materials are arrived then they are received and checked by receiving clerk against the order placed by the purchasing department to vendor. After proper checking materials are delivered to the store department for checking, if any discrepancy is found regarding the quality and quantity, it is immediately sent to the purchasing department to adjust the discrepancy. Since the company is purchasing raw materials from HLL, there are no discrepancy regarding quality and quantity.

4.2 Store Control Device

The raw materials are received by the purchasing department then all items received by the purchasing department should be passed onto store for protection against deterioration and pilferage. To minimize the cost of holding

materials in store all companies generally use different types of controlling devices like Bin cards and Store ledger. But the ULL uses bin cards. A bin card makes a record of the receipt and issues of materials. A bin card is kept for each item store carries. These cards are maintained by the storekeeper and storekeeper is accountable for any difference between the physical stock and balance shown in bin card. These cards are used not only for recording receipts and issues of stores but also for assist the storekeeper to control the stock.

For each item of store, minimum quantity, maximum quantity and ordering quantity are stated on the card. By seeing the bin card the storekeeper can send the material requisition for the purchase of materials in time.

4.3 Issuing and Pricing

The pricing of the issues can be determined by value as per weighted average method at the lower cost or market price.

4.4 Present Inventory Position of ULL

4.4.1 Relation between Raw Material and total inventory

Table 4.1

Proportion of Raw Material on total inventory

Fiscal Year	Raw Material (Rs.) (in million)	Inventory (Rs.) (in million)	% of Raw Material on total inventory
2058/59	88.11	172.20	51.20
2059/60	60.70	132.40	46
2060/61	134.70	293.93	46
2061/62	64.06	144.46	44.3
2062/63	59.20	126.11	47
2063/64	95.28	184.22	51.72
2064/65	124.53	229.76	54.20
2065/66	92.94	256.17	36.28
Average	89.94	192.40	47.10

Source : Annual Report of ULL

Note : % of RM on inventory = $\frac{\text{RM}}{\text{Inventory}}$

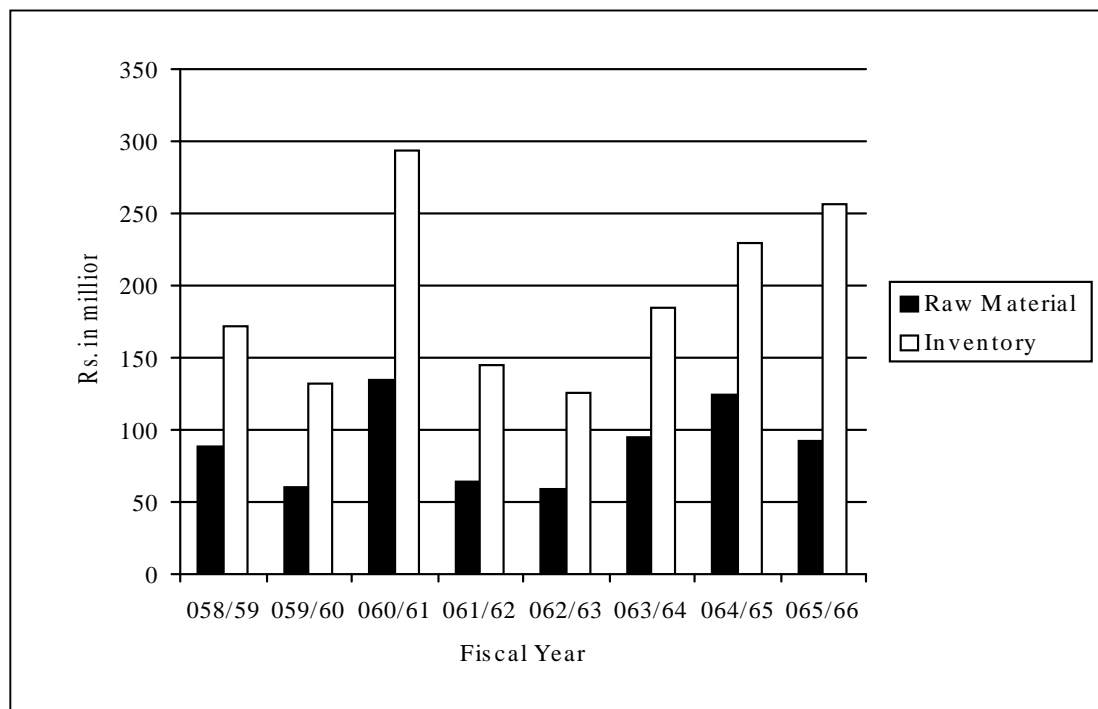
$$: \text{Average} = \frac{\text{sum of the figure of overall study period}}{\text{No. of Period}}$$

From the table 4.1, it is observed that, the Raw Material on total inventory during the study period is 51.20% in the FY 058/59, 46% in the FY 059/60, 46% in the FY 060/61, 44.3% in the FY 061/62, 47% in the FY 062/63, 51.72% in the FY 063/64, 54.20 in the FY 064/65, 36.28% in the FY 065/66.

Similarly, average inventory in overall study period is Rs.192.40 million, average inventory of Raw Material in overall study period is Rs.89.94 million and average percentage of Raw material on total inventory in overall study period is 47.10%.

The graphic presentation of level of Raw Material on total inventory is as follows:

Figure 4.1



From the analysis, it is observed that raw material consumption in the company is erratic. The fluctuation in stock of raw material during the study period is very high. Defective purchasing policy and poor planning of raw material may be responsible factors for such fluctuation.

4.4.2 Relation between WIP material and total inventory

Table 4.2

Proportion of WIP material on total inventory

Fiscal Year	WIP (Rs.) (in million)	Total inventory (Rs.) (in million)	% of WIP on Total inventory
2058/59	5.50	172.20	3.20
2059/60	8.20	132.40	6.20
2060/61	12.40	293.93	4.22
2061/62	6.30	144.46	4.36
2062/63	4.02	126.11	3.20
2063/64	5.52	184.22	3
2064/65	3.49	229.76	1.52
2065/66	7.67	256.17	3
Average	6.64	192.41	3.59

Source : Annual Report of ULL.

Note,

$$\% \text{ of WIP material on total inventory} = \frac{\text{WIP materials}}{\text{Total inventory}}$$

$$\text{Average} = \frac{\text{sum of the figure of overall study period}}{\text{No. of period}}$$

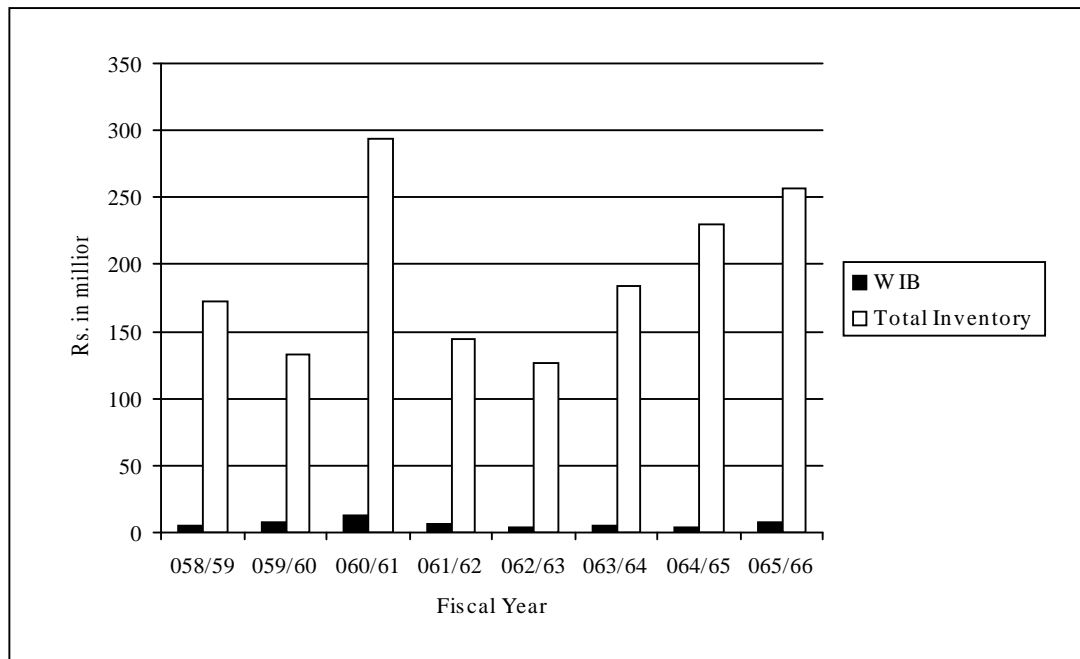
ULL has been using soap, noodles to produce the final product. The smaller portion of WIP on total inventory is used by the company.

From the table 4.2, it is observed that the proportion of WIP material on total inventory during the study period in 3.20% in the FY 058/59, 6.20% in the FY 059/60, 4.22% in the FY 060/61, 4.36% in the FY 061/62, 3.20% in the FY 062/63, 3% in the FY 063/64, 1.52% in the FY 064/65, 3% in the FY 065/66.

Similarly, the average percentage of WIP material on total inventory in overall study period in 3.59%. Similarly, average inventory overall study period is Rs.192.41 million, average inventory of WIP materials in overall study period is Rs.6.64 million.

The graphic presentation of level of WIP materials on total inventory is as follows:

Figure 4.2



From the analysis, it is observed the WIP materials of the company is fluctuating during the study period. Such fluctuation in inventory position is not considered as good from the point of view of inventory management. Fluctuation is demand and sales of company products, lack of appropriate inventory policy and ineffective demand forecast are the main reasons of such fluctuation.

4.4.3 Relation between finished goods and total inventory

Table No. 4.3

Proportion of finished goods on total inventory

Fiscal Year	Finished goods (Rs.) (in million)	Total inventory (Rs.) (in million)	% of finished goods on total inventory
2058/59	44.80	172.20	26
2059/60	20.70	132.40	15.60
2060/61	87.60	293.93	29.80
2061/62	41.30	144.46	28.60
2062/63	44.50	126.11	35.30
2063/64	55.50	184.22	30.13
2064/65	73.83	229.76	32.13
2065/66	116.35	256.71	45.32
Average	60.57	192.47	30.36

Source : Annual Report of ULL.

Note:

$$\text{Average} = \frac{\text{sum of the figure of overall study period}}{\text{No. of period}}$$

$$\% \text{ of finished goods on total inventory} = \frac{\text{finished goods}}{\text{Total inventory}}$$

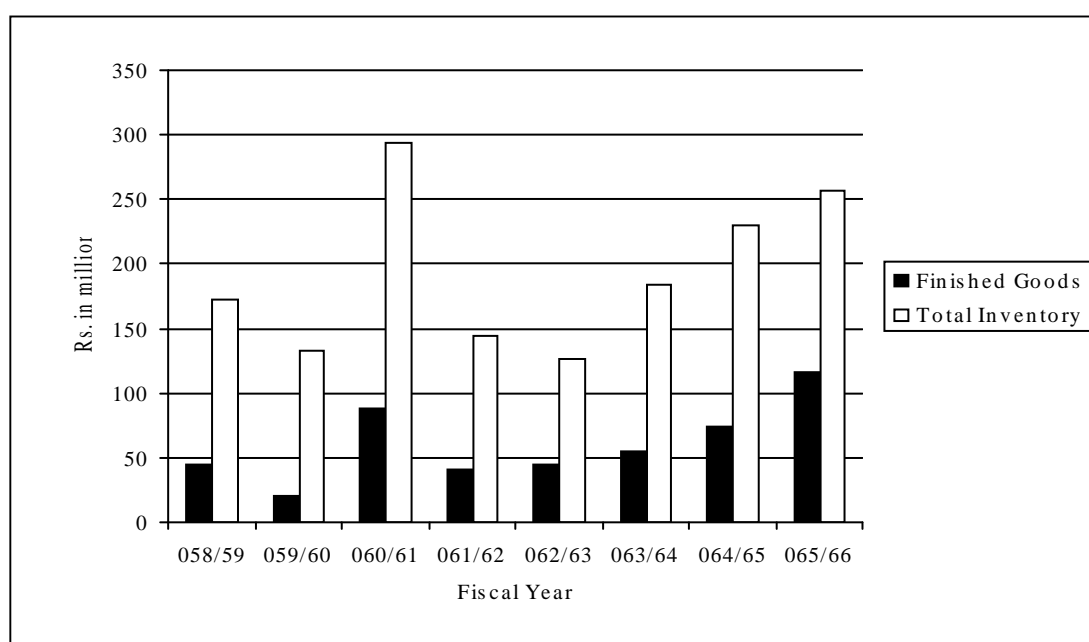
ULL has been production different kinds of products and product groups namely, detergents, toilet soap, oral care, scourers, skin creams, laundry soaps, hair care etc.

