A CASE STUDY ON "INVENTORY MANAGEMENT" OF UNILEVER LTD. AND ITS IMPACT ON PROFITABILITY

By:
Shiva Raj Adhikari
Department of Management
Shaheed Smriti Multiple Campus
T.U. Regd. No.: 44108-95
Exam Roll No.: 2390016/2066

A Thesis Submitted to:
Office of the Dean
Faculty of Management
Tribhuvan University

In Partial Fulfillment of the Requirement for the Degree of Master of Business Studies (MBS)

Ratnanagar, Chitwan

April, 2011

Recommendation

This is to certify that the thesis

Submitted by:

Shiva Raj Adhikari

Entitled

A Case Study on "Inventory Management" of Unilever Ltd. and its Impact on Profitability

has been prepared as approved by the Department in the prescribed format of Faculty of Management. This thesis is forwarded for examination.

------------------------	------------------------	------------------------
Supervisor	Chairperson, Research Committee	Campus Chief

Date:

Viva-Voce Sheet

We have conducted the viva-voce examination of the thesis presented by

Shiva Raj Adhikari

Entitled

A Case Study on "Inventory Management" of Unilever Ltd. and its Impact on Profitability

and found the thesis to be the original work of the student written according to the prescribed format. We recommend the thesis to be accepted as partial fulfillment for

Master's Degree in Business Studies (M.B.S.)

Viva-Voce Committee

Chairperson, Research Committee	---------------------
Member (Thesis Supervisor)	---------------------
Member (External Expert)	---------------------
Member (External Expert)	---------------------

Date: ---------------------

Declaration

I hereby declare that the work reported in this thesis entitled **A Case Study on "Inventory Management" of Unilever Ltd. and its Impact on Profitability** submitted to the Department of Management, Shaheed Smriti Multiple Campus, Ratnanagar-03, Chitwan is my original work. It is done in the form of partial fulfillment of the requirements for the Master of Business Studies (MBS) under the supervision and guidance of Mr. Surendra Regmi, Mr. Deepak Chandra Ghimire and Mr. Khimananda Aryal. I like to thank Mr. Shree Ram Chaudhary who helped me for setting all the documents in required form.

April, 2011

Shiva Raj Adhikari
Researcher
T.U. Regd. No.: 44108-95
Symbol No. 2390016/2066
Department of Management
Shaheed Smriti Multiple Campus

Table of Contents

List of Tables

List of Figures

List of Appendices

Abbreviation

ULL	-	Unilever Limited
FY	-	Fiscal Year
EOQ	-	Economic Order Quantity
ITR	-	Inventory Turnover Ratio
RM	-	Raw Material
WIP	-	Work In Progress
ABC	-	Always Better Control
r	-	Correlation Coefficient
NP	-	Net Profit

CHAPTER ONE

1. Introduction

1.1 Background

Industrialization is an important factor for achieving the basic objective of a country's economic and social progress. 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 rapid 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 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 manufactures, agricultural products or services. How to use resource at any time depends on market prospects and costs. So, the interesting question is not how fast a country can be industrialized, but how incentive policy, rules and regulation are designed so that new industries make maximum contribution to the country’s development.

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

Inventory is defined as the blocked Working Capital of an organization in the form of materials. As this is the blocked Working Capital of organization, ideally it should be zero. But we are maintaining Inventory. This Inventory is maintained to take care of fluctuations in demand and lead time. In some cases it is maintained to take care of increasing price tendency of commodities or rebate in bulk buying

Inventory management is the process of efficiently overseeing the constant flow of units into and out of an existing inventory. This process usually involves controlling the transfer in of units in order to prevent the inventory from becoming too high, or dwindling to levels that could put the operation of the company into jeopardy.

Competent inventory management also seeks to control the costs associated with the inventory, both from the perspective of the total value of the goods included and the tax burden generated by the cumulative value of the inventory.

1.2 History of Industrialization in Nepal

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 economies development of any nation depends upon the higher rates of growing of production activities in the different sector of the country's economic. About four decades age, when the country was under Rana rule for more than 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 Shamsher J.B.R. had established means of "communication and rope-way transport". Like wise, Buddha Shams her J.B.R. had established the first financial institution of Nepal, like Nepal Bank Ltd in 1994B.S., Morang Sugar mills Ltd. and Nepal Insurance & Transport Company Ltd in 2003 B.S. and 2004B.S. respectively.

After the Rana rue in 2007 B.S. and during the three decades of panchayat system in Nepal, a number of companies, industries and financial institution 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.

Timely amendments in Industrial Policy Industry enterprise Act and economic policies have been made over the period of the years with a view to industrialize the country. Inadequate industrial base of the country, it has made imperative to identify new industrial sectors, which are instrumental to attract and mobilize local manpower, material and scattered capital of the country.

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 arises due to the country being the land 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 their existence and growth only through a continuous process of innovation in functions, quality and cost product.

1.3 Introduction of Inventory Management

The literary meaning of the word inventory is stock of goods. Inventories are greatly influenced by the level of sales. Since inventories are acquired before sales can take place, and accurate sales forecast is critical to effective inventory management. Inventories generally represent the major element in the working capital of an organization and a very significant proportion of total assets.

Inventory is one of the most important assets to most of the organization. Larger percentage of total capital is invested in inventory. 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. It constitutes the most significant portion of current assets. Inventories are stocks of finished product of a company or components that make up the product.

The various forms in which inventories exist in a manufacturing company are: raw material, work in progress, and finished goods. Raw materials are those basic inputs that are converted into finished product through the manufacturing process. Raw material inventories are those units, which have been purchased and store for future production. Work in progress inventories are semi-manufactured products. They represent product that need more work before they become-finished product for sale. Finished goods inventories are those completely manufactured products, which are ready for sale. Stock of raw material and work in progress facilitate production, while stock of finished goods is required for smooth marketing operation. Thus, inventories serve as a link between the production and consumption of goods.

Modern concept of Inventory management can be traced to 1915-1922, with several authors (R.C. Davids, H.S. Owen, E.F. Clark and R.H.Wilson) acting independently, developed of carrying and holding costs for where the demand was known and constant.
Inventory management involves planning of the optimum level of inventory and control of inventory cost supported by an appropriate organization structure, which is staffed by trained persons and directed by top management. It involves both financial dimensions are interrelated and cannot be looked in isolation. (Agrawal G.R, Marketing in Nepal, 2000,p.238)

Inventory is the stock of materials or a product that frequently occurs in the manufacturing organization, depending upon the nature of industry and firm, inventories may be durable and perishable, valuable and inexpensive. When materials are purchased by an organization they have to be store until they are put into the production process. When the production is over the finished products have to be stored until they are sold. In manufacturing there are four steps of inventories such as raw materials, work in process (semi manufactured product), finished goods and office supplies (Pandey I.M, 2002:755)

"Inventory management is determining how much inventory there should be on hand to serve, the purpose of the business most economically" (Bhandari R.M, Inventory management, KTM, CEDA, Seminar of financial management, 1971).

Thus the management should pay adequate attention to the inventory management to reduce the cost of production. Inventory should be maintained in appropriate quantity so as to avoid both under stock and over stock. The aim of inventory management is to maintain optimum level of inventory for the smooth production and sales. Therefore, inventory management is primarily concerned with minimizing total cost of inventory. Both the physical as well as financial dimension of inventory should be efficiently managed. Thus, the real task of top management lies in formulating the plan and policy that will lead to optimal inventory investment for the attainment of desired objectives.

To know the cost of inventory management, the manager should identify all the costs involved in purchasing and maintaining inventories. These costs are ordering cost and carrying costs.

<u>Ordering costs</u>: Ordering costs are the costs of placing and receiving an order. The cost of each order generally is fixed regardless of the average size of inventory. Total ordering cost (TOC) is the product of number of order (N) and fixed cost per order (O). Thus, TOC=N X 0.

<u>Carrying costs</u>: Carrying costs associated with inventory include the finds ties up, storage costs, insurance, and depreciation. The annual total carrying cost (TCC) is equal to the product of average in units (Q/2), annual percentage carrying cost and price per units, and Thus, TCC=Q/2 X C.

<u>Total Inventory costs</u>: Total inventory cost (TIC) is equal t the sum of total carrying cost and total ordering cost. Thus, TIC=C X Q/2+O X N

Similarly, inventory has direct relationship with profit planning to prepare different budgets, especially for the production budget and purchase budget because

Production Units = Sales Units + Closing Inventory – Opening inventory

Purchase Units = Production Units + Closing Inventory of raw materials – Opening inventory or raw material.

1.4 Brief Overview of Nepal Lever Ltd

The study attempts to focus on Nepal Lever Ltd. (also called Unilever Nepal Limited) was formed as a subsidiary company of Hindustan Lever Ltd. of India. The factory is situated at Basamadi VDC-5 of Makwanpur District, 6 km far from Hetauda of central development region of Nepal. The corporate office of the company is situated at Heritage Plaza II, Kamaladi, Kathmandu. 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 the Kathamandu 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 13 th Dec.2004 (2064-08-28). Under the special resolution the change name has been approved by the company register office HMG with effect form 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 assist existing in the company's former name.

Despite difficult trading conditions, the company’s domestic business achieved market growth of 16% during the year 2002/03 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% reduced in exports. As indicted in the previous years reports, exports was on decline from 2000/2001. Consequent to the fiscal change introduced in the Indian budget and with the emergence of many new tax-exempt zone in India. Further withdrawal of the rebate on income tax on profits on exports business 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, distributers and ancillaries (11th annual report, 2060/61). It is already one of the largest corporate taxpayers of Nepal.

It is involving 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 the 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 clinics 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 throughout 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 in association with UNICEF (11^{th} annual report, 2060/61)

1.5 Ownership of Unilever Limited

It is a subsidiary company of foreign investment and technology transformation. It has an authorized capital of Rs 30,00,00,000 (thirty corers) divided into 30,00,000 (thirty lakhs) ordinary shares of Rs 100 each. The paid up capital is Rs 12,00,00,000 and twelve lakhs ordinary shares of Rs100 each and working capital of Rs 99,80,00,000(Nine corers and ninety eight lakhs). The company is listed in Nepal stock exchange centre and has a positive response to its investors. The composition and percentage of shares they hold are as follows:

Group	Allocation of shares	% of shares
A	Hindustan Lever Ltd, India	80%
B	Shiv Kreem Land and ind. Co (Pvt) Ltd. Kath	5%
C	Shares subscribed to the general public	15%

(Source: Annual Report 062/063)

1.6 The Corporate Purpose of Unilever Ltd.

The main objective of ULL is to carry on its own business of manufacturing detergent, toilet soaps, personal products, scourers, soap noodles, laundry soap, tea and vanaspati.

- Other objective of ULL is to meet the every need of people everywhere to anticipate the aspirations of consumers and to respond creatively and competitively with the branded products and services, which rises up quality of life. They bring their wealth of knowledge and industrial expertise to the service of local consumers.
- ULL has deep roots in local culture that the markets are unparallel inheritance thus has become foundation for the company’s future growth. It brings wealth of knowledge and international expertise to the service of local consumers.
- For its long-term success, ULL requires a total commitment to exceptional standards of performance and productivity to working together effectively and willingness to embrace new ideas and learn continuously.
- The company believes that the success required the highest standards of corporate behavior towards its employees, consumers, societies and the world in which it operates.
- This is ULL Nepal's road to sustainable profitable growth and long-term values for their shareholders and employee i.e. for their stakeholders.

1.7 Significance of the Study

As we know that inventory management plays a vital role in manufacturing as well as trading organization equally. Without efficient and effective inventory management, an organization cannot achieve its objective. So a topic chosen by me will be useful to both i.e. organization as well as researchers. The knowledge of sound keeping inventory management helps both i.e. organization and customers. So I am trying to emphasis on the importance of inventory management in the organization. Which tools and techniques can be used while keeping sound inventory management in the organization? What is the weakness of the organization while keeping sound inventory management system? There are lots of theses on this topic. Although, thesis related on this topic as a cooperative study are not found more. So, I have selected this topic.

1.8 Statement of the Problem

Inventory must be managed in such a way 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. Production oriented enterprises should held a sizeable level of inventory. 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. It should be balance in such a way that should neither be excessive nor be inadequate. 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 it’s profit margin is in decreasing trend. So the researcher has chosen this topic to provide suggestions for inventory management for profit planning.

Some major issues of statement problems are as fallows:

- How inventories are managed in ULL?
- What inventory management techniques does this company use?
- How can the factory reduce inventory cost?
- What problems the company has been facing in the management of inventory?
- To what extent inventory and sales are related?
- What is inventory turnover cost?
- Is the inventory management policy of ULL sound?
- What would be the impact of inventory management on the profitability of the company?

1.9 Objectives of the Study

Most of the Nepalese organization is failing management of their inventory properly; Unilever Limited is not free from these weaknesses. This study has attempted to concentrate on the problem faced by Unilever Limited and eliminates the obstacles in the inventory management.

The main objective of this study is to identify the problem under laying in inventory management of ULL and its impact on profitability. In order to meet the main objective the following specific.

Objectives have been proposed:

- To examine the existing inventory system applied by ULL.
- To determine optimal inventory level of major raw materials.
- To analyze the relationship among purchase, sales and inventories.
- To examine the techniques being employed to the manager to manage the inventory of ULL.

- To identify the relationship between inventory and different components of profit planning covering production budget, purchase budget by focusing inventory policy.
- To provide appropriate suggestion based in the major findings.

1.10 Limitations of the Study

This study attempts to find out the problems and impact on the profitability of ULL. Therefore the following will be major limitation of the study:

- This study only focuses on inventory management and its impact on profitability.
- The comprehensibility and accuracy of the study are based in the data provided by the management and various published document of ULL.
- This is case study, so it is not applicable in general situation or all types of manufacturing enterprises.
- 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.
- This study is based on data provided from companies and other available resources. Hence this study is based on secondary data as well as primary data.
- Financial tools and statistical tools are used in analyzing the inventory management of Nepal Lever Limited.

1.11 Organization of the Study

This study has to be completed within the format provides by the Research Department of Central Department of management, the faculty of Management, TU. So, the research is divided into five chapters, which are as follows

a) Chapter One: It includes general background of study statement of problem, objective of the study, introduction of the company, objectives and limitation of the study.

b) Chapter two: This chapter includes reviews of literature. The researcher has divided this chapter into two portions, first being theoretical framework and second is review of previous studies.

c) Chapter three: The Chapter includes research metrology research design, nature and sound of data, data gathering procedure, presentation and analysis of techniques and tools. Both primary and secondary data are used in this study. But secondary data are used considerers.

d) Chapter four: Forth chapter of this study is concern with data presentation and analysis. This is the main part of the study. 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.

e) Chapter five: This is the last chapter of the study and includes, summary conclusion, findings and some recommendations.

CHAPTER TWO

2.1 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 researcher's 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 made, and to receive some ideas for developing a research design." (Wolf and Pant, 1999:30).

There are many researches made in the field of Nepalese manufacturing enterprises. Only limited numbers of studies have been conducted in the field of inventory management. In this chapter attempts have been made in present the review of literature regarding inventory management. This chapter is divided into two-sub section. Conceptual Framework (theoretical concept of inventory management) is presented in first section and review of related studies has been presented in the second section.