From the table 4.3, it is observed that the portion of finished goods on total inventory during the study period in 26% in the FY 058/59, 15.60% in the FY 059/60, 29.80% in the FY 060/61, 28.60% in 061/62, 35.50% in the FY 062/63, 30.13% in the FY 063/64, 32.13% in the FY 064/65, 45.30% in the FY 065/66.

When as the average percentage of finished goods inventory in total inventory in overall study period is 30.36%. Similarly, average inventory is overall study period is Rs.192.47 million, average inventory of finished goods in overall study period is Rs.60.57 million.

The graphic presentation of level of finished goods on total inventory is as follows:

Figure 4.3



From the analysis, it is absorbed that the production rate was increasing from the FY 060/61 to 064/65. In the period contribution raw material and packaging material was also in increasing trend. Fluctuation of demand and sales of the company are the main reason of such situations.

4.4.4 Proportion of stores and spare parts on total inventory

Table 4.4

Proportion of stores and spare parts on total inventory

Fiscal Year	Stores and spare parts (Rs.) (in million)	Total inventory (Rs.) (in million)	% of stores and spare parts on total inventory
2058/59	11.30	172.20	6.56
2059/60	16.07	132.40	12.14
2060/61	16.98	293.93	5.78
2061/62	11.50	144.46	7.96
2062/63	6.90	126.11	5.47
2063/64	6.15	184.22	3.34
2064/65	4.52	229.76	1.97
2065/66	6.98	256.17	2.72
Average	10.05	192.41	5.74

Source : Annual Report of ULL.

Note:

$$\text{Average} = \frac{\text{sum of the figure of overall study period}}{\text{No. of period}}$$

$$\% \text{ of stores and spare parts on total inventory} = \frac{\text{stores and spare parts}}{\text{Total inventory}}$$

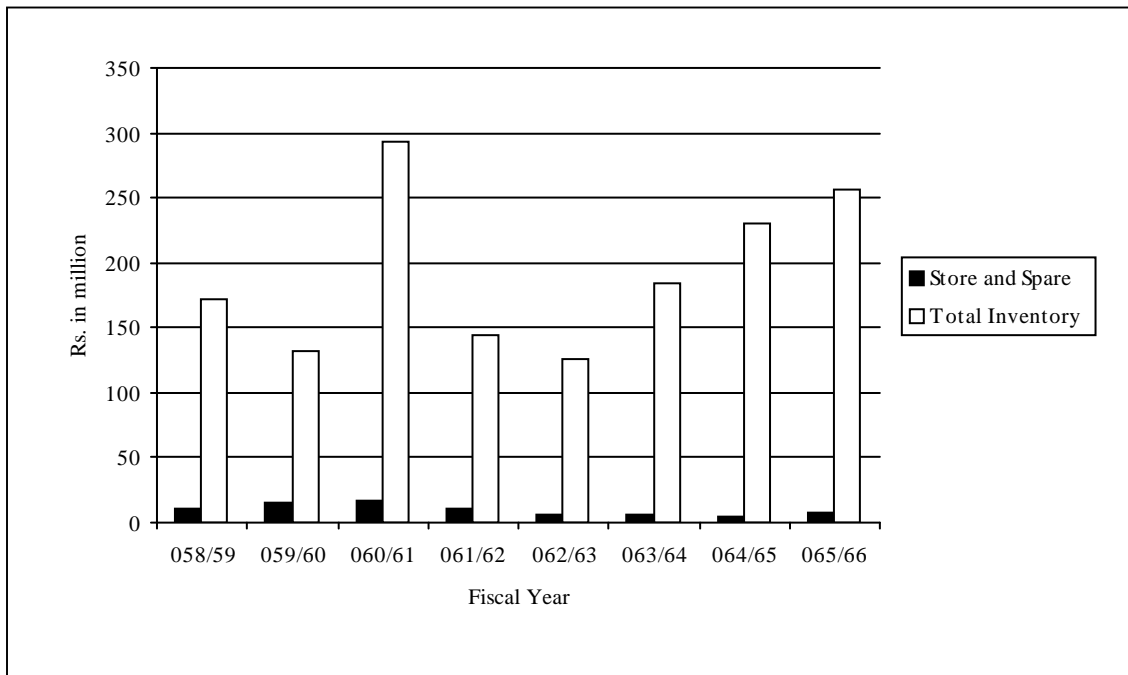
Stores and spare parts are not directly entered production and it facilitates the smooth production process. Store and spare parts are comparatively less and don't require significant investment.

From the table 4.4, it is observed that the portion of stores and spare parts on total inventory during the study period is 6.56% in the FY 058/59, 12.14% in the FY 059/60, 5.78% in the FY 060/61, 7.96% in the FY 061/62, 5.47% in the FY 062/63, 3.34% in the FY 063/64, 1.97% in the FY 064/65, 2.72% in the FY 065/66.

Where as, the average percentage of stores and spare parts on total inventory during the study period is 5.74%. Similarly, average inventory in overall study period is Rs.192.41 million, average inventory of stores and spare parts in overall study is Rs.10.05 million.

The graphic presentation of level of stores and spare parts on total inventory is as follows:

Figure 4.4



It is observed that, the quantity of stores and spare parts used by the company is irregular during the study period. Since the company's production is totally dependent on stores and spare parts, it obviously fluctuates over the study period.

4.4.5 Position and Relation of Raw Material and finished goods

Table 4.5

Position and Relation of Raw Material and finished goods

Fiscal Year	Raw Materials (Rs.) (in million)	Finished goods (Rs.) (in million)	% deviation on average raw material	% deviation on average finished goods
2058/59	88.11	44.80	(2.03)	(26.04)
2059/60	60.70	20.70	(32.51)	(65.83)
2060/61	134.70	87.60	49.77	44.62
2061/62	64.06	41.30	(28.77)	(31.81)
2062/63	59.20	44.50	(34.18)	(26.54)
2063/64	95.20	55.50	5.93	(8.37)
2064/65	124.53	73.83	38.46	21.89
2065/66	92.94	116.35	3.33	92.09
Average	89.94	60.57		

Source: Annual Report of ULL.

Note:

% deviation on average raw material =

$$\frac{\text{raw materials in given fiscal year} - \text{average raw materials in overall study period}}{\text{average raw materials in overall study period}}$$

% deviation on average finished goods =

$$\frac{\text{finished goods in given fiscal year} - \text{average finished goods in overall study period}}{\text{average finished goods in overall study period}}$$

The table 4.5 shows that the position of raw materials and finished goods from the FY 058/59 to 065/66. The table 4.5, it is observed that the average value of raw material is Rs.59.94 million and the average of value of finished goods is Rs.60.57 million.

Table 4.5 shows the percentage deviation of average raw materials and finished goods over the study period.

The highest positive deviation from the average raw materials is 49.77 percent in the FY 060/61 and the highest positive deviation from average finished goods is 92.09 percent in the FY 065/66. The highest negative deviation from an average raw material is (34.18) percent in the FY 062/63 and the highest negative deviation from an average finished goods is (65.83) percent in 059/60.

The analysis shows that the investment on RM and finished goods was fluctuating during the study period. This indicates the company has not been following and system of keeping inventory as well as production.

The correlation between raw materials and finished goods has been observed to be 0.34, i.e. positive, which is shown in Appendix-I. Therefore, there was positive and low degree of correlation between RM and FG.

4.4.6 Relation between Sales and Inventory

The relationship between sales and inventory is shown by the inventory turnover ratio. It indicates that how fast the goods are produced or sold from the inventory. High inventory ratio indicates the good inventory management. A low inventory turnover implies excessive inventory levels that warranted by production and sales activities with the help of this ratio, management can assess whether stock has been more efficiently used or not. The ULL trend of inventory turnover ratio is given in table no. 4.6.

Table 4.6
Inventory turnover ratio

(Rs. in million)				
Fiscal Year	Sales (Rs.)	Inventory (Rs.)	Inventory turnover ratio	% deviation on average inventory turnover ratio
2058/59	1503.69	172.20	8.73	6.20
2059/60	1728.63	132.40	13.06	58.89
2060/61	1540.99	293.93	5.24	(36.25)
2061/62	1236.05	144.46	8.56	4.14
2062/63	1244.73	126.11	9.87	20.07
2063/64	1524.90	184.22	8.28	0.73
2064/65	1481.56	229.76	6.45	(21.53)
2065/66	1434.94	256.17	5.60	(31.87)
Average	1461.93	192.41	8.22	

Source : Annual Report of ULL.

Note:

$$: \text{Inventory turnover ratio} = \frac{\text{sales}}{\text{inventory}}$$

: The figure in brackets is negative

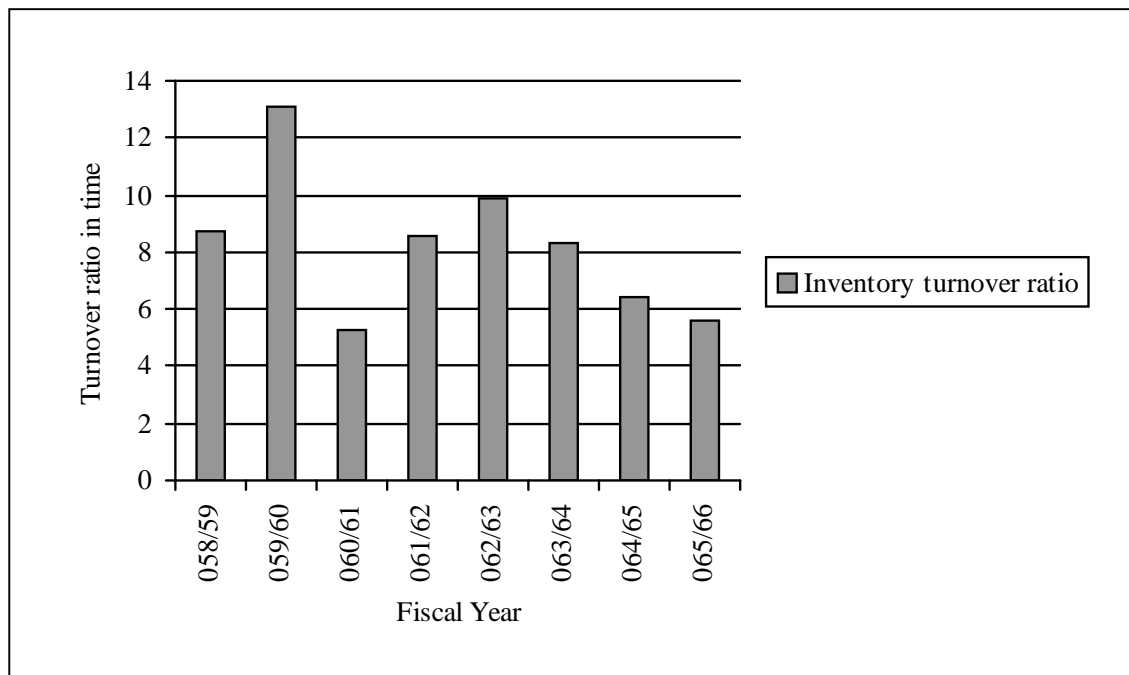
: % of deviation on average inventory turnover ratio =

$$\frac{\text{Inventory turnover in fiscal year} - \text{average inventory turnover ratio in overall study period}}{\text{average inventory turnover ratio in overall study period}}$$

From the table 4.6, it is observed that in the FY 058/59 the inventory turnover ratio is highest i.e. 13.06 times and in this year the highest positive deviation from the average inventory turnover ratio is 58.89 percent. So, in this year, how level inventory is kept in the company due to fast consumption and sales of raw materials and finished goods. In the FY 060/61, the inventory turn over ratio is the lowest i.e. 5.24 times. Similarly, the highest negative turnover ratio is (36.25) percent in the FY 060/61. Which indicates the slow consumption of raw materials, WIP materials and low sales of finished goods.