2.2 Conceptual Framework

2.2.1 Inventory concept

The dictionary meaning of inventory management is stock of goods or a list of goods. Various authors have given his inventory meaning differently. In according language inventory denotes stock of finished goods. In a manufacturing concern, it may include raw material, work in progress and stocks etc.

"Inventory refers to the physical stock 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 is composed of assets that will be sold in future in the normal course of business operation."(Khan and Jain, 2003,20.3)

"Inventory as a current asset, differ from the other current assets because only financial manager are not involved. Rather, all the financial areas, i.e. finance, marketing, production, 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)

"Anything that a firm kept meeting in future requirement of production and sale is called inventory. The basic reason for holding inventory are to keep up the production activities unhampered It is neither physical possible nor economically suitable to wait for the stocks to arrive at when they are actually required. There, keeping up inventory is a must for efficient working of a business unit (Jain and Narayan).

"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)

Inventory form a link between production and sale of product. The optimum level of inventories should be judges in relation to the flexibility if inventories. The lower the level of inventories makes the less flexibility of the firm. And higher level of inventory increase of the organization.

2.3 Nature of Inventory

Every business operation however big or small has to maintain some inventory. An inventory serve as cushions 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 formulation 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.

Inventories are stock of the product in a company is manufacturing foe sale and component that make up the product. There are various forms in which inventory exit in manufacturing industries.

Manufacturing firm generally hold four 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 the manufacturing process. There are goods that have yet committed to production in manufacturing firm. The level of row materials inventories is influenced by anticipation production, seasonally of production, reliability of sources of supply and the efficient of scheduling purchase and production operation.

"Raw materials inventories are those units which have been purchased and stores for future production."(Weston and Copeland, 1992:814).

It consists of item that firm purchases for use in its production process. It may consist of basic material and manufactures goods. Maintaining adequate raw materials inventories provides a firm with advantage in both purchasing and production. Chemicals and perfumes are the main raw materials used by the company i.e. ULL.

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 work before they become finished product for sale.

"Goods in progress include 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 material. 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 country.

iii. Finished product

Finished goods are those completely manufactured products, which are ready for sale. In a manufacturing firm, they are final output of production process. Stock of raw materials and WIP facilities production of finished goods. Finished goods are required for smooth marketing operation." Therefore finished goods are completely goods a waiting for sale"(Panday, 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."Panday, 2002.884).

2.4 Motives of Holding Inventories

There are four motives of holding inventory. They are Consumption Motives, Speculative Motives, Savings Motives and Precautionary Motives.

i. Consumption Motives

The main objective of holding inventory is for the regular consumption or use of them by the organization. The regular operation guides the basis of holding inventory. A company should maintain adequate stock of materials for supply to the factory for continuous production. It is not possible for a company to procure raw materials whenever it is needed. A time lag exists between demand for materials and its supply. There also exists uncertainty in processing in time at many occasions. The procurement of raw materials may be delayed because of such factor as strike, transportation disruption or short supply. Therefore, the firm should maintain sufficient stock of raw material at a given time to stream live production.

ii. Precautionary Motives

It necessitates holding of inventories to guard against the risk of unpredictable change in demand and supply forces and other factors. Stock of finished goods has to be held because production and sale are not instantaneous. A firm cannot produce immediately when customers demand gods. In case the firms sales are seasonal in nature substantial finished good inventories should be kept to meet the peak demand. Failure to supply products to customer, when demanded, would mean loss of the firm's sales to competition. "The level of finished goods, inventories would depend upon the co-operation between sales and production as well as on production time."(Panday, 2002:984). WIP inventory builds up because of production cycle is the time span between introduction of raw materials into production and emergences of finished product at completion of production cycle. Fill production cycle complete stock of WIP has to be maintained. Efficient firms constantly try to make production cycle smaller by improving their production techniques.

iii. Speculative motives

It influences the decision to increase or reduce inventory levels to take advantage of price fluctuations. Different factors which may necessitate, purchasing and holding of raw materials inventories quantity discount and anticipated price rise. The firm may purchase larger quantities of raw materials that needed for desired production and sale level to obtain quantity discount of bulk purchasing.

2.5 Objectives of Holding Inventory

There are many benefits of holding inventories. To hold inventories, the firm is able to separate the process o purchasing, producing and selling. If firms were not willing to hold adequate raw materials and finished goods, purchasing would take place only when immediate production and sales were anticipated. 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 economies 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, 1980:228).

i. Availability of inventory

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

ii. Least Investment in inventory

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

iii. 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.

iv. 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 profits, as long as the cost of maintaining the inventories are less then the amount of discount.

v. Reducing the Ordering Cost

Every time 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 invoice must be checked with the goods and then send to the accounting department so that supplies can be paid. The variable costs associated with individual order can be reduced if the firm places a few large then numerous small orders.

vi. Achieving Efficient Production Runs

Once a assemble line or pieces of machinery is prepared to receive certain raw materials and perform selected production operation, a set u 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.

2.6 Needs and Importance of Inventory Management

Inventory in any organizations are pivotal role. If the organization is not paying attention to inventory management, it will effect the efficiency and profitability of the organization. Buffa observes "Inventories serve the vital function of developing the various operation in sequence beginning with raw materials extending through all the manufacturing operations and into finished goods. Storage and continuing to warehouse and retail stores"

Importance of inventory management can be written as follows:

i. Inventory helps in smooth and efficient running of business.

ii. Inventory provide service to the customers immediately or at a short notice.

iii. 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.

iv. Inventory also acts as buffer stock when raw materials are received late and so many sales-orders are likely to be rejected.

v. Inventory also reduces product costs because there is an additional advantage of batching and long smooth running production runs.

vi. Inventory helps in maintaining the economy by absorbing some of the fluctuation when the demand for an item fluctuates or is seasonal.

vii. 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.

2.7 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 a 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 problem is to find the lower total cost."(Bloomberg and Hanna, 2003:159). Mainly there are two types of cost.

2.7.1 Carrying cost

Carrying cost are associated with physically goods, once the goals have been accept they became 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 appropriate 30 to 35 percent of the value of the inventory. Five major elements make up these casts in the following manner.

a.	Opportunity cost of investment funds	12-20%
b.	Insurance costs	2-4%
c.	Property Taxes	1-3%
d.	Storage3 costs	1-3%
e.	Obsolescence and deterioration	4-10%
	(Sources: Dobler-1992)	

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

Total carrying cost = Average inventory ×carrying cost per unit.

The inventory carrying cost further express as:

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. If funds were not locked up in inventory. They would have earned a return. 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 sprite of best precautions, firm must protect themselves against such hazard as fire or accident in the warehouse. Larger amount or inventory require larger amount of insurance. The insurance premium represents a carrying cost of inventory (Hamption, 1992:19).

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 provides 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 these 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 managers' 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 larger the inventory, the greater is the absolute from source.

2.7.2 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 & Hanna, 2002:161).

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

- Requisition
- Order placing
- Transportation
- Receiving, inspecting and storing
- Clerical and staff

Everetle. E. Adem, J.R. Ronald, Ebert said that inventory costs or cost associated with inventory included following five types of relevant costs (Adam & 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 inspection 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) 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, labor costs in purchasing in accounting, receiving costs, computer items for record keeping and purchase order supplies.

iii) Carrying (Holding) Costs

Carrying or holding costs are the costs of maintaining the inventory warehouse and protecting the inventory items. Typical costs are insurance, security, warehouse, rental, heat, light, taxes and losses due to pilferage or breakage. The cost of typing up capital in inventory is also considered a carrying cost.

iv) Stock Out Costs

Stock out cost, associated with demand when stocks have been depleted, takes the form of lost of sales or back order costs. When sales are lost because of stock out, the firm losses both the profit margin on unmade. Sales and its customer's good will. If customers take their business elsewhere, future profit margin may also be lost. When customers agree to come back after inventories have been replenished, they make back orders. Back order cost includes loss of goodwill and money paid to recording goods and notify customer when goods arrive.

v) Cost of Operating the Information Processing System

Whether by hand or by computer, someone most update as stock level change. For system in which inventory levels are not recorded daily, the cost is primarily incurred in obtaining accurate physical court of inventories. Frequently, those operating cost are more fixed than variable over a wide quantity (volume) range. Therefore, since fixed costs are not relevant to the operating doctrine, we will not consider them further.

2.8 Techniques of Inventory Management

To manage inventories, the firm's objective should be in consonance with the shareholders wealth maximization principle. To achieve this, 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 stocks. This increase the level of investment and the makes the firm unprofitable.

To manage inventories effectively, a firm should use a system approach to inventory management. A system approach considered in a single model all the factory that effect the inventory. The model called a system may have any number of sub system tied together t achieve a single goal."In the case of inventory system the goal is to minimize the costs". (Hamption, 1992:235)

"The financial manager should aim at an optimum level of inventory on the basic of the trade-off between cost and benefit, to maximize the owner's wealth. Many sophisticated mathematical techniques are available to handle inventory problems. But they are more approximately a part of production management."(Khan and Jain, 2002:20.11)

To manage inventories efficiently, answers 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 and 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.

2.9 Economic Order Quantity (EOQ)

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 of its production. (Van Horne, 2003:377)

EOQ refers to the order size that will result in the lower total ordering and carryings costs an item of inventory. If a firm places unnecessary orders. It will incur unneeded order costs. 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."(Hampton, 1990:231).

How much to order, or produce 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 of re order quantity. EOQ refers to size or quantity or under 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. A balanced is, therefore, struck between the two opposing cost factors and EOQ is determined at a level of which the ordering cost and carrying cost is equal and minimized in total. Therefore, it is necessary calculate order quantity which minimizes carrying cost and ordering cost. Re order quantity is such that when it is added to minimize 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 lead-time cycle is known and constant.
iii. The constant purchase price is independent of the amount ordered.
iv. Transportation costs are constant no matter the amount moves or the distance traveled.
v. No stock outs are permitted.
vi. There is no inventory in transit.
vii. All inventory parts are independent of each other.
viii. The planning horizon is infinite.
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 costs, and price vary. Stockout happen, planning horizons and limited and volume discounts can be significant. Also, many products are independent. No inventory in transit means that the firm buys on a delivered price basis and sells. Planning horizon is limited, as is capital available. Nonetheless, EOQ is most widely used single inventory model. It is simple to use and it produces exact answers.

2.9.1 Approaches to Set EOQ

EOQ model can be determined by following methods:

i. ***Mathematical or formula Method***

Mathematical models are also available to calculate economic order quantity. There are numerous 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 these model is to reduce, minimizes the inventory cost or total costs.

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:

$$\text{EOQ}=\sqrt{\frac{2Ao}{C}}$$

Where, A=Annual demand/requirement/Sales

O=Ordering cost per order

C=Carrying or Holding cost per unit per year

EOQ=Economic Order Quantity

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 one 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 fine the total cost. According to this approach the carryi9ng 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).

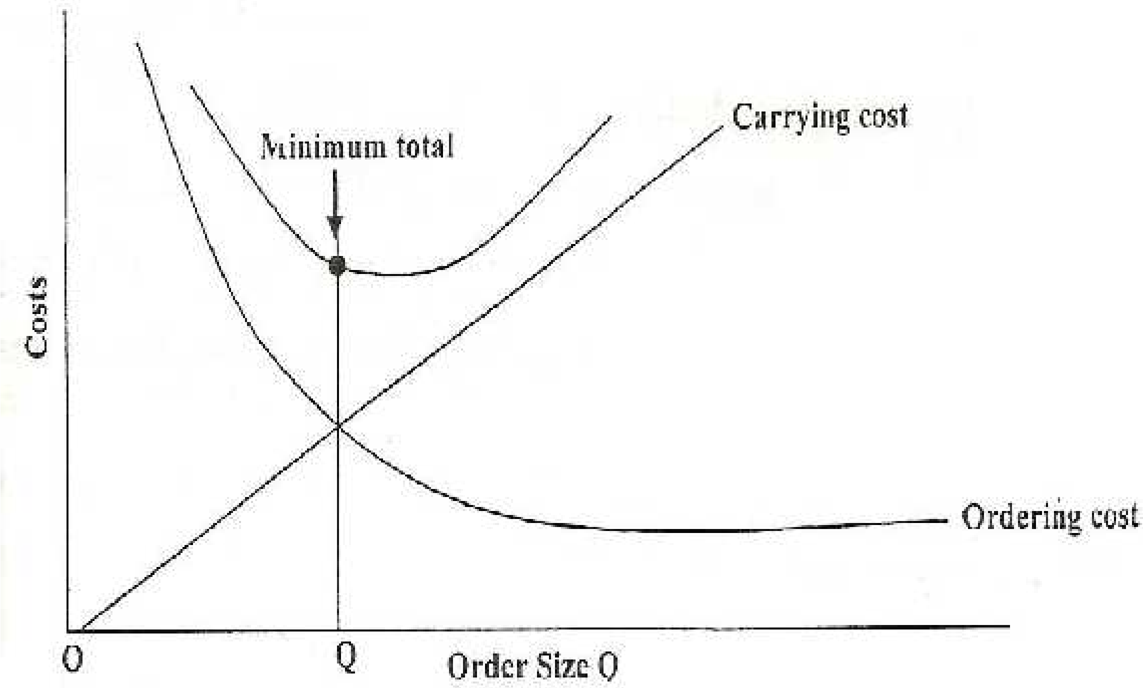
A table arrangement of data relating to items of material may allow them determination of appropriate EOQ. In this approach following points are included.

a) No of order =Increase no of order decreases order size.
b) Ordering size=Annual requirement divided by no of orders.
c) Average inventory=Equal to half of order size
d) Ordering cost=Ordering cost ×No of order
e) Carrying cost=Average inventory ×Carrying cost per unit per year
f) Total cost=Ordering cost + Carrying Cost

iii. The Graphic Approach

The economic ordering quantity can also found graphically. Figure 2.5 given below illustrates the EOQ function. In the figure, carrying, ordering and total costs are plotted on vertical and horizontal axis is used to represent the order size. Total carrying increases as the order size increases, because, on average, a larger inventory will be maintained, and ordering costs decline with increase in order size because large order size means loss number of orders. The behavior of total cash line in noticeable since it is a sum of two types of costs, which behave differently with order size. The total cost decline 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 firms operating profit is maximized at a point Q.

Figure No. 2.7



It should be noticed that the total cost of inventory are fairly insensitive to moderate changes in order size. It may, therefore, 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).

2.10 Methods of Inventory Computation

We can calculate inventory by different methods. Mainly the organization can compute inventory by following methods. (Welsh, Hiton and Gordan, 4th edition: 61)

a) Average sales method

This method can be divided into two categories:

i) Average sales method:

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

$$\text{Inventory} = \frac{Yearly\ sales / total\ Sales\ During\ the\ time\ Period}{No\ of\ time\ Period\ or\ 12} \times require\ Stock\ of\ Period$$

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

ii) Moving Average Method

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

$$\text{Inventory}= \frac{Sales\,(Previous\ Months + current\ month + next\ months)}{Total\ No\ of\ time\ Period} \times require\ No.of\ Months$$

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

b) Sales to turnover Ratio:

This method is also two types.

i) 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 × HSTR or multiplier

Where, Historical sales Turnover Ratio

$$= \frac{No.of\ Month\ in\, a\ year\ or\, 12\,(N)}{Turnover\,Time\,(TT)}$$

And = $\frac{Sales\,(historical)\ for\ the\,Year}{Average\ inventory}$

Average Inventory = $\frac{Opening\ Inventory + Clo\sin g\ inventory}{2}$

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

ii) Turnover Time Method:

Under this method, inventory can be calculated as:

Inventory = $\frac{Total\ Sales\,/\,Budgeted\ sales\ for\ the\,Year}{Turnover\,Time}$

Mostly it is used for suitable inventory policies.

c) 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:

Inventory= Sales for the month × given ratio.