The graphic presentation of inventory turnover ratio is as follows:

Figure 4.5



The correlation between inventory and sales is 0.21 which is shown in Appendix-II.

Test of significance of correlation coefficient.

To test the significance of correlation of coefficient 'T' statistic can be used. Here sample size is less than 30. So, the t-test is appropriate.

Here, $r = 0.21$

$$T \text{ statistic} = r \sqrt{\frac{n-2}{1-r^2}}$$

Null Hypothesis (H_0) = 0 (i.e. 'r' is not significant)

Alternative Hypothesis (H_1) $\neq 0$ (i.e. 'r' is significant)

Now, test statistic

$$\begin{aligned} T &= r \sqrt{\frac{n-2}{1-r^2}} \\ &= 0.21 \sqrt{\frac{8-2}{1-0.21^2}} \\ &= 0.21 \sqrt{\frac{6}{0.956}} \\ &= 0.52 \end{aligned}$$

Critical Value

Now tabulated value of 't' for (n-2) i.e. 8-2=6 degree of freedom for two tail test at 5% level of significance is 2.45.

Decision

Since collected /t/ is less than tabulated of /t/ at 6 degree of freedom at 5% level of significance. The reject alternative hypothesis (H_1) which indicate that correlation coefficient between variables are not significant between variables are not significance of 'r' is not significant.

4.4.7 Relation between inventory and net profit

Table No. 4.7

Relation between inventory and net profit

(Rs. in million)

Fiscal Year	Inventory (Rs.)	% Deviation on average inventory	Net Profit (Rs.)	% Deviation on average net profit
2058/59	172.20	(10.50)	119.03	(5.86)
2059/60	132.40	(31.19)	120.56	(4.65)
2060/61	293.93	52.76	68.04	(46.19)
2061/62	144.46	(24.92)	42.60	(66.31)
2062/63	126.11	(34.46)	93.20	(26.29)
2063/64	184.22	(4.26)	140.78	11.34
2064/65	229.76	19.41	189.19	49.63
2065/66	256.17	33.14	238.15	88.35
Average	192.41		126.44	

Source : Annual Report of ULL.

Note:

: The figure in brackets is negative.

: % Deviation on average inventory =

$$\frac{\text{inventory in given fiscal year} - \text{average inventory in overall study period}}{\text{average inventory in overall study period}}$$

: % Deviation on average net profit =

$$\frac{\text{net profit in given fiscal year} - \text{average net profit in overall study period}}{\text{average net profit in overall study period}}$$

The table 4.7 shows the relation between inventory and net profit from the FY 058/59 to 065/66. From the table 4.7, it is observed that the average inventory during the study period is Rs.192.41 million and the average net profit during the study period is Rs.126.44 million. Similarly, the above table shows the percentage deviation of inventory and net profit over the study period. The highest positive deviation from the inventory is 52.76 percent in the FY 060/61 and the highest positive deviation from the average net profit is 88.35 percent in the FY 065/66. Similarly, the highest negative deviation from the average inventory is (34.46) percent in the FY 062/63 and the highest

negative deviation from the average net profit is (66.31) percent in the FY 061/62.

From the analysis it is observed that inventory and net profit were fluctuating the study period. Therefore there is no specific policy of investment on inventory and inventory management system.

The correlation between inventory and net profit is 0.37 which is show in Appendix-III.

Test of significance of correlation coefficient

To test the significant of correlation of coefficient 'T' statistic can be used. Here sample size is less than 30. So, the t-test is appropriate.

Here, $r = 0.37$

Null Hypothesis (H_0) = 0 (i.e. 'r' is not significant)

Alternative Hypothesis (H_1) $\neq 0$ (i.e. 'r' is significant)

Now, Test statistic

$$\begin{aligned} T &= r \sqrt{\frac{n-2}{1-r^2}} \\ &= 0.37 \sqrt{\frac{8-2}{1-0.37^2}} \\ &= 0.37 \sqrt{\frac{6}{0.8631}} \\ &= 0.37 \times 2.6366 \\ &= 0.97 \end{aligned}$$

Critical Value

Tabulated value of 't' for (n-2) i.e. 8-2=6 degree of freedom for two test at 5% level of significance is 2.45.

Decision

Since the calculated value of /t/ is less then tabulated value of /t/ at 6 degree of freedom at 5% level of significant. The reject alternative Hypothesis

(H₁) which indicate the correlation coefficient between variables are not significant or 'r' is not significant.

4.4.8 Relation between sales and net profit

Table No. 4.8

Relation between sales and net profit

(Rs. in million)

Fiscal Year	Sales (Rs.)	% Deviation on average sales	Net Profit (Rs.)	% Deviation on average net profit
2058/59	1503.69	2.86	119.03	(5.86)
2059/60	1728.63	18.24	120.56	(4.65)
2060/61	1540.99	5.41	68.04	(46.19)
2061/62	1236.05	(15.45)	42.60	(66.31)
2062/63	1244.73	(14.86)	93.20	(26.29)
2063/64	1524.90	4.31	140.78	11.34
2064/65	1481.56	1.34	189.19	49.63
2065/66	1434.94	(1.85)	238.15	88.35
Average	1461.93		126.44	

Source: Annual Reports of ULL.

Note :

: The figure in brackets is negative.

: % Deviation on average sales =

$$\frac{\text{sales in given fiscal year} - \text{average sales in overall study period}}{\text{average sales in overall study period}}$$

: % Deviation on average net profit =

$$\frac{\text{net profit in given fiscal year} - \text{average net profit in overall study period}}{\text{average net profit in overall study period}}$$

The table 4.8 shows the relation between sales and net profit for the FY 058/59 to 065/66. From the above table, it is observed that the average sales and net profit during the study period are Rs.1461.93 million and Rs.126.44 million respectively. Similarly, the above table shows the percentage deviation of sales and net profit over the study period. The highest positive deviation from the average sales is 18.24% in the FY 059/60, and the highest positive deviation from an average net profit is 88.35% in the FY 065/66.

Similarly, the highest negative deviation from an average sales is (15.45) percent in the FY 061/62 and the highest negative deviation from an average net profit is (66.31) percent in the FY 061/62.

From the table 4.8 shows that the position of sales is Rs.1503.69 million and net profit Rs.119.01 million in the RY 058/059, sales Rs.1728.63 million and net profit Rs.120.56 in the FY 059/60, sales Rs.1540.99 million and net profit Rs.68.04 in the FY 060/61, sales Rs.1236.05 million and net profit Rs.42.60 million in the FY 061/62, sales Rs.1244.73 million and net profit Rs.93.20 in the FY 062/63, sales Rs.1524.90 million and net profit Rs.140.78 million in the FY 063/64, sales Rs.1481.56 million and net profit Rs.189.19 million in the FY 064/65, sales Rs.1434.94 and net profit Rs.238.15 million in the FY 065/66.

The correlation between sales and net profit is 0.26 which is shown in Appendix-IV.

Test of significance of correlation coefficient.

To test the significant of correlation of coefficient 'T' statistic can be used. Here sample size is less than 30. So, the t-test is appropriate.

Here $r = 0.26$

Null Hypothesis (H_0) = 0 (i.e. 'r' is not significant)

Alternative Hypothesis (H_1) $\neq 0$ (i.e. 'r' is significant)

Test statistic

$$\begin{aligned} T &= r \sqrt{\frac{n-2}{1-r^2}} \\ &= 0.26 \sqrt{\frac{8-2}{1-0.26^2}} \\ &= 0.26 \sqrt{\frac{6}{0.932}} \\ &= 0.26 \times 2.537 \\ &= 0.65 \end{aligned}$$

Critical value

The tabulated value of /t/ for (n-2) i.e. 8-2=6 degree of freedom for two tail test at 5% level of significance is 2.45.

Decision

Since calculated value of /t/ is less than tabulated value of /t/ at 5% level of significance. The reject alternative Hypothesis (H_1) which indicate the correlation coefficient between variables are not significant or 'r' is not significant.

4.5 Inventory management and control techniques

4.5.1 Economic order quantity calculation

The optimum level of raw material has been determined by the application of "Economic Order Quantity" model.

FY 2058/59

Raw materials [chemicals and perfumes]

One the basis of company's records, the following data are available.

Formula Method

Annual requirement (A) = 21950 tons

Ordering cost per order (O) = Rs.173733

Carrying cost per tons (C) = Rs.731 per tons

By applying EOQ formula

$$\begin{aligned} \text{EOQ} &= \sqrt{\frac{2AO}{C}} \\ &= \sqrt{\frac{2 \times 21950 \times 173733}{731}} = \sqrt{10433486.59} = 3230 \text{ tons} \end{aligned}$$

i. $\text{EOQ} = 3230 \text{ tons}$

ii. $\text{No. of order} = \frac{\text{Annual Requirement}}{\text{EOQ}}$

$$= \frac{21950}{3230} = 6.79 \text{ times} = 7 \text{ times (approx)}$$

From the calculation, the EOQ is 3230 tons under the formula method, which minimizes the total ordering and carrying cost with no. of order 7 times per year. Which is also clear the following tabular method.

iii. Trial and Error Approach

Table 4.9

Trial and Error Approach of EOQ (tabular Method) of 2058/59

No. of order	Order size (tons)	Average inventory (tons)	Total carrying cost (Rs.)	Total ordering cost (Rs.)	Total Cost (Rs.)
1	21950	10975	8022725	173733	8196458
3	7317	3658	2673998	521199	3195197
6	3658	1829	1336999	1042398	2379397
7	3136	1568	1146208	1216131	2362339
9	2439	1220	891820	1563597	2455417

Source : Annual Report of ULL.