2.11 Procedures of Inventory Management

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

2.11.1 Purchasing

The process of inventory management in fact begins with purchasing. The need for particular materials initiates purchasing in a firm. Purchasing in narrow sense refer merely to the act of buying as items at a price and in boarder sense purchasing make it's a management activity that goes belong the simple act of buying and including the planning and policy actives, research and development services section. Management suggests that purchasing decisions involve the weight of alternatives possibilities and may of these alternatives involve the influence of the other function on the purchasing decision. A good purchasing management has played important role in the management companies. The company should purchasing raw materials, supplies in the right quality from the right origin at the right time and cost. Purchasing management should be effectives otherwise it hamper in the quality of production.

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 gods into a firm. Other term have similar meaning:" Regardless of the term, supply management or purchasing aims at anticipating requirement, sourcing and obtaining supplies, moving supplies into the organization and monitoring the status of supplies as a current assets".(Bloombery Hanna,2002:16.3)

Purchasing activities relating to procuring materials and supplies consumes 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"(Hamton, 1930:228)

Purchasing now has become a specialized function in many organizations. Vesting express that "purchasing is a managerial actives that goes beyond the simple act of buying and includes the planning and police, objective covering wide range of related and complimentary 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 into decrease in profit.

2.11.2 Objectives of Purchasing

The objective of purchasing should confirm the overall objectives of an organization. The objectives of purchasing are like the objectives of integrated logistics. The efficient acquisition of products and services requires the right materials, in right Quantity, in right condition, at the right time, from the right source, with the right services, and the right price.

More explicitly is expected to accomplish nine item (Bloomberg and Hanna, 2002:481).

a) Provide an uninterrupted flow of materials, supplies and services requires to operation the firm.
b) Minimize Inventory Investment and loss: The cost of carrying inventory reaches as much as 50% of the value of product. Inventory carrying cost typically range between 20 and 30 percent of the value of product.
c) Maintain Adequate Quality Standards: The quality of firm's product may be limited by the quality of purchased materials. It is easy to lose sight of quality standards not be compromised solely for lower price.
d) Find or Develop competent Suppliers: Goods supplies help to solve many purchasing problems. It is primary goals of the purchasing manager to locate and attracts quality supplies.
e) Standardize, where ever and whenever possible, the items bought whenever possible.
f) Purchased required items and services at the lower ultimate price.
g) Improve the organization competitive position.
h) Work harmoniously with other department in the organization.
i) Accomplishing the purchasing objectives at the lower possible level of administrative costs.

2.11.3 Procedures of Purchasing

"Effective purchasing means learning the purchase, identified qualified sources of supplies, minimizing the total cost of supplies and administrating the purchase"(Adam and Ronald, 1992:221). While individual purchase may appear quite different, this is general underlying purchasing process. The process is described below (Bloomberg and Hanna, (2003:451).

i) 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. Once the need has been identified.

-

ii) Identifying a Supplier

Identifying the supplier may be as simple as making sure the e-mail address is correct on electronic order or 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.

iii) 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 gods meet standards and if supplies performs satisfactory.

iv) 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.

v) Evaluating the Purchasing and the Suppliers

This is a two-stage process A particular may go well or poorly. Most purchasing organization summarize the accumulated experience with a suppliers through many transaction and many purchase When one transaction goes awry, purchasing may contract the suppliers to avoid future problems, When many transactions fail to meet standards, purchasing then seek new suppliers.

2.11.4Receiving and Storing Keeping

After some time of placing the order, flow up process starts to get quick delivery of the items. The purchasing department at the time of delivery received the items 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 issue. "The store function involves both keeping and store of materials and keeping the store records, the former being physical task and the later being accounting task depending the nature and requirement of the organization. The stores are classified as centralized and decentralized store"(Agrawal, 2000:21)

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

The problem 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 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 provides 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.

i) Objectives of Store Keeping

The major objectives of storekeeping may be stated as follows:

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

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

ii) Bin Cards

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 send 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	Good on order		
	Goods rec. note no.	Qty.	Store requisition note no.	Qty.	Qty.			No. and date of order	Qty.	Date of goods received

iii) 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 nay time of each item of stores (Jain and Narayan: 1991).

<u>Sample of Store Ledger</u>

Name of Article　　　　Maximum quantity
Code No.　　　　Minimum quantity
Bin No.　　　　Ordered quantity

Date	Receipts				Issues				Balance			Remarks
	S.N.	Qty.	Rate	Amt.	S.N.	Qty.	Rate.	Amt.	Qty.	Rate	Amt.	

2.11.5 Issued and Pricing

Each item the inventory has some value associated with it. This value depends on the pricing duration of the item inside the inventory, procurement cost, storage cost etc. Pricing the inventory is one of the most interesting and widely matters in accounting process. Many organizations are interesting in various method of pricing inventory because it has a direct affect on the income. Inventory valuation approach is important is the aspect of income tax problem.

A basic function of the storekeeper is to issue material as required. The function should embrace prompt efficient services and the accurate recording of each transaction. The vouchers that support each materials issue may include some from of requisition that specify quantity, time and place of the delivery. The requisition should indicate proper authorization and the account or order to which materials cost is to be changed.

When materials are issued from the storeroom on requisition, there cost is deducted from the inventory balance. Their cost is also entered in the cost accounting records of materials costs of goods in process of manufacturing suppliers issued for use in a line or stuff department are also deducted at cost from the inventory balance and are recorded as expenses of the department.

There are many method of inventory but must significance method is cost and other method is lower of cost of market. Both methods give different results.

i) Cost Basis for Inventory Valuation

The primary basis of accounting for inventory is cost, which has defined generally as the price paid to consideration given to acquire assets. As applied to inventories, cost means in principle the sum of the application expenditure and change directly incurred in bringing an article to its existing condition and location (AICA-1961).

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 individuals particular purchase group. At that solution firm have faced difficulties in valuation the inventories. In this situation there are many methods which are based on historical use in determining the values of inventories are:

ii) Specific Identification Methods

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

iii) Weighted Average Cost

It assumes that goods are removes from the beginning inventory and purchase group in proportion to the number of unit, in this group consequently; cost of the ending inventory also represents a proportional distribution from the beginning inventory and various purchases groups. "The weighted average cost computed by dividing the total cost of goods available for during the period". (Laughin, 1990:221)

$$\text{Weight Average Cost} = \frac{Total\ \cos t\ of\ Goods\ Available\ for\ sale}{Total\ units\ available\ for\ sale}$$

The method is widely used by organization that hold item of inventory long period of time because it average out of the effect of price increase and decrease. In addition, weighted average process is satisfactory when there are both increase and decrease in cost with in the accounting period. Some organization used this method which purchase the inventory items frequently interval because it does not require that the ending inventory cost be associated with any particular purchase 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.

iv) First in First Out (FIFO) Method

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 state on that invoice until the lot has been exhausted. Materials issues are then assumed to be issued from the next lot received at the invoice price of the second lot until that lot is 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 balanced of store record.

v) Last in First Out (LIFO) Method

The LIFO method of pricing is based on the assumption that the last received is the first to be issued. Materials issued from stock are changes out at the cost of the lasted shipment received until that lot is exhausted. The next issues are then made from the next order preceding, provides the materials in that order were not prevailing costs materials with the prevailing costs materials instead of with cost which may have paid for materials at a much earlier date.

vi) Base Stock Method

Accounting to this method a certain quantity or base stock of material is assumed to be necessary to keep the going to be concern. 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 basic 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.

2.12 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 developed 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.

i) Stock Levels

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

a) Re-order level:

This is the level at which shopkeeper initiated 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 unusual delay in replenishment, stock does not reach zero level. Re order level is calculated as below:

Re-order level=Maximum re-order period × maximum Usage

Re- order level=Minimum level or Safety Stock+ (Normal usage ×Lead time needed)

b) Minimum level or Safety Stock Level

This represents the level, which the stock of particular materials touches before receipt of the fresh lot, provided the same is receiving in normal re-order period and usage is also normal during the period. Stock level is normally not allowed to fall below this level, which is considered, as buffer stock for use during emergency. Fall in stock level below the minimum level will indicate potential danger leading to stock-out position. Stock will fall below minimum level if consumption exceeds the normal consumption or re-order period exceeds the normal re-order or both these happen. Minimum stock level is computed as:

Minimum Level =Re-order Level- (normal consumption × normal re-order period)

c) Maximum Level

Stock is normally not allowed to rise above this level. Stock touches this level immediately on receipt of the fresh lot only if minimum usage occurs and delivery is received in the minimum re- order period Maximum stock level is a control indicator and if the stock exceeds this level the consumption Patten and re-order should be reviewed. Stock exceeds maximum level will lead to9 blocking of capital and unnecessary increase in inventory holding cost, both leading to wastage of scare resources which could have been put to use for other effective purpose.

Maximum Level= Re-order level+ re-order quantity- (minimum consumption × minimum re-order period).

d) Average Stock Level

The level indicates the average stock held by the concern. It is calculated with the help of following formula:

Average Stock Level = (Maximum Level + Minimum 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(Re-order Quantity)

e) Danger Stock Level

This represents the lower level, which the stock of particular materials is allowed to touch. Stock is normally not allowed to fall below this level, which is considered, as the dangerous level. Fall in stock level below the danger level will indicate a stock-out position. Danger level is computed as:

Danger Level = Maximum emergency re-order period × normal consumption

or

Danger Level = Minimum re-order period × Average usage

2.13 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, materials usage budget, open to buy budget, labor budget, flexible budget, capital expenditure budget, cash budget, budget income statement, budget sheet, activity based budget, cost volume profit analysis, etc.

2.13.1 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 efficiently and capital is allocated 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 in 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.

Because,

<u>Production Budget</u>

Sales units for the period	****
(+) Closing inventory	****
Total requirement for the period	****
(-) Opening inventory	****
Production units for the period	****

2.13.2 Inventory and Purchase Budget

In order to maintain company, co-ordination between materials usage, inventory level; of raw material 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. Thus inventory has also direct relationship with materials 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.

Materials Usage =Production Budget × Standard Usage rate

Material Purchase Budget

Materials usage units for the period	****
(+) Closing inventory of materials	****
Total requirement for the period	****
(-) Opening inventory of materials	****
Materials Purchase units for the period	****

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

Where,

Purchase Budget = sales + stock at the end +reduction (discount, mark up, 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= Budget sales for the period + budget reduction + stock at the end- (Actual sales to date + actual reduction to date)
Stock available =Stock at the beginning + stock received today + merchandise order for the period to delivery **–** (Actual sales to date + actual reduction to date)

2.14 Coordination Between Sales, Production and Inventory

The manager must plan an optimum co-ordination between productions 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 of inventory policies. An efficient plan should represent the optimum co ordination between sales budget, essential inventory levels and production levels.

2.15 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.

a) **Sharma, A.K.** has conducted a research work on the topic of "***Inventory Management: a case study of Royal Drug Ltd."***The main objectives of this study are identifying the problems underlying in the inventory management and control system of RDL. Other objectives of his studies are;

- To assess the types of inventory maintained in RDL
- To examine the techniques being employed to manage the inventory in RDL.
- To suggest proper inventory model to RDL bases on analysis.
- To find out inventory position of RDL.

b) **Baral,P,R.** 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 Co.'s policies and objectives, functions and activities regarding inventory management. Finally he came to know that the factory is following neither economic order quantity model in its purchasing decision nor ABC analyze in inventory management. (Baral-1994)

c) **Shrestha S.** regarding ***Inventory Management of Gorkha Patra Corporation*** has conducted a case study. His main objective is to find out the inventory position of the organization and to provide different suggestion regarding inventory management. He had conducted that Gkorkha Patra had not applied any sort of available inventory management techniques to manage the inventory. In the Gorkhapatra Corporation; it is difficult but not impossible to apply the inventory management techniques because of lack of certain data. (Shretha-1988)

d) **Dhital, L. B.** 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's policies related variables like purchase, sales, sales food quota 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 cereal production and requirement is negative. The total food grains quota is fluctuated in year after year because of production fluctuation in Nepalese Kingdom.

e) **Balika R.** 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 he revealed that there is no proper system for material purchase in the industry. And 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. (Bilika-1996)

f) **Rijal S.** has conducted the research work on the topic of ***"Inventory Management: A case study of Agriculture Input Corporation".*** His main objectives are to find present inventory position of AIC, to find out inventory management techniques used by AIC and to provide optimum suggestion regarding inventory management of AIC.

g) **Pradhan B.** has conducted a study on ***Significant of Inventory Management of Nepalese Manufacturing Enterprises.*** He had studies 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 22percent of total assets in the form of inventories in 2000/01 by Nepalese enterprise indicates that larger amount of money has be invested in the form of inventory. Hence, the inventory management has greater significance. (Pradhan-2000)

h) **Sigdel S.** 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, although AIC have capacity of sufficient warehouse throughout the country, it remains out of stock in season and overstock in out of season. AIC is not using ABC analysis also. (Sigdel-2002).

i) **Agrawal G.R.** has made a study relating to the ***Nepalese Public Enterprises,*** which stated that inventory management is the weakest aspect of the management. The tools and techniques for controlling inventory have not been applied in Nepalese manufacturing enterprises for controlling their physical as well as their financial dimension (Agrawal-1980)

j) **Bajrachaya P.** has conducted his study on ***Management in Public Sector Manufacturing Enterprises in Nepal***. The main objectives of his study are to fine out the different problems faced by public sector manufacturing organization in Nepal. One of the important findings was the inventory management suffers from the lack of planning, high carrying cost, poor record keeping and stores management system. (Bajracharya-1983)

2.16 Concluding Remarks

Inventory management is very important for each and every manufacturing organization. Many researches have been conducted in the field of Inventory management but no research is found in the field of inventory management which is connected with profitability. So I have presented the relationship of Inventory management and its impact on profitability for the purpose of completion of my research work. This study will be fruitful to those interested persons, parties, students, teachers, businessman, officers as well as government for the perspectives of academy as well as forming policy.

CHAPTER THREE

3. Research Methodology

3.1 Introduction

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 Limited and it's impact on profitability.

3.2 Research Design

"A research design is the arrangement of conditions for the collections 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 if investigation conceived. So as to obtain answers to research question and to control variances to achieve of the study, description and analytical research design have been used.

This study is entitled, "Impact of Inventory Management Practices of Unilever Limited on Profitability". This study deals with Unilever Limited. Only material collection, consumption and inventory position of product groups are variables under the study. This study is based on primary as well as secondary data. Some simple statistical methods such as trend line and correlation analysis have been applied to examine the facts of data.