Note :

$$\text{Order size} = \frac{\text{Annual requirement}}{\text{No. of order}}$$

$$\text{Average inventory} = \frac{\text{order size}}{2}$$

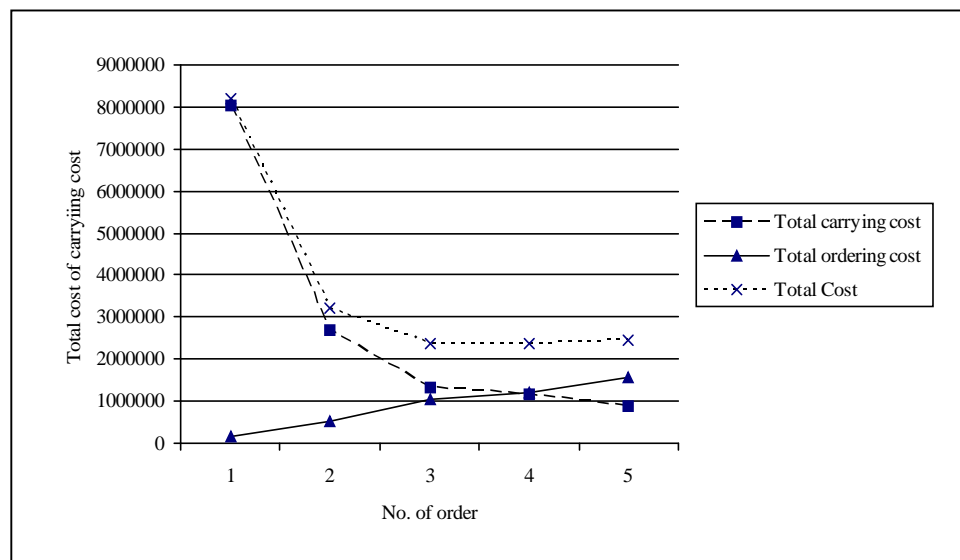
$$\text{Total carrying cost} = \text{Average inventory} \times \text{carrying cost per tons}$$

$$\text{Ordering cost} = \text{no. of order} \times \text{ordering cost per order}$$

$$\text{Total cost} = \text{Total carrying cost} + \text{Total ordering cost}$$

Graphic Presentation of EOQ is as follows:

Figure No. 4.6



The table 4.9 and figure no. 4.6 shows the minimum carrying cost and ordering cost, which minimize the total cost. OX axis denotes the no. of orders and OY axis denotes the total cost of ordering and carrying. Ordering cost is going upward and carrying cost is going downward. When order size is increasing, the carrying cost is decreasing and ordering cost is increasing.

The table shows that the carrying cost is decreasing and ordering cost is increasing with the increasing no. of order. The table 4.9 show the minimum total cost of RM is Rs.2362339. Where the total carrying cost is Rs.1146208 and total ordering cost is Rs.1216131 with the number of order is 7 times per year. So, it is clear that, if the company wants to minimize total cost of inventory of RM it should order 7 times during the year.

So, it becomes clear from formula, tabular method as well as graphical method, that the company should order 3230 tons, with 7 times during the year.

4.5.2 Economic Order Quantity of RM on FY 2059/60

Annual Requirement (A) = 24823 tons

Ordering cost per order (O) = Rs.198922

Carrying cost per tons (C) = Rs.1427 per tons

By applying EOQ formula,

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 24823 \times 198922}{1427}} = 2631 \text{ tons}$$

i. EOQ = 2631 tons

ii. No. of order = $\frac{\text{Annual Requirement}}{\text{EOQ}}$
 $= \frac{24823}{2631} = 9.43 \text{ times} = 9 \text{ times (approx.)}$

From the calculation, the EOQ is 2631 tons under the formula method. Which minimize the total ordering and carrying cost with the no. of order 9 times per year. Which is also clear the following tabular method.

iii. Trial and Error Approach

Table 4.10

Trial and Error Approach of EOQ (Tabular Method) of 2059/60

	Order size (tons)	Average inventory (tons)	Total carrying cost (Rs.)	Total ordering cost	Total cost
1	24823	12412	17711924	198922	17910846
3	8274	4137	5903499	596766	6500265
7	3546	1773	2530071	1392454	3922525
9	2758	1379	1967833	1790298	3758131
10	2482	1241	1770907	1989220	3760127

Source : Annual Report of ULL.

The table 4.10 show that the carrying cost is decreasing and ordering cost is increasing with the increasing number of order. The table shows the minimum total cost of RM is Rs.3758131. Where the total carrying cost is Rs.1967833 and total ordering cost is Rs.1790298 with the number of order 9 times per year. So, it is clear that, if the company wants to minimize total cost of inventory of RM it should order 9 times during the year.

So, it becomes clear from formula as well as tabular method that the company should order 2631 tons with 9 times during the year.

4.5.3 Economic Order Quantity of RM on FY 2060/61

Annual Requirement (A) = 20921 tons

Ordering cost per order (O) = Rs.163378

Carrying cost (C) = Rs.1423 per tons

By applying the EOQ formula

$$\begin{aligned} \text{EOQ} &= \sqrt{\frac{2AO}{C}} \\ &= \sqrt{\frac{2 \times 20921 \times 163378}{1423}} \\ &= 2192 \text{ tons} \end{aligned}$$

i. EOQ = 2192 tons

ii. No. of orders = $\frac{\text{Annual Requirement}}{\text{EOQ}}$

$$= \frac{20921}{2192} = 9.54 \text{ times} = 10 \text{ times (approx.)}$$

From the calculation, the EOQ is 2192 tons under the formula method, which minimize the total ordering and carrying cost with the no. of order 10 times per year. Which is also clear the following tabular method.

iii. Trial and Error Approach

Table 4.11

Trial and Error Approach of EOQ (Tabular Method) of 2060/61

No. of order	Order size (tons)	Average inventory (tons)	Total carrying cost (Rs.)	Total ordering cost (Rs.)	Total cost (Rs.)
1	20921	10461	14886003	163378	15049381
5	4184	2092	2976916	816890	3793806
7	2989	1494	2125962	1143646	3269608
10	2092	1046	1488458	1633780	3122238
11	1902	951	1353273	1797158	3150431

Source: Annual Report of ULL.

The table 4.11 show that the carrying cost is decreasing and ordering cost is increasing with the increasing number of order. The table 4.11 also shows the minimum total cost of RM is Rs.3122238. Where the total carrying cost is Rs.1488458 and total ordering cost is Rs.1633780 with the no. of order is 10 times per year. So, it is clear that, if the company wants to minimize total inventory cost of RM it should order only 10 times during the year.

So, it becomes clear from formula as well as tabular method, that the company should order 2192 tons with 10 times during the year.

4.5.4 Economic Order Quantity of RM on FY 2061/62

Annual Requirement (A) = 17665 tons

Ordering cost per order (O) = Rs.109094

Carrying cost per tons (C) = Rs.1378 per tons

By applying EOQ formula

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 17665 \times 109094}{1378}} = 1672 \text{ tons}$$

i. EOQ = 1672 tons

$$\begin{aligned} \text{ii. No. of orders} &= \frac{\text{Annual Requirement}}{\text{EOQ}} \\ &= \frac{17665}{1672} = 10.56 \text{ times} = 11 \text{ times (approx.)} \end{aligned}$$

From the calculation, the EOQ is 1672 tons under the formula method, which minimize the total ordering and carrying cost with the no. of order 11 times per year. Which is also clear the following tabular method.

iii. Trial and Error Approach

Table 4.12

Trial and Error Approach of EOQ (Tabular Method) of 2061/62

No. of order	Order size (tons)	Average inventory (tons)	Total carrying cost (Rs.)	Total ordering cost (Rs.)	Total cost (Rs.)
1	17665	8832	12170496	109094	1227590
5	3533	1767	2434926	545470	2980396
7	2524	1262	1739036	763658	2502694
11	1605	803	1106534	1200034	2306568
12	1472	736	1014208	1309128	2323336

Source : Annual Report of ULL.

The table 4.12 shows that the carrying cost is decreasing and ordering cost is increasing with the increasing number of order. The table shows the minimum total cost of RM is Rs.2306568. Where the total carrying cost is Rs.1106534 and total ordering cost is Rs.1200034 with the no. of order is 11 times per year. So, it is clear that, if the company wants to minimize total inventory cost of RM it should order only 11 times during the year.

So, it becomes clear from formula as well as tabular method, that the company should order 1672 tons with 11 times during the year.

4.5.5 Economic Order Quantity of RM on FY 2062/63

Annual Requirement (A) = 17365 tons

Ordering cost per order (O) = Rs.108472

Carrying cost per tons (C) = Rs.1123 per tons

By applying EOQ formula

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 17365 \times 108472}{1123}} = 1832 \text{ tons}$$

i. EOQ = 1832 tons

$$\begin{aligned} \text{ii. No. of order} &= \frac{\text{Annual Requirement}}{\text{EOQ}} \\ &= \frac{17365}{1832} = 9.47 \text{ times} = 9 \text{ times (approx.)} \end{aligned}$$

From the calculation, the EOQ is 1832 tons under the formula method, which minimize the total ordering and carrying cost with the no. of order 9 times per year. Which is also clear the following tabular method.

iii. Trial and Error Approach

Table 4.13

Trial and Error Approach of EOQ (Tabular Method) of 2062/63

No. of order	Order size (tons)	Average inventory (tons)	Total carrying cost (Rs.)	Total ordering cost (Rs.)	Total cost (Rs.)
1	17365	8682	9749886	108472	9858358
5	3473	1737	1950651	542360	2493011
9	1929	964	1082572	976248	2058820
10	1737	868	974764	1084720	2059484
12	1447	723	811929	1301664	2113593

Source : Annual Report of ULL.

The table 4.13 shows that the carrying cost is decreasing and ordering cost is increasing with the increasing number of order. The table 4.13 also shows the minimum total cost of RM is Rs.2058820. Where the total carrying cost is Rs.1082572 and total ordering cost is Rs.976248 with the no. of order is 9 times per year. So, it is clear that, if the company wants to minimize total inventory cost of RM it should order 9 times during the year.

So, it becomes clear from formula as well as tabular method, that the company order 1832 tons with 9 times during the year.

4.5.6 Economic Order Quantity of RM on FY 2063/64

Annual Requirement (A) = 21090 tons

Ordering cost per order (O) = Rs.108492

Carrying cost per tons (C) = Rs.1127 per tons

By applying EOQ formula

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 21090 \times 108492}{1127}} = 2015 \text{ tons}$$

i. EOQ = 2015 tons

$$\begin{aligned} \text{ii. No. of order} &= \frac{\text{Annual Requirement}}{\text{EOQ}} \\ &= \frac{21090}{2015} = 10.46 \text{ times} = 10 \text{ times (approx.)} \end{aligned}$$

From the calculation, the EOQ is 2015 tons under the formula method, which minimize the total ordering and carrying cost with the no. of order is 10 times per year. Which is also clear the following tabular method.

iii. Trial and Error Approach

Table 4.14

Trial and Error Approach of EOQ (Tabular Method) of 2063/64

No. of order	Order size (tons)	Average inventory (tons)	Total carrying cost (Rs.)	Total ordering cost	Total cost
1	21090	10545	11884215	108492	11992707
5	4218	2109	2376843	542460	2919303
7	3013	1506	1697262	759444	2456706
10	2109	1054	1187858	1084920	2272778
12	1758	879	990633	1301904	2292537

Source : Annual Report of ULL.

The table 4.14 shows that the carrying cost is decreasing and ordering cost is increasing with the increasing number of order. The table shows the minimum total cost of RM is Rs.2272778. Where the total carrying cost is Rs.1187858 and total ordering cost is Rs.1084920 with the number of order is 10 times per year. So, it is clear that, if the company wants to minimize total inventory cost of RM it should order 10 times during the year.