3.3 Sources of Data

In this study both primary and secondary data has been used. Mainly, the followings sources have been correlated to accumulate the secondary information:

a) Previous studies and reports
b) Article

c) Published and unpublished official record of ULL.

d) Primary data are based on interviews as well as unstructured dialogues and discussions with stuffs of the organization.

3.4 Data Gathering Procedure

The secondary data are directly obtained from various sources mentioned above fore the purpose of data analysis are taken from officials records, websites. The researcher had to visit the head office of Unilever 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 Presentation and Analysis of Technique and Tools

To analyze the collected facts and figures, various accounting tools are used to effectiveness on inventory management and control wherever necessary. The techniques included are statistical tools, graphs, Karl Pearson coefficient and Correlation. And the inventory management techniques applied in this study is EOQ, different stock levels, inventory turnover ratio and ABC analysis.

3.6 Statistical Tools

Some important statistical tools are used to achieve the objective of this study. In this study, statistical tools such as coefficient analysis, standard deviation, and coefficient of variance have been used.

i) Coefficient of Correlation

This analysis identifies and interprets the relationship between two or more 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

Where Y = Dependent Variable

X = Independent Variable

r = correlation coefficient

ii) Financial Tools:

There are various types of financial tools that applied in order to evaluate and examine inventory management in the research process are given below:

a) ABC Analysis
b) EOQ Model
c) Ratio Analysis:
d) Different turnover ratios
e) e)Different Statistical tools
f) Annual percentage change

CHAPTER FOUR

4.1 Presentation and Analysis of Data

The main objective of this study is to examine the relationship among sales, purchase & profit of investment and present practice of inventory management techniques in ULL. To active the said objective, collected data are analyzed in this chapter by applying 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.

4.2 Relationship Between R/M and Total Inventory Purchased

Table 1: Proportion of R/M on total inventory purchase. (Rs. in Million)

Fiscal year	Raw material	Inventory	% of R/M on total inventory
057/58	134.70	293.93	56.14
058/59	64.06	144.46	44.34
059/60	59.2	126.11	46.94
060/61	95.28	184.22	51.72
061/62	124.53	229.76	54.20
062/63	92.94	256.17	36.28
063/64	161.30	321.62	50.15
064/65	194.69	410.12	47.47
065/66	126.55	245.75	51.49
066/67	212.22	443.18	47.88
Average	126.547	265.532	47.65

Source: annual report of ULL

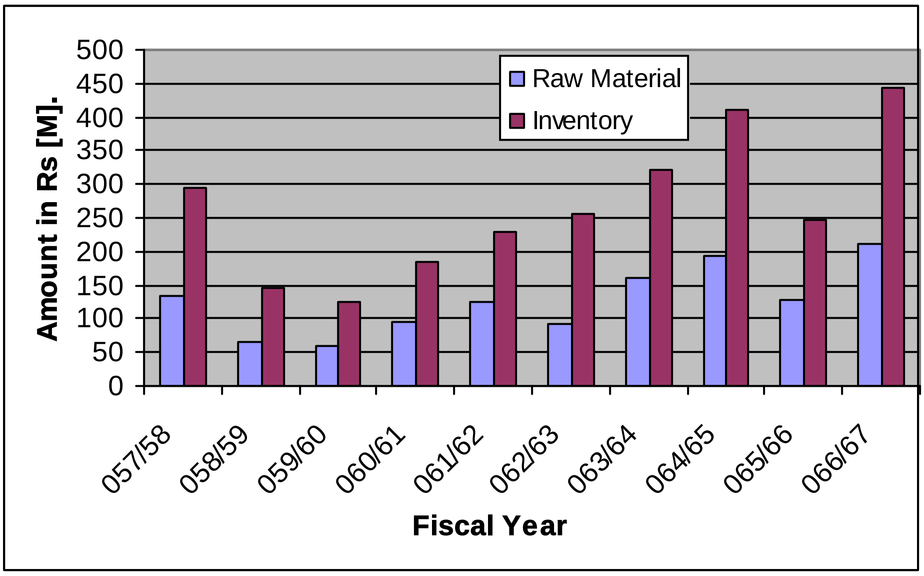
Note: i) % of R/M on inventory = $\frac{\text{R/M}}{\text{Inventory}}$

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

From the above table 4.1, it is observed that, the raw material on total inventory during the study period is 56.14% in the FY 057/58, 44.34% in the FY 058/59, 46.94% in the FY 059/60, 51.72% in FY060/61, 54.20% in the FY061/62, 36.28% in the FY062/63, 50.15% in the FY063/64, 47.47% in the FY064/65, 51.49% in the FY065/66 and 47.88% in the FY066/67.

Similarly, among inventory in overall study period is Rs. 265.532 M, average inventory of raw material in overall study period is Rs.126.547 M and average percentage of R/M in total inventory in overall study period is 47.65%.

Figure 1: The graphic presentation of level of R/M on total inventory is as follows:



From the above analysis, it is observed that raw material consumption in the company is erotic. 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 factor for such fluctuation.

The correlation between inventory and sales is 0.97 which is shown in **Appendix 1**.

4.3 Test of significance of Correlation Coefficient

To test the significance of correlation of coefficient we can use ‘T’ statistic. Here sample size in less then 30, so we can use ‘T’ statistics.

Here, r = 0.97

T 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

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

$$= 0.97\sqrt{\frac{10-2}{1-0.97^2}}$$

= 11.43

Critical value:

Now tabulated value of ‘t’ for (n – 2) i.e. 10 – 2 = 8 degree of freedom for two tail test at 5% level of significance in 2.307.

Decision: since collected $|t|$ is greater then tabulated of $|t|$ at 8 degree of freedom at 5% level of significance. We reject hypothesis (H_0) which indicate that correlation coefficient between variables are significance or ‘r’ is significant.

4.4 Relationship between WIP and total inventory purchased

Table 2: Proportion of WIP on total inventory (Rs. in Million)

Fiscal year	WIP (in M)	Total inventory (M)	% of WIP on total inventory
057/58	12.4	293.93	4.21
058/59	6.3	144.46	4.36
059/60	4.02	126.11	3.18
060/61	5.52	184.22	2.99
061/62	3.49	229.76	1.51
062/63	7.67	256.17	2.99
063/64	2.84	321.62	0.88
064/65	7.47	410.12	1.82
065/66	3.93	245.75	1.59
066/67	8.66	443.18	1.95
Average	6.23	265.532	2.34

Source: annual report.

Note,

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

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

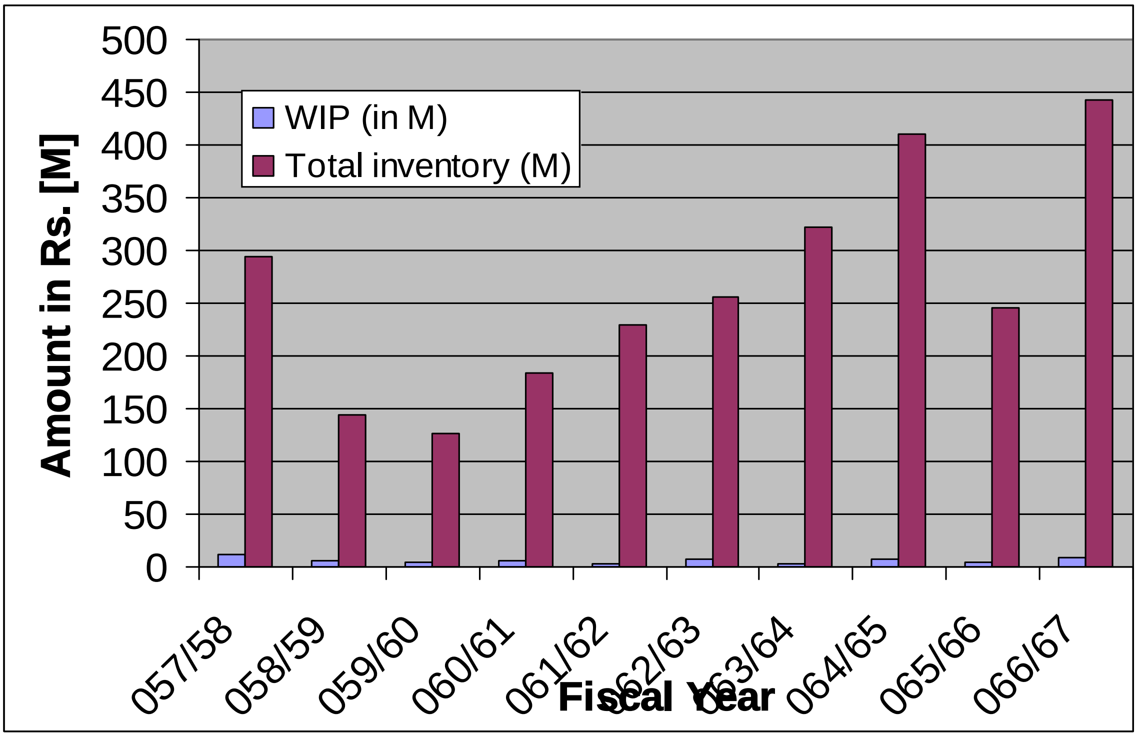
ULL was using few soap noodles to produce the fiscal product. The smaller portion of WIP on total inventory is used by the company.

From the above table 4.2, it is observed that the portion of WIP material on total inventory during the study period is 4.21% on the FY 057/58, 4.36% in the FY 058/59, 3.18% in the FY 059/60, 2.99% in the FY060/61, 1.51% in the FY 061/62, 2.99% in the FY062/63, 0.88% in the FY063/64, 1.82% in the FY066/65, 1.59% in the FY065/66 and 1.95% in the FY066/67.

Similarly, the average percentage of WIP material in total inventory in overall study period in 3.58%. similarly, average inventory overall study period is Rs 265.532 (million), average inventory o WIP materials in overall study period is Rs 6.23 Million.

The graphical presentation of level of WIP materials and total inventory is as follows:

Figure 2: Proportion of WIP on total inventory (Rs. in Million)



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

The correlation between inventory and sales is 0.39 which is shown in **Appendix 2**.

Test of significance of correlation coefficient

To test the significance of correlation of coefficient we can use 'T' statistic. Here sample size in less then 30, so we can use 'T' statistics.

Here, r = 0.39

T 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

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

$$= 0.39\sqrt{\frac{10-2}{1-0.39^2}}$$

= 1.199

= 1.20

Critical value:

Now tabulated value of ‘t’ for (n – 2) i.e. 10 – 2 = 8 degree of freedom for two tail test at 5% level of significance in 2.307.

Decision: since collected $|t|$ is less then tabulated of $|t|$ at 8 degree of freedom at 5% level of significance. We reject hypothesis (H_1) which indicate that correlation coefficient between variables are not significance or ‘r’ is not significant.

4.5 Relationship between finished goods and total inventory purchased.

Table 3: Proportion of finished goods on total inventory. (Rs. in Million)

Fiscal year	Finished goods (M)	Total inventory (M)	% of finished goods in total inventory
057/58	87.6	293.93	29.80
058/59	41.3	144.46	28.58
059/60	44.5	126.11	35.28
060/61	55.50	184.22	30.12
061/62	73.83	229.76	32.13

Fiscal year	**Finished goods (M)**	**Total inventory (M)**	**% of finished goods in total inventory**
062/63	116.35	256.71	45.41
063/64	94.04	321.62	29.23
064/065	111.59	410.12	27.20
065/66	51.56	245.75	20.98
066/67	129.86	443.18	29.30
Average	80.613	265.532	30.35

Source: annul report of ULL.

Note:

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

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

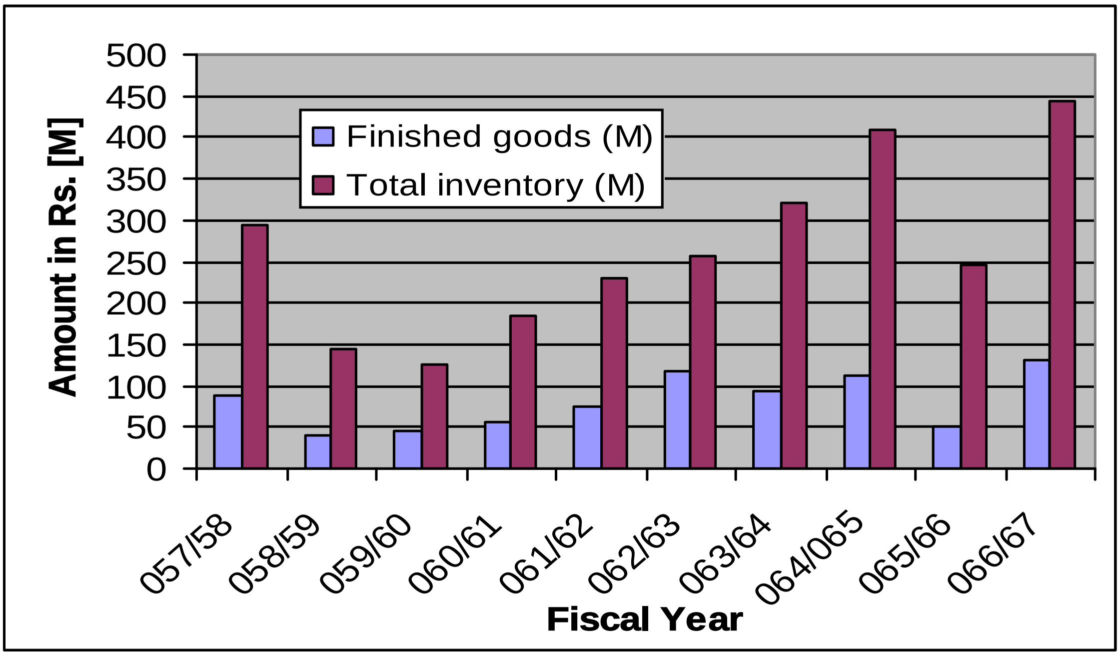
ULL has been producing different kinds of products and product groups namely, detergents, toilet soap, oral care, scourers, skin creams, laundry soaps, hair care etc.

From the above table4.3, it is observed that the portion of finished goods a total inventory during the study period is 29.80% in the FY. 057/58, 28.58% in the FY. 058/59, 35.28% in the FY. 059/60, 30.12% in the FY 060/61, 32.13% in the FY 061/62, 45.41% in the FY. 062/63, 29.23% in the FY. 063/64, 27.20% in the FY. 064/65, 20.98% in the FY. 065/66 and, 29.30% in the FY. 066/67.

As the table above, average percentage of finished goods inventory in total inventory in overall study period is 30.35%. Similarly, average inventory is overall study period is Rs 265.532 Million, average inventory of finished goods in overall study period is Rs 80.613 Million.

The graphical presentation of level of finished goods in total inventory is as follows:

Figure 3: Proportion of finished goods on total inventory



From the above analysis, it is observed that the production rate was fluctuating during the study period. In that period of study, contribution of raw material and packaging material was in increasing trend. Fluctuation of demand and sales of the company are the main reason of such situations.

The correlation between inventory and sales is 0.88 which is shown in **Appendix 3**.

Test of significance of correlation coefficient

To test the significance of correlation of coefficient we can use 'T' statistic. Here sample size in less then 30, so we can use 'T' statistics.