So, it becomes clear from formula as well as tabular method, that the company order 2015 tons with 10 times during the year.

4.5.7 Economic Order Quantity of RM on FY 2064/65

Annual Requirement (A) = 19484 tons

Ordering cost per order (O) = Rs.109090

Carrying cost per tons (C) = Rs.1170 per tons

By applying EOQ formula

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 19484 \times 109090}{1170}} = 1906 \text{ tons}$$

i. EOQ = 1906 tons

ii. No. of order = $\frac{\text{Annual Requirement}}{\text{EOQ}}$
 $= \frac{19484}{1906} = 10.22 \text{ times} = 10 \text{ times (approx.)}$

From the calculation, the EOQ is 1906 tons under the formula method which minimize the total ordering and carrying cost with the no. of order is 10 times, which is also clear from the following tabular method.

iii. Trial and Error Approach

Table 4.15

Trial and Error Approach of EOQ (Tabular Method) of 2064/65

No. of order	Order size (tons)	Average inventory (tons)	Total carrying cost (Rs.)	Total ordering cost (Rs.)	Total cost (Rs.)
1	19484	9742	11398140	109090	11507230
5	3897	1948	2279160	545450	2824610
9	2165	1083	1267110	981810	2248920
10	1948	974	1139580	1090900	2230480
12	1624	812	950040	1309080	2259120

Source: Annual Report of ULL .

The table 4.15 shows that the carrying cost is decreasing and ordering cost is increasing with the increasing no. of order. The table 4.15 also shows the minimum total cost of RM is Rs.2230480. Where the total carrying cost is Rs.1139580 and total ordering cost is Rs.1090900 with the no. of order 10 times per year. So, it is clear that, if the company wants to minimize total cost of inventory of RM it should order 10 times during the year.

So, it becomes clear from formula as well as tabular method that the company order 1906 tons with 10 times during the year.

4.5.8 Economic Order Quantity of RM on FY 2065/66

Annual Requirement (A) = 20929 tons

Ordering cost per order (O) = Rs.107375

Carrying cost per tons (C) = Rs.1135 per tons

By applying EOQ formula

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 20929 \times 107375}{1135}} = 1990 \text{ tons}$$

i. EOQ = 1990 tons

$$\begin{aligned} \text{ii. No. of order} &= \frac{\text{Annual Requirement}}{\text{EOQ}} \\ &= \frac{20929}{1990} = 10.52 \text{ times} = 11 \text{ times (approx.)} \end{aligned}$$

From the calculation, the EOQ is 1990 tons under the formula method, which minimizes the total ordering and carrying cost with no. of orders 11 times, which is also clear the following tabular method.

iii. Trial and Error Approach

Table 4.16

Trial and Error Approach of EOQ (Tabular Method) of 2065/66

No. of order	Order size (tons)	Average inventory (tons)	Total carrying cost (Rs.)	Total ordering cost (Rs.)	Total cost (Rs.)
1	20929	10464	11876640	107375	11984015
5	4186	2093	2375555	536875	2912430
7	2989	1494	1695690	751625	2447315
11	1903	951	1079385	1181125	2260510
13	1609	805	913675	1395875	2309550

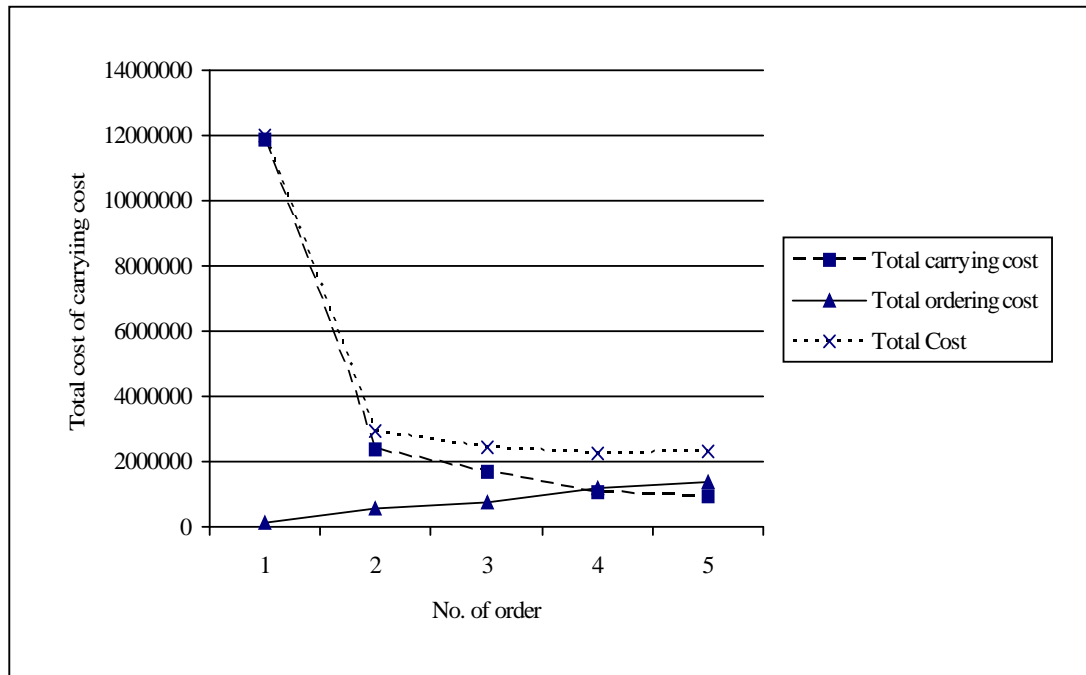
Source: Annual Report of ULL.

The table 4.16 shows that the carrying cost is decreasing and ordering cost is increasing with the increasing number of order. The table shows the minimum total cost of RM is Rs.2260510. Where the total carrying cost is Rs.1079385 and total ordering cost is Rs.1181125 with the no. of order 11

times per year. So, it clear that if the company wants to minimize total cost of inventory of RM it should order 11 times during the year.

Graphic Presentation of EOQ is as follows:

Figure 4.7



The table 4.16 and figure No. 4.7 shows the minimum carrying cost and ordering cost, which minimize the total cost. OX axis denotes the no. of orders and OY axis denotes the total cost of carrying and ordering. Ordering cost is going upward and carrying cost is going downward. When order size is increasing, the carrying cost is decreasing and ordering cost is increasing.

So, it becomes clear from the formula, tabular method as well as graphical method, the company should order 1990 tons with 11 times during the year.

4.5.9 EOQ of Raw Materials (Chemicals and Perfumes) in total study period

Table 4.17

EOQ of Raw Materials in total study period

Fiscal Year	No. of order (Approx.)	EOQ in tons
2058/59	7 times	3230
2059/60	9 times	2631
2060/61	10 times	2192
2061/62	11 times	1672
2062/63	9 times	1832
2063/64	10 times	2015
2064/65	10 times	1906
2065/66	11 times	1990

Source : Annual Report of ULL.

From the table 4.17, it can be interpreted that, there is no similar size of EOQ during the study period.

In the FY 058/59, the EOQ of RM is very high i.e. 3230 tons, while in the FY 061/62 the EOQ of RM is very low i.e. 1672 tons.

There is high fluctuation in EOQ size during the study period due to various reasons. This type of fluctuation in ordering cost is due to fluctuation in demand.

4.5.10 Trend Line Analysis of Annual Demand of Raw Material

Trend line analysis has been employed to the trend of purchase of raw material so in this part, attempt has been made to analyze the purchasing trend of raw material by using trend lines.

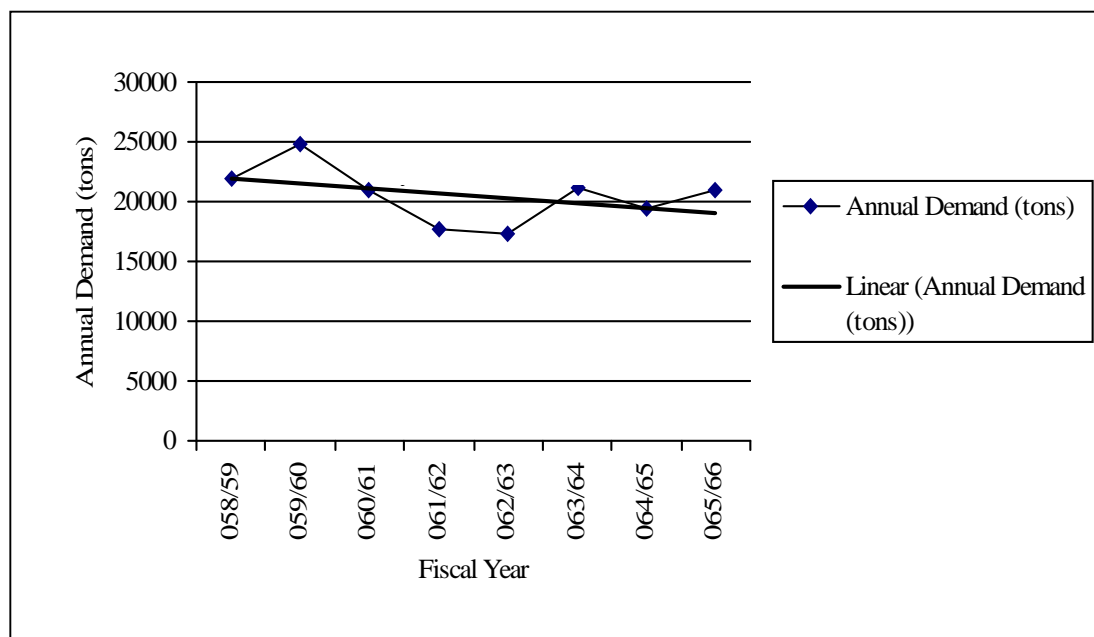
Table 4.18
Chemicals and Perfumes

Fiscal Year	Annual Demand (tons)
2058/59	21950
2059/60	24823
2060/61	20921
2061/62	17665
2062/63	17365
2063/64	21090
2064/65	19484
2065/66	20929
Average	20528

Source : Annual Report of ULL.

Trend line analysis of demand of RM

Figure 4.8



From the table 4.18, it is observed that the average annual demand of raw material is 20528 tons. In the FY 059/60, the annual demand of raw material is very high i.e. 24823 tons, while in the FY 062/63 the annual demand of raw material is very low i.e. 17365 tons. There is high fluctuation in annual demand of raw material during the study period.

4.6 Selective Inventory Control (ABC Analysis)

As the term ABC implies always better control which states that a fewer items of high investment value should be paid more attention than a bulk of items having low value and having low investment in capital. Category A includes the most important items and recognized for special attention. Category B includes lesser important items and category C consists of the least important and low value items.

According to ABC analysis, concept, the items of inventory of Unilever Ltd is categorized as A, B and C on the basis of product value and usage rate. The value items having more than Rs. One lakhs per tons fall under category 'A'. The items having from Rs.50,000 to Rs.100000 per ton fall under category 'B' and the items having value to Rs.50000 per tons fall under category 'C'.

4.6.1 ABC Analysis Concept

According to ABC analysis concept, the items of inventory of ULL are categorized as A, B and C group on the basis of the usage value of shown in able 4.19.