Here, r = 0.88

T 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

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

$$= 0.88\sqrt{\frac{10-2}{1-0.88^2}}$$

$$= 5.24$$

Critical value:

Now tabulated value of 't' for (n – 2) i.e. 10 – 2 = 8 degree of freedom for two tail test at 5% level of significance in 2.307.

Decision: since collected $|t|$ is greater then tabulated of $|t|$ at 8 degree of freedom at 5% level of significance. We reject hypothesis (H_0) which indicate that correlation coefficient between variables are significance or 'r' is significant.

4.6 Relation between spare parts and total inventory purchased

Table 4: Proportion of stores and spare parts in total inventory (Rs. in Million)

Fiscal year	Stores and spare parts (M)	Total inventory (M)	% of stores and spare parts
057/58	16.98	293.93	5.77
058/59	11.5	144.46	7.96
059/60	6.9	126.11	5.47
060/61	6.15	184.22	3.33
061/62	4.52	229.76	1.96
062/63	6.98	256.17	2.72
063/64	7.26	321.62	2.25
064/65	8.49	410.12	2.07
065/66	8.83	245.75	3.59
066/67	10.75	443.18	2.42
Average	8.836	265.532	3.32

Source: Annual report of ULL.

Note:

i) % of stores and spares parts on total inventory = $\frac{\text{stores and spares in Rs.}}{\text{total inventory in Rs.}}$.

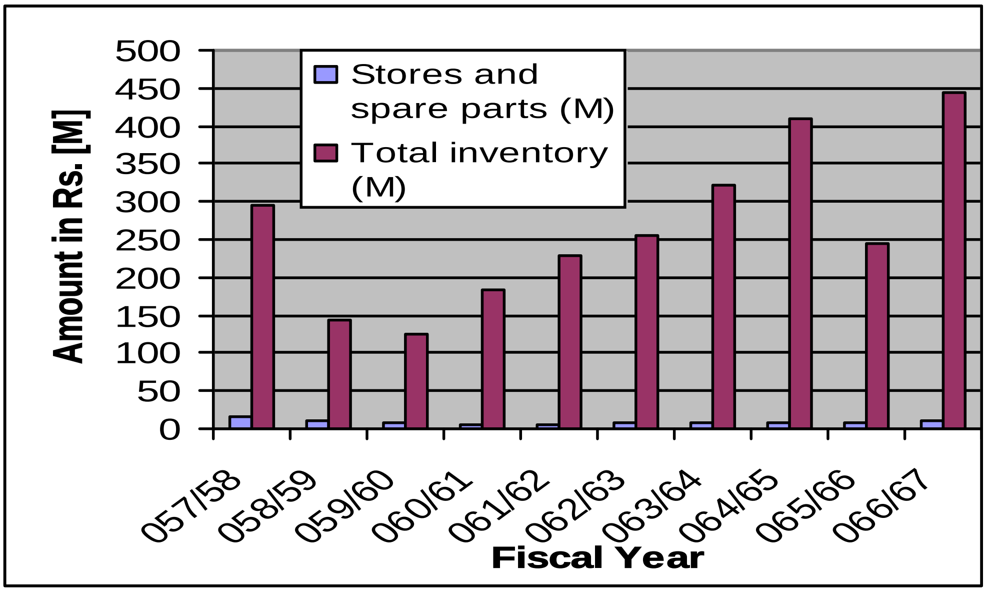
ii) Average = $\frac{\text{sum of the figure of overal study period}}{\text{No. of period}}$

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

From the above table 4.4, it is observed that the portion of stores and spare parts on total inventory during the study period is 5.7% in the FY 057/58, 7.9% in the FY 058/59, 5.5% in the FY 059/60, 3.34% in the FY 060/61, 1.96% in the FY 061/62, 2.72% in the FY 062/63, 2.25% in the FY 063/64, 2.07% in the FY 064/65, 3.59% in the FY 065/66 and 2.42% in the FY 066/67.

When as, the average percentage of stores and spare parts inventory on total inventory in overall study period is 3.32%. Similarly, average inventory in overall study period is RS 265.532 Million, average inventory of stores and spare parts in overall study is Rs 8.836 Million. The graphical presentation of level of stores and spare parts to total inventory is as follows:

Figure 4: Proportion of stores and spare parts in total inventory



From the above analysis, 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.

The correlation between inventory and sales is 0.09 which is shown in **Appendix 4**.

Test of significance of correlation coefficient

To test the significance of correlation of coefficient we can use 'T' statistic. Here sample size in less then 30, so we can use 'T' statistics.

Here, r = 0.09

T 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

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

$$= 0.09\sqrt{\frac{10-2}{1-0.09^2}}$$

= 0.26

Critical value:

Now tabulated value of 't' for (n – 2) i.e. 10 – 2 = 8 degree of freedom for two tail test at 5% level of significance in 2.307.

Decision: since collected $|t|$ is less then tabulated of $|t|$ at 8 degree of freedom at 5% level of significance. We reject hypothesis (H_1) which indicate that correlation coefficient between variables are not significance or 'r' is not significant.

4.7 Relationship between sales and inventory

Table 5: Inventory turnover ratio (Rs. In Million)

Fiscal year	Sales (Rs.)	inventory (Rs.)	inventory turnover ratio	% deviation on average inventory turnover ratio
057/58	1540.99	293.93	5.24	(23.16)
058/59	1236.05	144.46	8.56	25.51
059/60	1244.73	126.11	9.87	44.72
060/61	1524.90	184.22	8.28	21.40
061/62	1481.56	229.76	6.45	(5.42)
062/63	1434.94	256.17	5.60	(17.88)
063/64	1818.53	321.62	5.65	(17.15)
064/65	2144.59	410.12	5.23	(23.31)
065/66	2625.83	245.75	10.68	56.59
066/67	3055.07	443.18	6.89	1.02
Average	1810.719	265.532	6.82	

Source: annual report of ULL.

Note:

(i) Inventory turnover ratio = $\frac{\text{sales}}{\text{inventory}}$

(ii) The figure in brackets are negative.

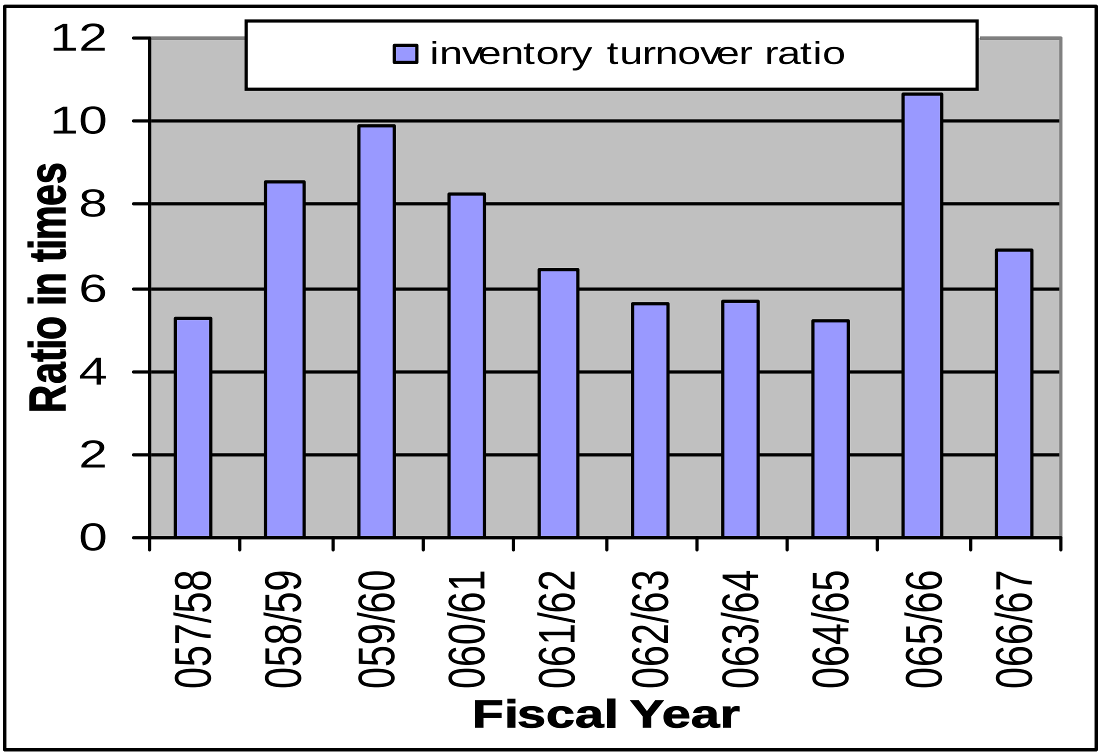
(iii) % of deviation on average inventory turnover ratio =

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

From the above table 4.5, it is observed that in the FY 065/66 the inventory turnover ratio is highest i.e. 10.68 times. So, in this year low level of inventory is kept in the company due to fast consumption of raw materials and sales of finished goods. In the FY 064/65, the inventory turnover ratio is the lowest, i.e. 5.23 times. Similarly, the highest negative deviation from the average of inventory turnover ratio is (23.31%) in the FY 064/65, which indicates the slow consumption of raw material or low utilization of raw material, WIP materials and low sales of finished goods.

The graphical presentation of inventory turnover ratio is as follows:

Figure 5: Inventory turnover ratio



The correlation between inventory and sales is 0.75 which is shown in **Appendix 5**.

Test of significance of correlation coefficient

To test the significance of correlation of coefficient we can use 'T' statistic. Here sample size in less then 30, so we can use 'T' statistics.

Here, r = 0.75

T 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

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

$$= 0.75\sqrt{\frac{10-2}{1-0.75^2}}$$

$$= 3.22$$

Critical value:

Now tabulated value of 't' for (n – 2) i.e. 10 – 2 = 8 degree of freedom for two tail test at 5% level of significance in 2.307.

Decision: since collected $|t|$ is greater then tabulated of $|t|$ at 8 degree of freedom at 5% level of significance. We reject hypothesis (H_0) which indicate that correlation coefficient between variables are significance or 'r' is significant.

4.8 Relationship between inventory and net profit

Table 6: Relationship between inventory and net profit (Rs. In Million)

Fiscal year	Inventory	% Deviation on average inventory	Net profit	% Deviation on average net profit
057/58	293.93	10.69	68.04	(71.53)
058/59	144.46	(45.59)	42.60	(82.18)
059/60	126.11	(52.50)	93.20	(61.01)
060/61	184.22	(30.62)	140.78	(41.11)
061/62	229.76	(13.47)	189.19	(20.86)
062/63	256.17	(3.52)	238.15	(0.38)
063/64	321.62	21.12	263.06	10.03
064/65	410.12	54.45	335.12	40.17
065/66	245.75	(7.44)	444.04	85.73
066/67	443.18	66.9	576.53	141.15
Average	265.532		239.071	

Source: annual report of ULL.

Note:

i) The negative figures are in the bracket.

i) % deviation on average net profit.

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

ii) % Deviation on average inventory

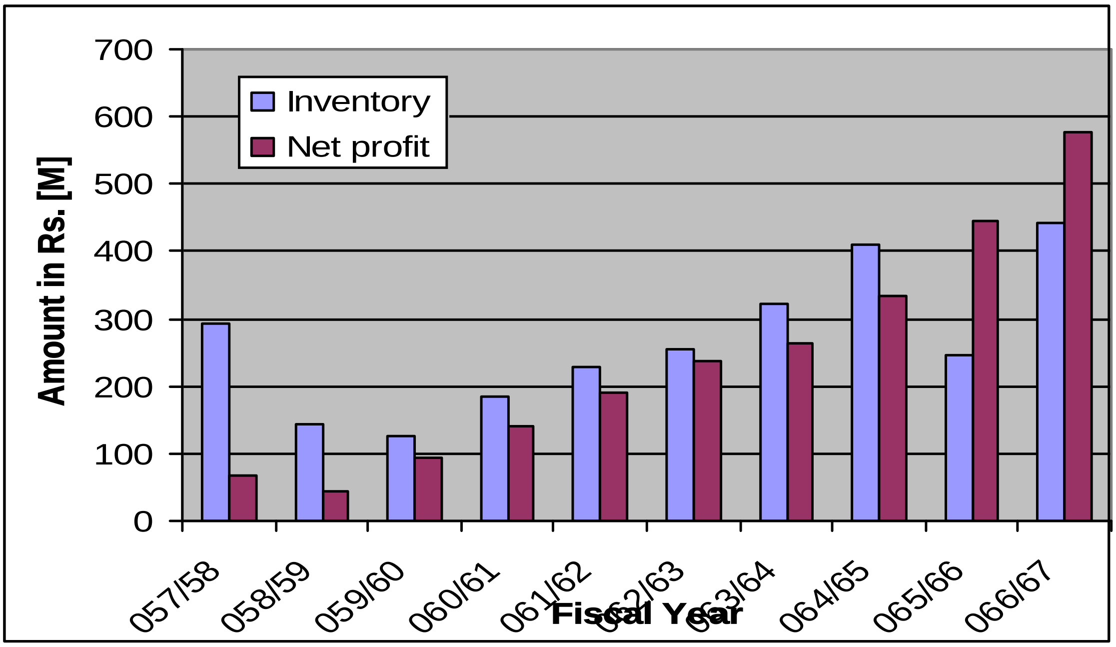
$$\frac{\text{inventory in given fiscal year - average inventory in overall study period}}{\text{average inventory in overall study period}}$$

The above table 4.6 shows the relation between inventory and net profit from the FY 057/58 to 066/67. From the above table it is observed that the average inventory during the study period is Rs 265.532 million and the average net profit during the study period is 239.071 million. Similarly, the above table shows the percentage deviation of inventory and net profit over the study period. The highest positive deviation from the average inventory is 66.90% in the FY 066/67 and the highest positive deviation from the average net profit is 141.15% in the FY 066/67. Similarly, the highest negative deviating from the average inventory is (52.50%) in the FY 059/60 and the highest negative deviation from the average net profit is (82.81%) in the FY 058/59.

From the above analysis it is observed that inventory and net profit were fluctuating during the study period.

The graphical presentation of Inventory and Net Profit is presented below.

Figure 6: Relationship between inventory and net profit



The correlation between inventory and net profit is 0.74 which is shown in **Appendix-6**

Test of significance of correlation coefficient

To test the significant of correlation of coefficient we are use T statistic. Here size is less than 30, so we can use T statistic.

Here, r = 0.74

Step – I, Null Hypothesis (H_0) = 0 (i.e. 'r' is not significant)

Step – II, Alternative Hypothesis (H_1) # 0 (i.e. 'r' is significant)

Step – III, Test statistic T = $r\sqrt{\frac{n-2}{1-r^2}}$

$$= 0.74\sqrt{\frac{10-2}{1-0.74^2}}$$

$$= 3.11$$

Step – IV, Critical Value:

Tabulated value of 't' for n – 2 i.e. 10 – 2 = 8 degree of freedom for two test at 5% level of significance is 2.307.

Decision:

Since the calculated value of $|t|$ is less than tabulated value of $|t|$ at 8 degree of freedom at 5% level of significant. So we reject null Hypothesis (H_0) which indicate the correlation coefficient between variables are significant or 'r' is significant.

4.9 Relationship between sales and net profit

Table 7: Relationship between sales and net profit (Rs in Million)

Fiscal year	Sales	% Deviation on average sales	Net profit	% Deviation on average net profit
057/58	1540.99	(14.89)	68.04	(71.53)
058/59	1236.05	(31.73)	42.60	(82.18)
059/60	1244.73	(31.25)	93.20	(61.01)
060/61	1524.90	(15.78)	140.78	(41.11)

Fiscal year	Sales	% Deviation on average sales	Net profit	% Deviation on average net profit
061/62	1481.56	(18.17)	189.19	(20.86)
062/63	1434.94	(20.75)	238.15	(0.38)
063/64	1818.53	0.43	263.06	10.03
064/65	2144.59	18.43	335.12	40.17
065/66	2625.83	45.01	444.04	85.73
066/67	3055.07	68.72	576.53	141.15
Average	1810.719		239.071	

Source: annual reports of ULL.

Note:

i) The negative figure are in the brackets.

ii) % deviation on average sales =

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

iii) % deviation on average net profit =

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

The above table – 4.7 shows the relation between sales and net profit for the FY 057/58 to 066/67. From the above table, it is observed that the average sales and net profit during the study period are Rs. 1810.719 million and Rs 239.071 million respectively. Similarly, the above table also shows the percentage deviation of sales and net profit over the study period. The highest positive devotion from the average sales 68.72% in the FY 066/67, and the highest positive deviation from an average net profit is 141.15% in the FY 066/67. Similarly, the highest negative deviation from an average sale is (31.73%) in the FY 058/59 and the highest negative deviating from an average net profit is (82.18%) in the FY 058/59.

From the above analysis, it is observed that in FY 057/58 sales was Rs 1540.99 million and in that year, the company accrued Rs. 68.04 million profit and from FY 058/59 sales and net profit are in increasing trend. Similarly from the FY 060/61 to 062/63 sales is in decreasing trend and net profit is in increasing trend. From FY062/63 sales and net profit both are in increasing trend. In the FY 066/67 sales amounted Rs. 3055.07 million and not profit increased is to Rs 576.53 million.

The correlation between sales and net profit is 0.95 which is shown in **Appendix-7**

Test of significance of correlation coefficient.

To test the significant of correlation, we can use T-test. Here sample size is less then 30. So we can use T-test.

Here, r = 0.95

Step – I, Null Hypothesis (H_0) = 0 (i.e. 'r' is not significant)

Step – II, Alternative Hypothesis (H_1) # 0 (i.e. 'r' is significant).

Step – III, Test statistic

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

$$= 0.95\sqrt{\frac{10-2}{1-0.95^2}}$$

= 8.61

Step – IV, Critical Value:

The tabulated value of $|t|$ for (n – 2) i.e.10 – 2 = 8 degree of freedom for two-tail test at 5% level of significance is 2.307.

Step – V, Decision:

Since calculated value of $|t|$ is less then tabulated value of $|t|$ at 5% level of significance, we reject null Hypothesis (H0). The means, correlation coefficient between variable are significant or 'r' is significant.

4.10 Inventory Management and Control Techniques

Economic order quantity (EOQ)

The optimal level of raw material has been determined by the application of "Economic Order Quantity" model. EOQ can be calculated by using 3 methods.

i) Formula method,

ii) Tabular method (trial and error method)

iii) Graphical method.

4.10.1 Calculation of EOQ of the FY 057/58

i) Formula Method:

Annual requirement (A) = 20921 tons

Ordering cost per order (O) = Rs. 163378

Carrying cost per tons (C) = Rs. 1423/tons,

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

$$= \sqrt{\frac{2 \times 20921 \times 163378}{1423}}$$

= 2192 tons

(i) EOQ = 2192 tons

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

$$= \frac{20921}{2192}$$

= 9.54 times $\approx$ 10 times

From the above 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.

ii) Trial and Error Method:

Table 8: Inventory control cost

No. of order	Order size (tons)	Average invest (tons)	Total C. C. (Rs.)	Total O.C. (Rs.)	Total cost (Rs.)
1	20921	10461	14886003	163378	15049381
3	6973	3487	4962001	490134	5452135
7	2989	1494	2126571	1143646	2370217
9	2325	1162	1654000	1470402	3124402
10	2092	1046	1488600	1633780	3122380

Source: annual report of ULL

The above table 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 R/M is Rs. 3122380 which the total carrying cost is RS 1488600 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 R/M it should order only 10 times during the year.

So, it becomes clear from formula as well as tabular method, that the company order 2191 tons with 10 times during the year.

4.10.2 Economic Order Quantity of Raw Material on FY 058/059

Annual requirement (A) = 17665 tons

Ordering cost per order (O) = Rs. 109094

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

$$\therefore \text{EOQ} = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 17665 \times 109094}{1373}} = 1675 \text{ tons}$$

(iii) EOQ = 1675 tons

(iv) No. of order = $\frac{\text{Annual Requirement}}{\text{EOQ}}$

$$= \frac{17665}{1675}$$

$= 10.54$ times ≈ 11 times

From the above calculation, the EOQ is 1675 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.

ii) Trial and Error Method:

Table 9: Inventory control cost

No. of order	Order size (tons)	Average invest (tons)	Total C. C. (Rs.)	Total O.C. (Rs.)	Total cost (Rs.)
1	17665	8832	12126336	109094	12235430
3	3533	1766	2425267	545470	2970737
7	2523	1262	1732334	763658	2495990
10	1766	883	1212633	1090940	2303573
11	1605	802	1102394	1200034	2302428

Source: annual report of ULL

The above table 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 R/M is Rs. 2302428 which the total carrying cost is RS 1102394 and total ordering cost is Rs. 1200024 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 R/M it should order only 11 times during the year.

So, it becomes clear from formula as well as tabular method, that the company order 1675 tons with 11times during the year.

4.10.3 Economic Order Quantity of Raw Material on FY 059/060

Annual requirement (A) = 17365 tons

Ordering cost per order (O) = Rs. 108472

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

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

$$= \sqrt{\frac{2 \times 17362 \times 108472}{1123}}$$

= 1831 tons

(v) EOQ = 1831 tons

(vi) No. of order = $\frac{\text{Annual Requirement}}{\text{EOQ}}$

$$= \frac{17665}{1675}$$

= 9.48 times $\approx$ 9 times

From the above calculation, the EOQ is 1831 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.

ii) Trial and Error Method:

Table 10: Inventory control cost

No. of order	Order size (tons)	Average invest (tons)	Total C. C. (Rs.)	Total O.C. (Rs.)	Total cost (Rs.)
1	17362	8681	9748763	108472	9857235
5	3472	1736	1949752	542360	2492112
9	1929	964	1083196	976248	2094444
10	1736	868	974876	1084720	2059596
12	1447	723	812397	1301664	2114061

Source: annual report of ULL

The above table 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 R/M is Rs. 2059444 which the total carrying cost is RS 1086196 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 R/M it should order only 9 times during the year.

So, it becomes clear from formula as well as tabular method, that the company order 1831 tons with 9 times during the year.

4.10.4 Economic Order Quantity of Raw Material on FY 060/061

Annual requirement (A) = 21090 tons

Ordering cost per order (O) = Rs. 108492

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

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

$$= \sqrt{\frac{2 \times 21090 \times 108492}{1127}}$$

= 2014 tons

(vii) EOQ = 2014tons

(viii) No. of order = $\frac{\text{Annual Requirement}}{\text{EOQ}}$

$$= \frac{21090}{2014}$$

= 10.47 times $\approx$ 10 times

From the above calculation, the EOQ is 2014 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.

ii) Trial and Error Method:

Table 11: Inventory control cost

No. of order	Order size (tons)	Average invest (tons)	Total C. C. (Rs.)	Total O.C. (Rs.)	Total cost (Rs.)
1	21090	10545	11884215	108492	11992707
5	4218	2109	2376843	542460	2919303
9	2343	1171.5	1320281	976428	2296709
10	2109	1054.5	1188422	1084920	2273342
12	1758	879	990633	1301904	2292537

Source: annual report of ULL

The above table 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 R/M is Rs. 2273342 which the total carrying cost is RS 1188422 and total ordering cost is Rs. 1084920 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 R/M it should order only 10 times during the year.

So, it becomes clear from formula as well as tabular method, that the company order 2014 tons with 10 times during the year.

4.10.5 Calculation of EOQ of Raw Material on the FY 061/62

Annual requirement (A) = 19484 tons

Ordering cost per order (O) = Rs. 109090

Carrying cost per order (C) = Rs. 1170

By applying EOQ formula

$$\text{EOQ} = \sqrt{\frac{2Ao}{C}}$$

$$= \sqrt{\frac{2 \times 19484 \times 109090}{1170}}$$

$= 1906.13$ tons

(i) EOQ = 1906.13 tons

(ii) $\text{No. of orders} = \frac{\text{Annualrequirement}}{EOQ}$

$$= \frac{19484}{1906.13}$$

$= 10.22$ tons

From the above calculation, the EOQ is 1906.13 tons under the formula method which minimize the total ordering and carrying cost with no. of orders 10.22 tons, which is also clear from the following tabular method.

Table 12: Trial and error approach of EOQ of 061/62

No. of order	Order size (tons)	Average invest (tons)	Total C. C. (Rs.)	Total O.C. (Rs.)	Total cost (Rs.)
1	19484	9742	11398140	109090	11507230
5	3896.8	1948.4	2279628	545450	2825078
7	2783.42	1391.71	1628300.7	763630	2391930.7
10	1948.4	974.2	1139814	1090900	2230714
12	1623.67	811.83	949846.95	1309080	2258926.95

Source: annual report of ULL

The above table shows that the carrying cost is decreasing and ordering cost is increasing with the increasing no. of order. The above table shows the minimum total cost of R/M is 2230714 where the total carrying cost is Rs 11,39,814 and total carrying cost is Rs. 10,90,900 with the no. of order nearly 10 times per year. So it is clear that, if the company wants to minimize total cost of inventory of R/M it should order 10 times during the year.

So, it becomes clear from formula as well as tabular method that the company should order 19.6.13 tons with 10 times during the year.

4.10.6 Calculation of EOQ of Raw Material on the FY 062/63

Annual requirement (A) = 20929 tons

Ordering cost per order (O) = Rs 107375

Carrying cost per ton (C) = Rs 1135

By applying formula,

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

$$= \sqrt{\frac{2 \times 20929 \times 107375}{1135}}$$

= 1990 tons

(i) EOQ = 1990 tons

(iii) No. of order = $\frac{\text{Annual requirement}}{EOQ}$

$$= \frac{20929}{1990}$$

= 10.51 times

From the above calculate, the EOQ is 1990 tons under the formula method which minimizes the total ordering and carrying cost with no. of orders 10 times which is also clear from the following tabular method.

Table 13: Trial and Error approach of EOQ of 062/63

No. of order	Order size (tons)	Average invest (tons)	Total C. C. (Rs.)	Total O.C. (Rs.)	Total cost (Rs.)
1	20929	10464.5	11877207.5	107375	11984582.5
3	6976.3	3488.15	3959050.25	322125	4281175.25
5	4185.8	2092.9	2375441.5	536875	2912316.5
10	2092.9	1046.45	1187720.75	1073750	2261470.75
13	1609.9	804.96	913629.6	1395875	2309504.6

Source: annual report of ULL

The above table shows that the carrying cost is decreasing and ordering cost is increasing with the increasing no of order. The above table shows the minimum total cost of R/M is Rs. 2261470.75 where the total carrying cost is 1187720.75 and the total ordering cost is

Rs. 1073750 with the no. of order nearly 11 times per year. So it clear that if the company wants to minimize total cost of inventory of R/M it should order 11 times during the year.

Graphic method

Under this method carrying and ordering cost are plotted in graphs and the point, where carrying cost and ordering cost is equal that quantity is taken as EOQ.
Graphic presentation of EOQ is as follows:

Figure 7: Inventory control cost

The above table 4.8.8 and figure shows the minimum carrying cost and ordering cost, which minimize the total cost. OX axis denote the no. of orders and OY axis denotes the total cost of ordering and carrying. Ordering cost is going up and carrying cost is going downward. When ordering 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.

4.10.7 Calculation of EOQ of Raw Material on the FY 063/64

Annual requirement (A) = 23354 tons

Ordering cost per order (O) = Rs. 117895

Carrying cost per ton (C) = Rs. 1450 per tons

By applying EOQ formula

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

$$= \sqrt{\frac{2 \times 23354 \times 117895}{1450}}$$

= 1948.76tons

(iv) EOQ = 1948.76 tons i.e. 1949 tons

(v) No. of orders = $\frac{\text{Annualrequirement}}{EOQ}$

$$= \frac{23354}{1948.76}$$

= 11.98 times

From the above calculation, the EOQ is 1948.76 tons under the formula method which minimize the total ordering and carrying cost with no. of orders 11.98 times, which is also clear from the following tabular method.

Table 14: Trial and error approach of EOQ of 063/64

No. of order	Order size (tons)	Average invest (tons)	Total C. C. (Rs.)	Total O.C. (Rs.)	Total cost (Rs.)
1	23354	11677	16931650	117895	17049545
6	3892.4	1946.2	2821990	707370	3521360
11	2123	1061.5	1539175	1296845	2836020
12	1946.2	973.1	1410995	1414740	2825735
13	1796.4	898.2	1302390	1532635	2835025

Source: annual report of ULL

The above table shows that the carrying cost is in decreasing order and ordering cost is increasing order with the increasing no. of order. The above table shows the minimum total cost of R/M is 2825735 where the total carrying cost is Rs 1410995 and total ordering cost is Rs. 1414740 with the no. of order nearly 12 times per year. So it is clear that, if the company wants to minimize total cost of inventory of R/M it should order 12 times during the year.

So, it becomes clear from formula as well as tabular method that the company should order 1948.76 tons with 12 times during the year.

4.10.8 Calculation of EOQ of Raw Material on the FY 064/65

Annual requirement (A) = 24126 tons

Ordering cost per order (O) = Rs. 121900

Carrying cost per ton (C) = Rs. 1510 per tons

By applying EOQ formula

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

$$= \sqrt{\frac{2 \times 24126 \times 121900}{1510}}$$

= 1973.65 tons

(i) EOQ = 1973.65 tons

(ii) No. of orders = $\frac{\text{Annual requirement}}{EOQ}$

$$= \frac{24126}{1973.65}$$

= 12.22 times

From the above calculation, the EOQ is 1973.65 tons under the formula method which minimize the total ordering and carrying cost with no. of orders 12.22 times, which is also clear from the following tabular method.

Table 15: Trial and error approach of EOQ of 064/65

No. of order	Order size (tons)	Average invest (tons)	Total O. C. (Rs.)	Total C.C. (Rs.)	Total cost (Rs.)
1	24126	12063	121900	18215130	18337030
10	2412.6	1206.3	1219000	1821513	3040513
12	2010.6	1005.3	1462800	1518003	2980803
13	1855.8	927.9	1584700	1401129	2985829
14	1723.3	861.6	1706600	1301016	3007616

Source: annual report of ULL.