Table 4.19
ABC classification of Overall study period

Fiscal Year Categories	2058/59		2059/60		2060/61		2061/62		2062/63		2063/64		2064/65		2065/66		Average	
	Proportion % of total items	% of total cost	% of total items	% of total cost	% of total items	% of total cost	% of total items	% of total cost	% of total items	% of total cost	% of total items	% of total cost	% of total items	% of total cost	% of total items	% of total cost	% of total items	% of total cost
'A' items oral care, skin creams, hair care, tea, food and beverages	32.44	61.53	16.37	48.45	15.04	48.54	11.67	34.45	11.64	37.57	17.45	46.79	17.36	50.21	17.90	51.08	17.48	47.33
'B' items Toilet soaps	29.23	25.60	30.56	33.54	15.50	24.93	26.40	40.71	20.23	34.92	23.13	30.91	30.03	31.70	29.18	30.61	25.53	31.65
'C' Items Detergents, Scourers, Soft noodles, Laundry Soap	38.33	12.77	53.07	17.70	69.46	26.53	61.93	24.84	68.13	27.51	59.42	22.30	52.61	18.09	52.92	18.31	56.98	21.01
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: Annual Report of ULL.

From the table 4.19, it is observed oral care, skin creams, hair care, tea, food and beverages are categorized under 'A'. The table 4.19 also shows that under 'A' category, average percentage of total units is 17.48% and average percentage of total cost is 47.33% during the study period. Therefore, 'A' group involves largest investment and would be under tightest control by management. It should rather keep a more regards control and the most sophisticated control techniques should be applied in 'A' items than another items.

Toilet soap is categorized under 'B' item. The table 4.19 show that under 'B' items, average percentage of total units is 25.53% and average percentage of total cost is 31.65% of the overall study period. Therefore, 'B' group involves normal inventory control is exercised. The 'B' group stands mid way. It deserves less attention than 'A' but more than 'C'. It can be controlled by employing less sophisticated techniques.

Detergent, scourers, soft noodles, laundry soaps are categorized under 'C' items. The table 4.19 again shows that under 'C' items, average percentage of total units is 56.98% and average percentage of total cost is 21.01% of the overall study period. In case of 'C' items, simple control will be sufficient.

4.7 Major Findings

Inventory management planning and controlling are highly complicated task since in affects the profitability of manufacturing industries. It requires pre planning and arrangement. The major findings out of the analysis of the inventory management of ULL are as follows:

1. ULL is used the bin card technique to control the store in order to minimize the cost of holding materials. The bin cards are maintained by store keeper. The pricing of the issues, determine by value as weighted average cost method at the lower cost or market price.
2. It is found that the company has not used EOQ model for optimum level of inventory management system.

3. Purchasing manager of purchasing department of ULL collects the purchase requisition slip from the store department for all items.
4. ULL is a subsidiary company of Hindustan Lever Ltd. (HLL). So, the requirement of all materials is purchased from Hindustan Lever Ltd. of India. Therefore, ULL has adopted centralized purchasing procedure.
5. In case of centralized purchasing, ULL purchasing department prepares orders and sends to the HLL to supply a specific quality and quantity of materials at the stipulated terms at the time and place mentioned.
6. When materials are arrived then they are received and checked by receiving clerk against the order placed by the purchasing department to vendor. After proper checking materials are delivered to the store department for checking.
7. The average percentage of RM in total inventory in the overall study period is 47.10%. The highest proportion and RM on total inventory is 54.20% in the FY 064/65 and the lowest proportion of RM in total inventory is 36.28% in the FY 065/66.
8. The average percentage of WIP materials in total inventory is 3.59%. The highest proportion of WIP in total inventory is 6.20% in the FY 059/60. The lowest proportion of WIP on total inventory is 1.52% in the FY 064/65.
9. The average percentage of finished goods in total inventory is 30.36%. The highest proportion of finished goods in total inventory is 45.32% in the FY 065/66. The lowest proportion of finished goods on total inventory is 15.60% in the FY 059/60.
10. The average percentage of stores and spare parts on total inventory is 5.74%. The highest proportion of stores and spare parts on total inventory is 12.14% in the FY 059/60. The lowest proportion of stores and spare parts on total inventory is 1.97% in the FY 064/65.
11. The correlation between RM and FG is 0.34. Therefore, there was positive and low degree of correlation between RM and FG.

12. Inventory turnover ratio show the relation between sales and inventory and it also show the efficiency of inventory management. The average ITR is 8.22 times and found to be satisfactory. The highest ITR is 13.06 times in the FY 059/60. The highest negative deviation on average ITR is (36.25%) in the FY 060/61 and the highest positive deviation on average ITR is 58.89% in the FY 059/60. The correlation between inventory and sales is 0.21. So, it becomes clear that there is positive and low degree of correlation between inventory and sales. 'T' statistics also indicate that correlation coefficient between sales and inventory is not significant.
13. The average value of inventory is Rs.192.41 million and average value of net profit is Rs.126.44 million. The highest positive deviation from the average inventory is 52.76% in the FY 060/61 and the highest positive deviation from the average net profit is 88.35% in the FY 065/66. Similarly, the highest negative deviation from the average inventory is (34.46%) in the FY 062/63 and the highest negative deviation from the average net profit is (66.31%) in the FY 061/62. The correlation between inventory and net profit is 0.37. So, it becomes clear that there is positive and low degree of correlation between inventory and net profit. 'T' statistics also indicate that correlation coefficient between inventory and net profit is not significant.
14. The average value of sales is Rs.1461.93 million and average value of net profit is Rs.126.44 million. The highest positive deviation from the average sales is 18.24% in the FY 059/60 and the highest positive deviation from the average net profit is 88.35% in the FY 065/66. Similarly, the highest negative deviation on average net profit is (66.31%) in the FY 061/62 and the highest negative deviation on average sales is (15.45%) in the FY 061/62. The correlation between sales and net profit is 0.26. It becomes clear that there is positive and low degree of correlation between sales and net profit 'T' statistics also indicate that correlation coefficient between sales and net profit is not significant.

15. EOQ is not similar during the study period. In the FY 058/59 the EOQ of RM is very high i.e. 3230 tons, while in the FY 061/62 the EOQ of RM is very low i.e. 1672 tons. This type of fluctuations is due to variation of ordering cost and fluctuation in demand. There is high fluctuation in EOQ size during the study period due to various reasons.
16. The significance of the ABC analysis reflects the concept of appropriate management of inventory. It is clearly seen under 'A' items and average percentage of total units is 17.48% and average percentage of total cost is 47.33%. Similarly, under 'B' items and average percentage of total units is 25.53% and average percentage of total cost is 31.65%. Again under 'C' items, the average percentage of total unit is 56.98% and the average percentage of total cost is 21.01%. So, it is clearly seen that the average percentage of total cost of 'B' items is comparatively high but per tone cost is less than 'A' items and more than 'C'. In order to minimize inventory cost of 'A' items should be controlled carefully and should be cared more attention than 'B' and 'C'. 'B' items lies in between 'A' and 'C' items. It requires neither careful nor simple but a moderate controlled system is adequate for this item.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.1 Summary

This study attempts to focus on Unilever Nepal Limited was formed as a subsidiary company of Hindustan Lever Limited of in India. The factory is situated at Basmati VDC of Makwanpur district, 6km far from Hetauda of central development region of Nepal. The corporate office of the company is situated at Heritage Plaza, Kamaladi, Kathmandu. Unilever Limited was formed as a public limited company in 1993 and production started from December 1994. It was registered to company act 2053. As a growing manufacturing company, ULL has main objective of expanding the domestic business by introducing new brands and categories in the domestic market and import substitution of foreign goods too. The company is to manufacture soaps, detergents, cosmetics, toiletries, oleaginous saponaceous, unguents and other chemical products and marketing them in and outside the country under the brand name of Hindustan Lever Limited and ULL. The success of this industry will attract the foreign investment and technology transformation in the country and also encourage the private sector in the country.

Inventory management is one of the most important functions in any organization. Without effective and efficient inventory management no organization can achieve its goal. Success of any enterprises basically depends on the efficiency and effectiveness of systematic management. Inventory management is the most important part for manufacturing company. the company invests the most of amount for inventory, where the functions are associated as purchasing, storing selling, distribution etc. Inventory constitutes most significant part of current assets. It should, therefore be managed efficiently to avoid unnecessary investment. Unilever

limited is a subsidiary company of Hindustan Lever Limited. ULL produces different types of products and product groups. So this study deals with inventory management of Unilever Nepal Limited.

The main objective of this study is identifying the inventory management position of Unilever Limited. In this study an attempt has been made to identify the inventory position of ULL, to know the relationship between sales and inventories with identifying their trends, to assess the inventories and their consequences on profitability of ULL and suggest over the better practice of inventory management of ULL. This study is one of the new studies which only try to know the inventory management of ULL.

The required information is secondary as well as primary. The researcher had submitted question to ULL to find out actual result and the researcher controlled the secondary data from annual report of ULL.

All the collected data are analyzed on the basis of inventory management with the help of ABC analysis, EOQ model, inventory turnover ratio, correlation coefficient, average percentage of the total study period by presenting with table and figure in required places. The analysis has been done year wise as well as the average of total study period is analyzed. To make certain type of inventory management decision many statistical tools and financial tools and techniques are available for controlling in the inventory but the company has not applied some sort of technique for managing the inventory.

The basic problem area of this study is to examine the inventory management system practiced by the company is unscientific. The carrying cost, ordering cost, order size, safety stock maintained are unsatisfactory and unscientific. It is not paying much attention to the lead time. Therefore, all these functions lead to increase total cost of the company.

5.2 Conclusion

1. ULL is the subsidiary company of Hindustan Lever Ltd. India. Which holds 80% share of ULL is to take the centralize purchasing procedure.

Therefore, require raw materials and work in progress is imported from HLL of India.

2. The pricing of the issues of goods are determined by value as waited average cost method at the lower cost or market price.
3. ULL is used the bin card techniques to control the store in order to minimize the cost of holding materials. The bin cards are maintained by store keeper.
4. ULL was formed as a public limited company in 1993 and production started from December 1994. It was registered to company act 2053, as a growing manufacturing company.
5. ULL has main objective of expanding the domestic business by introducing new brands and categories in the domestic market and import substitution of foreign goods too.
6. In ULL, inventory includes raw materials, WIP materials, finished goods and stores and spare parts. The highest proportion of RM on total inventory and the lowest proportion of RM on total inventory. Therefore, it is observed that raw material consumption in the company is erratic. The fluctuation is stock of RM during the study period is very high. Defective purchasing policy and poor planning of RM may be responsible factors for such fluctuation.
7. The WIP materials consumptions in the company are fluctuation during the study period. Fluctuation in demand and sales of company products, lack of appropriate inventory policy and ineffective demand forecast are the main reasons of such fluctuation.
8. The average percentage of stores and spare parts in total inventory during this period, the quantity of stores and spare parts used by the company is irregular. Since, the company's production is totally dependent stores and spare parts, it obviously fluctuates over the study period.
9. The correlation between RM and FG is 0.34. Therefore, there was positive and low degree of correlation between RM and FG. It is

observed that changes in stock of RM are directly related to the change in stock of RM are directly related to the change in stock of finished goods. The correlation between sales and net profit is 0.26. It becomes clear that there is positive and low degree of correlation between sales and net profit. It is observed that change in sales results change of net profit.

10. The fluctuating inventory and net profit indicates that there is no specific policy of investment on inventory. However, the level of inventory has been maintained according to the demand of products. The correlation between inventory and net profit is 0.37. So, it becomes clear that there is positive and low degree of correlation between inventory and net profit.
11. Inventory turnover ratio shows the relation between sales and inventory and it also shows the efficiency of inventory management. The correlation between inventory and sales is 0.21. So, it becomes clear that there is positive and low degree of correlation between inventory and sales. It is observed that changes in inventory results changes into the sales.