The above table shows that the carrying cost is in decreasing order and ordering cost is increasing order with the increasing no. of order. The above table shows the minimum total cost of R/M in inventory is 2980803 where the total carrying cost is Rs 1518003 and total ordering cost is Rs. 1462800 with the no. of order nearly 12 times per year. So it is clear that, if the company wants to minimize total cost of inventory of R/M it should order 12 times during the year.

So, it becomes clear from tabular method that the company should order 2010.6 tons with 12 times during the year.

4.10.9 Calculation of EOQ of Raw Material on the FY 065/66

Annual requirement (A) = 27386 tons

Ordering cost per order (O) = Rs. 124250

Carrying cost per ton (C) = Rs. 1570 per tons

By applying EOQ formula

$$\text{EOQ} = \sqrt{\frac{2Ao}{C}}$$

$$= \sqrt{\frac{2 \times 27386 \times 124250}{1570}}$$

= 2081.98 tons i.e.2082 tons

(i) EOQ = 2082 tons

(ii) No. of orders = $\frac{Annual requirement}{EOQ}$

$= \frac{27386}{2082}$

= 13.15 times i.e.13 times

From the above calculation, the EOQ is 2082 tons under the formula method which minimize the total ordering and carrying cost with no. of orders 13 times, which is also clear from the following tabular method.

Table 16: Trial and error approach of EOQ of 065/66

No. of order	Order size (tons)	Average invest (tons)	Total O. C. (Rs.)	Total C.C. (Rs.)	Total cost (Rs.)
1	27386	13693	124250	21498010	21622260
10	2738.6	1369.3	1242500	2149801	3392301
12	2282.2	1141.1	1491000	1791527	3282527
13	2106.6	1053.3	1615250	1653681	3268931
14	1956.2	978.1	1739500	1535617	3275117

Source: annual report of ULL.

The above table shows that the carrying cost is in decreasing order and ordering cost is increasing order with the increasing no. of order. The above table shows the minimum total cost of R/M in inventory is 3268931 where the total carrying cost is Rs 1653681 and total ordering cost is Rs. 1615250 with the no. of order nearly 13 times per year. So it is clear that, if the company wants to minimize total cost of inventory of R/M it should order 13 times during the year.

So, it becomes clear from tabular method that the company should order 2106.6 tons with 13 times during the year.

4.10.10 Calculation of EOQ of Raw Material on the FY 066/67

Annual requirement (A) = 21863 tons

Ordering cost per order (O) = Rs. 126350

Carrying cost per ton (C) = Rs. 1590 per tons

By applying EOQ formula

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

= $\sqrt{\frac{2 \times 21863 \times 126350}{1590}}$

= 1864.05 tons i.e.1864 tons

(i) EOQ = 2082 tons

(ii) No. of orders = $\frac{\text{Annualrequirement}}{EOQ}$

= $\frac{21863}{1864}$

= 11.73 times i.e.12 times

From the above calculation, the EOQ is 1864 tons under the formula method which minimize the total ordering and carrying cost with no. of orders 12 times, which is also clear from the following tabular method.

Table 17: Trial and error approach of EOQ of 065/66

No. of order	Order size (tons)	Average invest (tons)	Total O. C. (Rs.)	Total C.C. (Rs.)	Total cost (Rs.)
1	21863	10931.5	126350	17381085	17487435
10	2186.3	1093.2	1263500	1738188	3001688
11	1987.6	993.8	1389850	1580142	2969992
12	1822	911.0	1516200	1448490	2964690
13	1681.8	840.9	1642550	1337031	2979581

Source: annual report of ULL

The above table shows that the carrying cost is in decreasing order and ordering cost is increasing order with the increasing no. of order. The above table shows the minimum total cost of R/M in inventory is 2964690 where the total carrying cost is Rs 1448490 and total ordering cost is Rs. 1516200 with the no. of order nearly 12 times per year. So it is clear that, if the company wants to minimize total cost of inventory of R/M it should order 12 times during the year.

So, it becomes clear from tabular method that the company should order 1822 tons with 12 times during the year.

4.10.11 EOQ of inventory in total study period

Table 18: EOQ of inventory in total study period

Fiscal year	No or order (Approx.)	EOQ in tons
057/58	10 times	2192
058/59	11 times	1675
059/60	9 times	1831
060/61	10 times	2014
061/62	10 times	1906
062/63	11 times	1990
063/64	12 times	1949
064/65	12 times	1974
065/66	13 times	2082
066/67	12 times	1864

Source: annual report of ULL

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

In the FY 0578/58, the EOQ of inventory is high i.e. 2192 tons, while in the FY 058/59 the EOQ of inventory is very low i.e. 1675 tons. There is high fluctuation in EOQ size during the study period due to various reasons. This type of fluctuation is due to fluctuation in ordering costs is due to fluctuation in Annual requirement and fluctuating ordering cost.

4.11 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 alternation. Category B includes lesser important items and category C consists of the least important and 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 wage rate. The value items having more then Rs. One lakes per tons fall under category ‘A’. The items having value having from Rs. 50,000 to Rs. 100,000 per ton falls under category ‘B’ and the items having value to Rs. 50,000 per ton falls under category ‘C’.

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.

Table 19: ABC technique of analyzing inventory

Fiscal year	057-58		059-60		060-61		061-62		062-63		063-64		064-65		065-66		066-67	
Production / Categories	% 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 cream, hair care food & beverages	13.3	37.1	16.4	51	33.4	62.3	17.1	49.3	16.3	43.03	7.70	34.43	9.25	35.64	12.90	32.26	12.52	41.42
'B' items Toilet soaps	28.1	41	15.4	24.7	29.7	25.6	31.1	33.7	22.6	29.7	20.75	32.94	22.50	33.34	24.64	33.56	20.75	30.55
'C' items detergents, soap, noodles, laundry soap	58.6	21.9	68.2	24.3	36.9	12.1	51.8	17	61.1	27.27	71.55	32.63	68.25	31.02	62.46	34.18	66.73	28.03
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Unpublished Journal of ULL

From the above table 4.9, it is observed oral care, skin creams, hair care, food and beverage are categorized under ‘A’. The table above shows that under a ‘A’ category, average percentage of total units is 13.89% and average percentage of total cost is 38.75% 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 technique should be applied in ‘A’ items than another items.

Toilet soap categorized under ‘B’ item. The table 4.9 above shows that under ‘B’ items, average percentage of total units is 21.55% and average percentage of total cost is 28.51% of the overall study period. Therefore, in ‘B’ group involves normal inventory control in exercised. This ‘B’ group stands mid way. It deserves less attention than ‘A’ but more then ‘C’. it can be controlled by employing less sophisticated techniques.

Detergents, scourers, soap noodles, laundry soap are categorized under ‘C’ items. The table above shows that under ‘C’ items, average percentage of total units is 64.56% and average percentage of total cost is 32.74% of overall study period. In case of ‘C’ items, simple control will be sufficient.

4.12 Major Findings

Inventory Management planning and control 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:

i) In the company, there are different types of inventories, like RM, WIP, finished goods and stores and spare parts. For the question is asked to reveal the ranking if cost for solution of ABC analysis the company could give only the name of inventories but not specified the cost. The researcher found that RM, WIP and stores and spare parts are controlled through physical checking system and finished goods are controlled through ABC analysis.

ii) For the question asked to ULL about the cost of ordering and carrying. The researcher found that there is no systematic and scientific system to determine ordering and carrying cost.

iii) Purchasing is the first step of inventory management of manufacturing companies. As the question was asked about the purchasing system they said that procedures are followed by ULL. The researcher had found that the company has been following the centralize purchasing procedure and required RM and WIP materials are purchased from HLL of India.

iv) When all items of inventories are received by purchasing department it should be passed into the store. So these items are handled and managed carefully. As the question asked to ULL about store control technique used by the company with the option of bin cards and store ledger, the researcher found that the company is using the bin card technique to control the store.

v) As the question is asked to ULL about the valuation of inventories with various options, the researcher found that the pricing of issues can be determine by value as per weighted average cost method.

vi) The fluctuation in stock of RM during the study period is very high. Defective purchasing policy and poor planning of raw materials are the main responsible factors for such fluctuation. There is no fixed policy of purchasing materials.

vii) Demand and sales of company (ULL's) is very fluctuated. The main reason of such fluctuation is lack of appropriate inventory policy and ineffective demand forecast.

viii) The correlation between sales and net profit is 0.9536. Therefore, there is significant relationship between sales and net profit and it is concluded that the change in sales results change of net profit. 'T' Statistics also indicate that there is significant relationship between sales and net profit.

ix) The correlation between inventory and net profit is 0.7396. So, it becomes clear that there is positive correlation between inventory and net profit. ' T ' Statistics also indicate that correlation coefficient between inventory and net profit is significant.

x) EQQ is almost similar during the study period with low degree of fluctuation. This type of fluctuation is due to variation of ordering cost and fluctuation in demand but the Company has not used EOQ model to manage and control of the inventory.

xi) ULL is using the bin card technique and ABC analysis to control and manage the store in order to minimize the cost of holding materials. The bin cards are maintained by store keeper

xii) Political crisis and especially Nepal Banda, uncertainly about the future supply of materials, strikes on operation of factory, fluctuation of materials prices and lockout organized by different pressure group directly affect the company and its inventory management while geographical barriers and transportation problems are other problems faced by Unilever Ltd.

CHAPTER FIVE

5.1 Summary, Conclusion and Recommendation

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 Co. The Co. 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 products group. So this study deals with inventory management of Nepal Lever Limited.

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 is 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.

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 their trends, to assets 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 fine 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, EQQ model, Inventory turnover ratio, correlation coefficient, average percentage of the total study period by presenting with table and figure in require place. 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 technique are available for controlling in the inventory but the company has not applied some sort of technique for managing the inventory.

5.2 Conclusion

The inventory management of ULL is not only necessary but also compulsory for better performance of the organization. If ULL initiates steps to appropriate management of inventory, certainly it will copy its set objective successfully. This study is just a small part to fulfill the partial requirement of MBS. Concerning this finding it may be appropriate to make some suggestions and recommendations. Although this suggestion may not be enough they certainly suggests the areas that can be improve and required attenuation to bring some improvement in inventory of ULL.
From the analysis of primary and secondary data we can reach in following conclusion

- ULL is the subsidiary company of Hindustan Lever Ltd. withholds 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.
- 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 storekeeper.
- The pricing of the issues can be determined by value as waited average cost method at the lower cost or market price.
- In ULL, inventory includes raw materials, packaging materials, work-in- progress materials, finish goods and store and spare parts. The average percentage of RM in total inventory in the overall study period is 47.65%. The highest proportion and RM in total inventory is 56.14% in the FY 057/058, and the lowest proportion of RM in total inventory is 36.28% in FY 062/063. Therefore it is observed that raw material consumption in the company is elastics. The fluctuation in stock of RM during the study period is very high. Defective

purchasing policy and poor planning of RM may be responsible factors for search fluctuation.

- The average percentage of WIP materials in total inventory is 2.34%, which is low in comparison with other inventory. The highest proportion of WIP in total inventory is 4.36% in the FY 058/059. The lowest proportion of WIP on total inventory is 0.8% in the FY 063/064. The WIP materials consumptions in the company is fluctuating during the study period. Fluctuation in demand and sales of company products, lack of appropriate inventory policy and ineffective demand forecast are the main reason for such fluctuation.
- The average percentage of finished goods in total inventory is 30.35%. The highest value of finish products, i.e. 45.41% is produced in the FY 062/063 as compared with the overall study period. But in the FY 058/059 and 059/060, there is decreasing trend in the production of finished goods. Fluctuation of demand and sales of the company are the main reason for such situations.
- The average percentage of stores and spare parts in total inventory is 3.32%. During this study period, the quantity of stores and spare parts used by company is irregular during study period. Since, the company's production is totally dependent to the stores and spare parts; it obliviously fluctuates over the study period.
- The average value of sales is Rs. 1810.72 millions and average value of net profit is Rs. 239.07 million. The highest positive deviation of sales from the average sales is 68.72% in the FY 066/067 and the highest negative deviation of sales from the average sales is 31.73% in the FY 058/059. The highest positive deviation of net profit from average net profit is 141.15% in the FY 066/067 and the highest negative deviation from in net profit is (82.18%) in the FY 058/059. The correlation between sales and net profit is 0.95. It becomes clear that there is positive and good relation of correlation between sales and net profit.
- The average value of inventory is Rs. 265.53 million and average value of net profit is Rs. 239.07 million. The highest positive deviation of inventory from average inventory is 66.90% in the FY 066/067. Similarly, the highest negative deviation of inventory from the average inventory is (52.50%) in the FY 059/060. The highest positive deviation of net profit from an average net profit is 141.15% in the FY 066/067 and the highest negative deviation of net profit from an average net profit is (82.18%) in the FY 058/059. 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 0.74. So, it becomes clear that there is positive and moderate relation of correlation between inventory and net profit.

- Inventory turnover ratio shows the relation between sales and inventory and it also shows the efficiency of inventory management. The average ITR is 6.82 times and found to be satisfactory. The highest ITR is 10.68 times in the FY 065/066, the highest positive deviation from an average of ITR is 56.59% in the FY 064/065. So in this year, low inventory is kept in the company and due to fast movement of the materials and finish goods. In the FY 062/063 and 057/058, the ITR is lowest, i.e. 5.6 times and 5.24 times. Similarly, the highest negative deviation from the average of ITR is (23.31%) in the FY064/65, which indicates the slow movement of the RM or low utilization of RM, WIP materials and low sales of finish goods. The correlation between inventory and sales is 0.75. So, it becomes clear that there is positive and low degree of correlation between inventory and net profit.
- EOQ is not similar during the study period. In the FY 057/058 the EOQ of RM is 2192 tones & that for the FY 058/59 is 1675 tones. 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.
- The significance of the ABC analysis reflects the concept of appropriate management of inventory. The concept states that it is uneconomical to spend the sale cost of supervision to all items. It is clearly seen under 'A' items and average percentage of total units is 13.89% and average percentage of total cost is 38.75%. Similarly, under 'B' items and average percentage of total unit is 21.55% and average percentage of total cost is 28.51%. Again under 'C' items, the average percentage of total unit is 64.6% and the average percentage of total cost is 27.2%. So it is clearly seen that the average percentage of total cost of 'B' items is comparatively high but per ton cost is less then '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 then '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.

- The company has faced some problems on managing proper inventories in using full system because there is uncertainty about the future supply of materials, operation of factory, Nepal Banda, lockouts, strikes, geographical problems, fluctuation of prices etc.

5.3 Recommendations

To achieve all the objective 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.

i) Purchasing plan should be prepared for different type of RM and WIP materials with the proper cooperation and coordination among the planning, purchasing, storing, production, marketing and sales department to avoid excessive investment on inventory.

ii) 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 material handling system and timely inspection. Moreover systematic inventory control system should be applied to know inventory position in the company.

iii) ULL has not been able to satisfy the level of costumers 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.

iv) 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.

v) In order to minimize inventory cost, 'A' item should be controlled carefully and should be paid more attenuation then '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.

vi) 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.

vii) Specific policy on inventory should be defined and comprehensive system of inventory management has to be introduced.

viii) Inventory should not treat as a reason for investment rather it should be planned has coordinating factor between sales and production.

ix) Primary problem faced by ULL in production planning are unsuitable inventory and production policy, lack of coordination between sales and production. So the company should clarify production and inventory policy.

x) The top-level management should pay its attention to the overall management, purchasing, production and financial aspect of factory.