5.3 Recommendations

To achieve all the objectives of ULL, the efficient management is essential. The management of inventory in ULL is not only necessary but compulsory for the better performance of the company. If ULL initiates steps to appropriate management of inventory, certainly it will attend its set objectives successfully. On the basis of the study, the following suggestions may be recommendations for consideration.

1. The company should adjust the inventory according to the sales and productions and its priority basis. Holding large amount of inventory requires high operating cost. There should be good store keeping system, better materials handling system and timely inspection.

Moreover systematic inventory control system should be applied to know inventory position in the company.

2. ULL has not been able to satisfy the level of customers demand. Company should try to use optimal capacity which has been idle now to maintain the level of customer demand. By this way the company's profitability will be increased.
3. It is found that the company has not used EOQ model for optimal level of inventory management system. It is recommended that the order size of the inventory which minimized the total cost of inventory, i.e. ordering and carrying cost should be applied. So, the company should adopt inventory management techniques.
4. In order to minimize inventory cost, 'A' item should be controlled carefully and should be paid more attention than 'B' and 'C' items. 'B' lies between 'A' and 'C' items. It requires neither careful nor simple but a moderate control system is adequate for this item.
5. Specific policy on inventory should be defined and comprehensive system of inventory management has to be introduced.
6. Planning of inventory is most welcomed in the world today. So, products of different types of personal products, oral care, different groups of soaps, detergent etc. should be produced on planned basis and attention should be given to implementing better marketing strategies to take a strategic advantage of competitive world.
7. Inventory should not treat as a reason for investment rather it should be planned has coordinating factor between sales and production.
8. The top level management should pay its attention to the overall management, purchasing, production and financial aspect of factory.

BIBLIOGRAPHY

- Adam, Evertte E. and Ebert, Jr. Ronal J. (2003). *Production and Operation Management*, New Delhi: Prentice Hall of India Pvt. Ltd.
- Agrawal, Govinda Ram (2000). *Marketing in Nepal*, Kathmandu:Asmita Books and Publisher.
- Balika, Radha Kumari (2003). *Inventory Problems of Hetauda Cement Industry Ltd.* Kirtipur: Unpublished Degree Dissertation submitted to Faculty of Management, T.U.
- Baral, Puspa Raj (1994). *Inventory Management: A case study of Gandaki Noodles Pvt. Ltd.* Kathmandu: Unpublished Degree Dissertation submitted to Faculty of Management, T.U.
- Bhandari, Lila (2005). *Inventory Management and Control: A case study of Royal Drugs Ltd.* An unpublished Master's Dissertation, Central Department of Management, T.U.
- Blocker, J.G. and Weltmer, W.K. (1992). *Cost Accounting*, 3rd ed., New Delhi: Tata Mc Graw Hill Co. Ltd.
- Bloomberg, David J., Leemay Stephen and Hanna Joe B. (2002). *Logistics*, New Delhi: Prentice Hall of India Pvt. Ltd.
- Dangol, R.M., P. Gurung and J. Dongol (2001). *Cost and Management Accounting*, 2nd ed. Kathmandu: Taleju Prakashan.
- Dhital, Lila Bdr. (2000). *A case study of Nepal Food Corporation*, Kirtipur: Unpublished Degree Dissertation submitted to Faculty of Management, T.U.
- Dobler, Donal W., T.R. Lamarlee, Burt David N. (1992). *Purchasing and material management*, New Delhi: Prentice Hall of India Pvt. Ltd.
- Fago, G. (2003). *Profit Planning and Control*, 1st ed., Kathmandu: Buddha Academic Publishers and Distributers Pvt. Ltd.
- Goet, J., I. Bhattariai and A. Gautam (2062). *Budgeting Profit Planning and Control*, 1st ed. Kathmandu: Asmita Books Publishers and Distributers Pvt. Ltd.
- Hampton, John J. (1990). *Financial Decision Making*, New Delhi: Prentice Hall of India Pvt. Ltd.
- Jain, S.P. and Narang, K.L. (1991). *Cost Accounting*, New Delhi: Kalyani Publishers.
- Kerlinger, F.N. (2000). *Foundation of Behavioural Research*, New Delhi: Surjeet Publication.

- Khan, M.Y. and Jain, P.K. (2003). *Financial Management*, New Delhi: Tata Mc Graw Hill Co. Ltd.
- Kothari, C.R. (1990). *Research Methodology Method and Techniques*, New Delhi: Wile of Estern Ltd.
- Kotler, P. G. Armstrong (2004). *Principle of Marketing*, India: Pearson Education (Singapore) Pvt. Ltd. India Branch.
- Munakarmi, Shiva Prasad and Shrestha, Bijaya Prakash (2003). *Cost and Management Accounting*, Kathmandu: Educational Publishing House.
- Panday, Laxmi (2000). Inventory Management: A case study of Gorkhapatra corporation, Kartipur: Unpublished Degree Dissertation submitted to Faculty of Management, T.U.
- Pandey, I.M. (2002). *Financial Management*, New Delhi: Vikas publishing House Pvt. Ltd.
- Pant, P.R. (2003). *Business Environment in Nepal*, 2nd ed., Kathmandu: Buddha Academic Publication.
- Pradhan, Bishnu (2006). Inventory Management of Nepalese Manufacturing Enterprises, Kathmandu: Unpublished Degree Dissertation submitted to Faculty of Management, T.U.
- Pradhan, R.S. (2004). *Financial Management*, Kathmandu: Buddha Academic Publishers and Distributor Pvt. Ltd.
- Saru, Ram Kumari (2007). Planning and Controlling of Inventory of Manufacturing Industries in Nepal: A case study of Gosheli Packaging House, unpublished Diss. submitted to P.N.C., Pokhara (T.U.)
- Sharma, P.R. (2007). *Research Methodology with SPSS*, Pokhara: Durga Publication.
- Sharma, R.K. and Gupta, S.K. (1984). *Management Accounting Principle and Practice*, Ludiyana: Kalyani Publishers.
- Shrestha, Sunity and Silwal, Durba Prasad (2001). *Production and Operation Management*, Kathmandu: Taleju Publication.
- Sigdel, Saroj (2007). Inventory Management of Agriculture input corporation, Kirtipur: Unpublished Degree Dissertation submitted to Faculty of Management, T.U.
- Starr, M.K. and D.W. Miller (1981). *Inventory Control, Theory and Practice*, New Delhi: Prentice Hall of India Pvt. Ltd.
- Tiwari, Ghanashyam (2009). Inventory Analysis of Nepalese Public Enterprises: A case study of salt trading corporation limited, unpublished Diss. submitted to R.N.C., Pokhara (T.U.)
- Van Horne, James C. (2003). *Financial Management and Policy*, New Delhi: Prentice Hall of India Pvt. Ltd.

- Welsh, C.A., Hiton, R.W. and Gordon, P.N. (2001). ***Budgeting Profit Planning and Control***. New Delhi: Prentice Hall of India Pvt. Ltd.
- Weston, J. Fred and Copeland, Thomas E. (1992). ***Managerial Finance***, USA New York: A Hart Court Brace Jovanvich College Publisher, The Dryden Press.
- Wolff, H.K. and Pant, P.R.(2003). ***A Handbook of Social Science Research and Thesis Writing***. Kathmandu: Buddha Academy.

APPENDIX I

Calculation of correlation between R.M. and F.G.

(Rs. in million)

Fiscal Year	R.M. (Rs.) X	F.G. (Rs.) Y	XY	X ²	Y ²
2058/59	88.11	44.80	3947.33	7763.37	20070.04
2059/60	60.70	20.70	1256.49	3684.49	428.49
2060/61	134.70	87.60	11799.72	18144.09	7673.76
2061/62	64.06	41.30	2645.67	4103.68	1705.69
2062/63	59.20	44.50	2634.40	3504.64	1980.25
2063/64	95.28	55.50	5288.04	9078.27	3080.25
2064/65	124.53	73.83	9194.05	15507.72	5450.87
2065/66	92.94	116.35	10813.57	8637.84	13537.32
	dX= 719.52	dY= 484.58	dXY= 47579.27	dX²= 70424.10	dY²= 53926.67

Correlation between R.M.(X) and F.G.(Y)

$$\begin{aligned}
 r &= \frac{N \sum XY - \sum X \cdot \sum Y}{\sqrt{N \sum X^2 - (\sum X)^2} \cdot \sqrt{N \sum Y^2 - (\sum Y)^2}} \\
 &= \frac{8 \mid 47579.27 - 719.52 \mid 484.58}{\sqrt{8 \mid 70424.10 - (719.52)^2} \cdot \sqrt{8 \mid 53926.67 - (484.58)^2}} \\
 &= \frac{380634.16 - 348665}{213.74 \mid 443.39} \\
 &= \frac{31969.16}{94770.17} = 0.34
 \end{aligned}$$

... Correlation(r) = 0.34

APPENDIX II

Calculation of correlation between Sales and Inventory

(Rs. in million)

Fiscal Year	Sales (Rs.) X	Inventory (Rs.) Y	XY	X ²	Y ²
2058/59	1503.69	172.20	258935.42	2261083.62	29652.84
2059/60	1728.63	132.40	228870.61	2988161.67	17529.76
2060/61	1540.99	293.93	452943.19	2374650.18	86394.84
2061/62	1236.05	144.46	178559.78	1527819.60	20868.69
2062/63	1244.73	126.11	156972.90	1549352.77	15903.73
2063/64	1524.90	184.22	280917.07	2325320	33937
2064/65	1481.56	229.76	340403.23	2195020	52789.66
2065/66	1434.94	256.17	367588.58	2059052.80	65623.07
	dX= 11695.49	dY= 1539.25	dXY= 2265190.78	dX²= 17280460.64	dY²= 322699.59

Correlation between Sales(X) and Inventory(Y)

$$\begin{aligned}
 r &= \frac{N \sum XY - \sum X \cdot \sum Y}{\sqrt{N \sum X^2 - (\sum X)^2} \cdot \sqrt{N \sum Y^2 - (\sum Y)^2}} \\
 &= \frac{8 \mid 2265190.78 \mid 11695.49 \mid 1539.25}{\sqrt{8 \mid 17280460.64 \mid (11695.49)^2} \cdot \sqrt{8 \mid 322699.59 \mid (1539.25)^2}} \\
 &= \frac{18121526.24 \mid 18002282.98}{1207.97 \mid 460.77} \\
 &= \frac{119243.257}{556596.34} = 0.21
 \end{aligned}$$

... Correlation(r) = 0.21

APPENDIX III

Calculation of correlation between Inventory and Net Profit (Rs. in million)

Fiscal Year	Inventory (Rs.) X	Net Profit (Rs.) Y	XY	X ²	Y ²
2058/59	172.20	119.03	20496.96	29652.84	14168.14
2059/60	132.40	120.56	15962.14	17529.76	14534.71
2060/61	293.93	68.04	19998.99	86394.84	4629.44
2061/62	144.46	42.60	6153.99	20868.69	1814.76
2062/63	126.11	93.20	11753.45	15903.73	8686.24
2063/64	184.22	140.78	25934.49	33937.00	19819.00
2064/65	229.76	189.19	43468.29	52789.66	35792.86
2065/66	256.17	238.15	61006.88	65623.07	56715.42
	dX= 1539.25	dY= 1011.55	dXY= 204775.19	dX²= 322699.59	dY²= 156160.57

Correlation between Inventory(X) and Net Profit(Y)

$$\begin{aligned}
 r &= \frac{N \sum XY - \sum X \cdot \sum Y}{\sqrt{N \sum X^2 - (\sum X)^2} \cdot \sqrt{N \sum Y^2 - (\sum Y)^2}} \\
 &= \frac{8 \mid 204775.19 \mid 1539.25 \mid 1011.55}{\sqrt{8 \mid 322699.59 \mid (1539.25)^2} \cdot \sqrt{8 \mid 156160.57 \mid (1011.55)^2}} \\
 &= \frac{1638201.52 \mid 1557028.34}{460.766 \mid 475.45} \\
 &= \frac{81173.18}{219071.19} = 0.37
 \end{aligned}$$

... Correlation(r) = 0.37

APPENDIX IV

Calculation of correlation between Sales and Net Profit

(Rs. in million)

Fiscal Year	Sales (Rs.) X	Net Profit (Rs.) Y	XY	X ²	Y ²
2058/59	1503.69	119.03	178984.22	2261083.62	14168.14
2059/60	1728.63	120.56	208403.63	2988161.67	14534.71
2060/61	1540.99	68.04	104848.96	2374650.18	4629.44
2061/62	1236.05	42.60	52655.73	1527819.60	1814.76
2062/63	1244.73	93.20	116008.84	1549352.77	8686.24
2063/64	1524.90	140.78	214675.42	2325320	19819
2064/65	1481.56	189.19	280296.34	2195020	35792.86
2065/66	1434.94	238.15	341730.96	2059052.80	56715.42
	dX= 11695.49	dY= 1011.55	dXY= 1497604.10	dX²= 17280460.64	dY²= 156160.57

Correlation between R.M.(X) and F.G.(Y)

$$\begin{aligned}
 r &= \frac{N \sum XY - \sum X \cdot \sum Y}{\sqrt{N \sum X^2 - (\sum X)^2} \cdot \sqrt{N \sum Y^2 - (\sum Y)^2}} \\
 &= \frac{8 \mid 1497604.10 \mid 11695.49 \mid 1011.55}{\sqrt{8 \mid 17280460.64 \mid (11695.49)^2} \cdot \sqrt{8 \mid 156160.57 \mid (1011.55)^2}} \\
 &= \frac{11980832.80 \mid 11830572.91}{1207.97 \mid 475.45} \\
 &= \frac{150259.89}{574329.336} = 0.26
 \end{aligned}$$

... Correlation(r) = 0.26

APPENDIX V

1. F/Y 2058/59 ABC Analysis

S.N.	Name of the items	Units (tons)	% of total items	Cost per tons	Total Cost (Rs.)	% of total cost
1	Oral care	75	16.23	147764	11082300	27.49
2	Skin creams	18	3.90	305867	5505606	13.66
3	Hair care	13	2.81	120348	1564524	3.88
4	Food and Beverages	44	9.50	151687	6674228	16.50
5	Toilet soaps	135	29.23	76521	10330335	25.60
6	Detergents	119	25.76	24279	2889201	7.16
7	Scourers	5	1.08	11336	56680	0.14
8	Soft noodles	38	8.23	46501	1767038	4.38
9	Laundry soaps	15	3.25	29348	440220	1.09
Total		462	100		40310132	100

2. F/Y 2059/60 ABC Analysis

S.N.	Name of the items	Units (tons)	% of total items	Cost per tons	Total Cost (Rs.)	% of total cost
1	Personal Products	120	16.37	175434	21052080	48.45
2	Toilet soaps	224	30.56	65596	14693504	33.84
3	Detergents	175	23.87	19050	3333750	7.67
4	Scourers	20	2.73	16760	335200	0.8
5	Laundry soaps	194	26.47	20810	4037140	9.29
Total		733	100		43451674	100

3. F/Y 2060/61 ABC Analysis

S.N.	Name of the items	Units (tons)	% of total items	Cost per tons	Total Cost (Rs.)	% of total cost
1	Tooth Paste	75	5.67	161123	12084225	14.54
2	Skin creams	32	2.42	283258	9064256	10.92
3	Shampoo	22	1.66	158466	3486252	4.20
4	Tea	70	5.29	224086	15686020	18.88
5	Toilet soaps	205	15.50	101215	20749075	24.93
6	Detergents	540	40.82	17905	9668700	11.65
7	Scourers	158	11.94	27239	4303762	5.19
8	Laundry soaps	221	16.70	36410	8046610	9.68
Total		1323	100		83088900	100

4. F/Y 2061/62 ABC Analysis

S.N.	Name of the items	Units (tons)	% of total items	Cost per tons	Total Cost (Rs.)	% of total cost
1	Tooth Paste	30	7.61	133712	4011360	21.31
2	Skin creams	8	2.03	148045	1184360	6.29
3	Shampoo	7	1.78	152215	1065505	5.66
4	Tea	1	0.25	223502	223502	1.19
5	Toilet soaps	104	26.40	73678	7662512	40.71
6	Detergents	115	29.19	17441	2005715	10.66
7	Scourers	18	4.57	13429	241722	1.28
8	Laundry soaps	111	28.17	21882	2428902	12.90
Total		394	100		18823578	100

5. F/Y 2062/63 ABC Analysis

S.N.	Name of the items	Units (tons)	% of total items	Cost per tons	Total Cost (Rs.)	% of total cost
1	Tooth Paste	80	9.80	134806	10784480	29.94
2	Skin creams	15	1.84	183140	2747100	7.63
3	Toilet soaps	165	20.23	76217	12575805	34.92
4	Detergents	418	51.23	17150	7168700	19.91
5	Scourers	36	4.40	18523	666828	1.85
6	Laundry soaps	102	12.50	20312	2071824	5.75
Total		816	100		36014737	100

6. F/Y 2063/64 ABC Analysis

S.N.	Name of the items	Units (tons)	% of total items	Cost per tons	Total Cost (Rs.)	% of total cost
1	Tooth Paste	60	13.61	135710	8142600	35.41
2	Shampoo	8	1.81	154205	1233640	5.36
3	Skin creams	7	1.58	134051	938357	4.08
4	Tea	2	0.45	223570	447140	1.94
5	Toilet soaps	102	23.13	69685	7107870	30.91
6	Detergents	119	26.98	17324	2061556	8.96
7	Scourers	16	3.64	14553	232848	1.02
8	Laundry soaps	127	28.80	22318	2834386	12.32
Total		441	100		22998397	100

7. F/Y 2064/65 ABC Analysis

S.N.	Name of the items	Units (tons)	% of total items	Cost per tons	Total Cost (Rs.)	% of total cost
1	Personal Products	126	17.42	173225	21826350	50.21
2	Toilet soaps	218	30.03	63201	13777818	31.70
3	Detergents	176	24.24	18240	3210240	7.38
4	Scourers	20	1.75	17025	340500	0.78
5	Laundry soaps	186	25.62	23205	4316130	9.93
Total		726	100		43471038	100

8. F/Y 2065/66 ABC Analysis

S.N.	Name of the items	Units (tons)	% of total items	Cost per tons	Total Cost (Rs.)	% of total cost
1	Personal Products	135	17.90	172250	23253750	51.08
2	Toilet soaps	220	29.18	63350	13937000	30.61
3	Detergents	175	23.21	18225	3189375	7
4	Scourers	19	2.52	17205	326895	0.73
5	Laundry soaps	205	27.19	23504	4818320	10.58
Total		754	100		45525340	100

APPENDIX VI

Questionnaires of Unilever Nepal Limited for the purpose of study on Inventory Management.

- 1. The inventory management and control system following by Unilever Nepal Limited are**
 - a. Inventory management through ABC analysis. []
 - b. Determination of optimal stock level (EOQ). []
 - c. Perpetual inventory management system (Physical checking). []
 - d. If other, please specific

- 2. The store control technique used by the Unilever Nepal Limited?**
 - a. Bin Card. []
 - b. Store Ledger. []
 - c. Observation. []
 - d. Others. []

- 3. What are the methods used by Unilever Nepal Limited for valuation of inventories?**
 - a. Weighted average cost method. []
 - b. First in first out method (FIFO). []
 - c. Last in first out method (LIFO). []
 - d. Special identification method. []
 - e. Average cost method. []
 - f. Highest in first out method (HIFO). []

- 4. What types of purchasing procedure are adopted by Unilever Nepal Limited?**
 - a. Centralized Purchasing. []
 - b. Decentralized Purchasing. []

- 5. Who collected the Purchase Requisition slip in Unilever Nepal limited?**
 - a. Purchase Manager. []
 - b. Purchase Asst. Manager. []
 - c. Storekeeper. []
 - d. If other, please specific

- 6. Who prepares the purchase order in Unilever Nepal Limited?**
 - a. Purchase Department. []
 - b. Accounts Department. []
 - c. If other, please specific

- 7. Who control the inventory?**
 - a. Manager. []
 - b. Storekeeper. []
 - c. Supervisor. []
 - d. Workers. []

8. Who makes the Purchase Decision in Unilever Nepal Limited?
- Purchase Manager. []
 - Purchase Asst. Manager. []
 - If other, please specific
9. If application of ABC analysis, specify the name of inventories (raw materials, work in progress, finished goods and spare parts) according to the purchasing cost, manufacturing cost and selling price (High Cost to Low Cost).

S.N.	Raw Materials	Work in progress	Finished goods	Spare parts
a	Distilled fatty acid	soap, noodles	Detergents	
b	Lauric acid	soap, noodles	Toilet soaps	
c	Caustic soda		Personal Products	
d	Soda ash		Scourers	
e	Sorbital		Laundry soap	
f			Tea and Vanaspati	
g				
h				

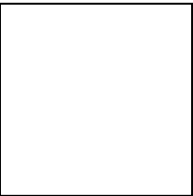
10. For determining Economic Order Quantity, which and how much components and the expenses were incurred as ordering and carrying cost?

Ordering Cost:

S.N.	Component of Cost	Amount (Rs.)
a	Cost of staffs posted for ordering of goods	
b	Inspection cost of incoming material	
c	Expenses incurred on transportation of goods purchased	
d	Cost of stationary, typing, postage telephone charges etc	
e		
f		
g		

Carrying Cost:

S.N.	Component of Cost	Amount (Rs.)
a	Cost of capital invested in inventories	
b	Storage cost	
c	Deterioration and obsolescence cost	
d	Insurance cost	
e	Cost of spoilage in handling of material	
f		



- 11. What of system are follow to the purchase?**
- a. Tender. []
 - b. Blanket order. []
 - c. Hand to mouth. []
 - d. Other, if any. []
- 12. From where do you purchase the materials?**
- a. Local market. []
 - b. National market. []
 - c. International market. []
 - d. All of above. []
- 13. If no, who is responsible for purchasing activities?**
- a. Manager. []
 - b. Accountant. []
 - c. Storekeeper. []
 - d. General Manager. []
- 14. Does the industry prepare Inventory Planning?**
- a. Yes. []
 - b. No. []
- 15. How many quantity to purchase at a time?**
.....
- 16. How many times purchase a one month?**
.....
- 17. If yes, who is authorizing person far inventory planning?**
- a. Top Level Management. []
 - b. Middle Level Management. []
 - c. Lower Level Management. []
 - d. Other specify. []
- 18. Who received and checks the materials arrived in Unilever Nepal Limited?**
- a. Receiving Clerk. []
 - b. Purchase Manager. []
 - c. Purchase Asst. Manager. []
 - d. If other, please specific
- 19. Please, specify the problem faced by the Unilever Nepal Limited Company while managing the inventories?**
- a. Nepal Bendha, Strikes, Lockout. []
 - b. Unexpected changes in price. []
 - c. Geographical problem. []
 - d. If other, please specific