APPENDIXES

Appendix 1: Correlation between R/M and total inventory purchased

Fiscal Year	Inventory (X)	R/M (Y)	X^2	Y^2	XY
057/58	293.93	134.70	86394.8449	18144.09	39592.3710
058/59	144.46	64.06	20868.6916	4103.6836	9254.1076
059/60	126.11	59.20	15903.7321	3504.6400	7465.7120
060/61	184.22	95.28	33937.0084	9078.2784	17552.4816
061/62	229.76	124.52	52789.6576	15507.7209	28612.0128
062/63	256.17	92.94	65623.0689	8637.8436	23808.4398
063/64	321.62	161.30	103439.4244	26017.6900	51877.3060
064/65	410.12	194.69	168198.4144	37904.1961	79846.2628
065/66	245.75	126.55	60393.0625	16014.9025	31099.6625
066/67	443.18	212.22	196408.5124	4537.3284	94051.6596
	$\sum X =$ 2655.32	$\sum Y =$ 1265.47	$\sum X^2=$ 803956.4172	$\sum y^2 =$ 183950.3735	$\sum XY=$ 383160.0157

Source: annual report of ULL.

Correlation between inventory (x) and R/M (y)

$$r = \frac{N\Sigma Xy - \Sigma X.\Sigma y}{\sqrt{N.\Sigma X^2 - (\Sigma X)^2}\sqrt{N.\Sigma y^2 - (\Sigma y)^2}}$$

$$= \frac{10 \times 383160.0157 - 2655.32 \times 1265.47}{\sqrt{10 \times 803956.4172 - (2655.32)^2}\sqrt{10 \times 183950.3735 - (1265.47)^2}}$$

$$= \frac{471372.3566}{994.4043 \times 487.9441}$$

= 0.9714

= 0.97 (Approx.)

$\therefore$ Correlation (r) = 0.97

Appendix 2: Correlation between WIP and total inventory purchased (in million)

Fiscal Year	Inventory (X)	WIP (Y)	X^2	Y^2	XY
057/58	293.93	12.4	86394.8449	153.7600	3644.7320
058/59	144.46	6.30	20868.6916	39.6900	910.0980
059/60	126.11	4.02	15903.7321	16.1604	506.9622
060/61	184.22	5.52	33937.0084	30.4704	1016.8944
061/62	229.76	3.49	52789.6576	12.1801	801.8624
062/63	256.17	7.67	65623.0689	58.8289	1964.8239
063/64	321.62	2.84	103439.4244	8.0656	913.4008
064/65	410.12	7.47	168198.4144	55.8009	3063.5964
065/66	245.75	3.93	60393.0625	15.4449	965.7975
066/67	443.18	8.66	196408.5124	74.9956	3837.9388
	$\sum X =$ 2655.32	$\sum Y =$ 62.30	$\sum X^2 =$ 803956.4172	$\sum Y^2 =$ 465.3968	$\sum XY =$ 17626.1064

Source: annual report of ULL.

Correlation between inventory (X) and (Y)

$$r = \frac{N\Sigma XY - \Sigma X.\Sigma Y}{\sqrt{N.\Sigma X^2 - (\Sigma X)^2}\sqrt{N.\Sigma Y^2 - (\Sigma Y)^2}}$$

$$r = \frac{10 \times 17626.1064 - 2655.32 \times 62.30}{\sqrt{10 \times 803956.4172 - (2655.32)^2}\sqrt{10 \times 465.3968 - (62.30)^2}}$$

$$= \frac{10834.6280}{994.4043 \times 27.7971}$$

= 0.3919

= 0.39 (Approx.)

$\therefore$ Correlation (r) = 0.39

Appendix 3: Correlation between finished goods and total inventory purchased (Rs. In Million)

Fiscal year	Inventory (X)	Finished goods (y)	X^2	Y^2	XY
057/58	293.93	87.60	86394.8449	7673.7600	25748.2680
058/59	144.46	41.30	20868.6916	1705.6900	5966.1980
059/60	126.11	44.50	15903.7321	1980.2500	5611.8950
060/61	184.22	55.50	33937.0084	3080.2500	10224.2100
061/62	229.76	73.83	52789.6576	5450.8689	16963.1808
062/63	256.17	116.35	65623.0689	13537.3225	29868.2085
063/64	321.62	94.04	103439.4244	8843.5216	30245.1448
064/65	410.12	111.59	168198.4144	12452.3281	45765.2908
065/66	245.75	51.56	60393.0625	2658.4336	12670.8700
066/67	443.18	129.86	196408.5124	16863.6196	57551.3548
	$\sum X = 2655.32$	$\sum Y = 806.13$	$\sum X^2 =$ 803956.4172	$\sum Y^2 =$ 74246.0443	$\sum XY =$ 240614.6207

Source: Annual report of ULL.

Correlation between total inventory (X) and finished goods (Y).

$$r = \frac{\text{N}\Sigma\text{Xy - }\Sigma\text{X}.\Sigma\text{y}}{\sqrt{\text{N}.\Sigma\text{X}^2 - (\Sigma X)^2}\sqrt{\text{N}.\Sigma\text{Y}^2 - (\Sigma Y)^2}}$$

$$r = \frac{10 \times 240614.6207 - 2655.32 \times 806.13}{\sqrt{10 \times 803956.4172 - (2655.32)^2}\sqrt{10 \times 74246.0443 - (806.13)^2}}$$

$$= \frac{265613.0954}{994.4043 \times 304.3269}$$

= 0.8777

= 0.88 (Approx.)

$\therefore$ correlation (r) = 0.88

Appendix 4: Correlation between total inventory purchased and finished goods (Rs. In Million)

Fiscal year	Inventory (X)	Stores and spare parts (Y)	X^2	Y^2	XY
057/58	293.93	16.98	86394.8449	288.3204	4990.9314
058/59	144.46	11.50	20868.6916	132.2500	1661.2900
059/60	126.11	6.90	15903.7321	47.6100	870.1590
060/61	184.22	6.15	33937.0084	37.8225	1132.9530
061/62	229.76	4.52	52789.6576	20.4304	1038.5152
062/63	256.17	6.98	65623.0689	48.7204	1788.0666
063/64	321.62	7.26	103439.4244	52.7076	2334.9612
064/65	410.12	8.49	168198.4144	72.0801	3481.9188
065/66	245.75	8.83	60393.0625	77.9689	2169.9725
066/67	443.18	10.75	196408.5124	115.5625	4764.1850
	$\sum X = 2655.32$	$\sum Y = 88.18$	$\sum X^2 = 803956.4172$	$\sum Y^2 = 893.4728$	$\sum XY = 23732.9527$

Source: Annual report of ULL.

Correlation between inventory(X)and stores and spare parts (Y).

$$r = \frac{N\Sigma Xy - \Sigma X.\Sigma y}{\sqrt{N.\Sigma X^2 - (\Sigma X)^2}\sqrt{N.\Sigma y^2 - (\Sigma y)^2}}$$

$$r = \frac{10 \times 23732.9572 - 2655.32 \times 88.18}{\sqrt{10 \times 803956.4172 - (2655.32)^2}\sqrt{10 \times 893.4728 - (88.18)^2}}$$

$$= \frac{3183.4094}{994.4043 \times 34.0443}$$

= 0.0940

= 0.09 (Approx.)

$\therefore$ Correlation (r) = 0.09

Appendix 5: Correlation between sales (X) and inventory(Y)

Fiscal year	Sales (X)	Inventory (y)	X^2	Y^2	XY
057/58	1540.99	293.93	2374650.18	86394.8449	452943.19
058/59	1236.05	144.46	1527819.60	20868.6916	178559.78
059/60	1244.73	126.11	1549352.77	15903.7321	156972.90
060/61	1529.9	184.22	2325320.01	33937.0084	280917.08
061/62	1481.56	229.76	2195020.03	52789.6576	340403.23
062/63	1434.94	256.17	2059052.80	65623.0689	367588.58
063/64	1818.53	321.62	3307051.36	103439.4244	584875.62
064/65	2144.59	410.12	4599266.27	168198.4144	879539.25
065/66	2625.83	245.75	6894983.19	60393.0625	645297.72
066/67	3055.07	443.18	9333452.71	196408.5124	135945.92
	$\sum X$ = 18107.19	$\sum Y$= 2655.32	$\sum X^2$= 36165968.92	$\sum Y^2$= 803956.4172	$\sum XY$= 5241043.27

Source: annual report of ULL.

Correlation between sales (X) and inventory (y)

$$r = \frac{N\Sigma XY - \Sigma X.\Sigma Y}{\sqrt{N.\Sigma X^2 - (\Sigma X)^2}\sqrt{N.\Sigma Y^2 - (\Sigma Y)^2}}$$

$$r = \frac{10 \times 5241043.27 - 18107.19 \times 2655.32}{\sqrt{10 \times 36165968.92 - (18107.19)^2}\sqrt{10 \times 803956.4172 - (2655.32)^2}}$$

$$= \frac{4330048.95}{5812.86 \times 994.40}$$

= 0.7491

or 0.75 (Approx.)

$\therefore$ Correlation between sales and inventory (r) = 0.75

Appendix 6: Correlation between inventory and net profit. (Rs. In million)

Fiscal year	inventory (X)	Net Profit (Y)	X^2	Y^2	XY
057/58	293.93	68.04	86394.8449	4629.4416	19998.9972
058/59	144.46	42.60	20868.6916	1814.7600	6153.9960
059/60	126.11	93.20	15903.7321	8686.2400	11753.4520
060/61	184.22	140.78	33937.0084	19819.0084	25934.4916
061/62	229.76	189.19	52789.6576	35792.8561	43468.2944
062/63	256.17	238.15	65623.0689	56715.4225	61006.8855
063/64	321.62	263.06	103439.4244	69200.5636	84605.3572
064/65	410.12	335.12	168198.4144	112305.4144	137439.4144
065/66	245.75	444.04	60393.0625	197171.5216	109122.8300
066/67	443.18	576.53	196408.5124	332386.8409	255506.5456
	$\sum X = 2655.32$	$\sum Y = 2390.71$	$\sum X^2 =$ 803956.4172	$\sum y^2 =$ 838522.0691	$\sum XY =$ 754990.2639

Source: annual report of ULL.

$$r = \frac{N\Sigma Xy - \Sigma X.\Sigma y}{\sqrt{N.\Sigma X^2 - (\Sigma X)^2}\sqrt{N.\Sigma y^2 - (\Sigma y)^2}}$$

$$r = \frac{10 \times 754990.2639 - 2655.32 \times 2390.71}{\sqrt{10 \times 803956.4172 - (2655.32)^2}\sqrt{10 \times 838522.0691 - (2390.71)^2}}$$

$$= \frac{1201802.562}{994.4043 \times 1633..9297}$$

= 0.73966

= 0.74

$\therefore$ Correlation (r) = 0.74

Appendix 7: Correlation between sales (X) and net profit (y)

Fiscal Year	Sales (X)	Net Profit (Y)	X^2	Y^2	XY
057/58	1540.99	68.04	2374650.18	4629.4416	104848.96
058/59	1236.05	42.60	1527819.60	1814.7600	52655.73
059/60	1244.73	93.20	1549352.77	8686.2400	116008.84
060/61	1529.9	140.78	2325320.01	19819.0084	214675.42
061/62	1481.56	189.19	2195020.03	35792.8561	280296.33
062/63	1434.94	238.15	2059052.80	56715.4225	341730.96
063/64	1818.53	263.06	3307051.36	69200.5636	478382.50
064/65	2144.59	335.12	4599266.27	112305.4144	718695.00
065/66	2625.83	444.04	6894983.19	197171.5216	1165973.55
066/67	3055.07	576.53	9333452.71	332386.8409	1761339.51
	$\sum X = 18107.19$	$\sum Y = 2390.71$	$\sum X^2 =$ 36165968.92	$\sum y^2 =$ 838522.0691	$\sum XY =$ 5234606.80

Source: annual report of ULL.

Correlation between sales (X) and net profit (Y)

$$r = \frac{N\Sigma XY - \Sigma X.\Sigma Y}{\sqrt{N.\Sigma X^2 - (\Sigma X)^2}\sqrt{N.\Sigma Y^2 - (\Sigma Y)^2}}$$

$$r = \frac{10 \times 5234606.80 - 2390.71 \times 18107.19}{\sqrt{10 \times 36165968.92 - (18107.19)^2}\sqrt{10 \times 838522.07 - (2390.71)^2}}$$

$$= \frac{9057027.80}{5812.86 \times 1633.93}$$

$= 0.9536$

$= 0.95$ (Approx.)

$\therefore$ Correlation (r) = 0.95

Appendix 8: Questionnaires of Unilever Limited for the Purpose of study on Inventory Management

Name:

Position:

Department:

a) In 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
1				
2				
3				
4				
5				
6				
7				

b) For determining Economic order Quantity, which and how much components and the expenses were incurred as ordering and carrying costs?

Ordering Cost:

S.N.	Component of cost	Amount (Rs.)
1		
2		
3		
4		
5		
6		

Carrying Cost:

S.N.	Component of cost	Amount (Rs.)
1		
2		
3		
4		
5		
6		
7		

c) What was the ordering cost and the carrying cost of the company each year?

Fiscal Year	Ordering Cost	Carrying Cost
2057/58		
2058/59		
2059/60		
2060/61		
2061/62		
2062/63		
2063/64		
2064/65		
2065/66		
2066/67		

d) What are the methods used by Unilever Limited for valuation of inventories?

i. Weighed average cost method [ ]
ii. First in first out method (FIFO) [ ]
iii. Last in first out method (LIFO) [ ]
iv. Average cost method [ ]
v. Latest purchase price [ ]
vi. Height in first out method [ ]
vii. Real inventory method [ ]

e) The store control techniques used by Unilever Limited?

i. Bin Card [ ]
ii. Store Ledger [ ]
iii. Others [ ]

f) The inventory management and control system followed by Unilever limited are:

i. Inventory management through ABC analysis [ ]
ii. Determination of optimum stock level (EOQ) [ ]
iii. Perpetual inventory management system [ ]
iv. Others [ ]

g) Please, specify the problem faced by Unilever Limited company while managing the inventories?

i. Nepal Bandha, Strikes, Lockout [ ]
ii. Unexpected changes in price [ ]
iii. Geographical Problem [ ]

Bibliography

Adam, Evertte. and Ebert, Jr.Ronal J. (2003). *Production and Operation Management*. New Delhi: Hall of India Pvt Ltd.

Agrawal, Govinda Ram (1980) *Management in Nepal.* Kathmandu: CDC, T.U.

Agrawal, Govinda Ram (2000) *Marketing in Nepal*. Kathmandu: Education Enterprises Ltd.

American Institute of Certified Public Accountants (1961). *Accounting Research and Terminology Bulletins.* New York: Final Edition.

Bajracharya, Puskar (1983)*"Management on public Sector Manufacturing Enterprise in Nepal"* Unpublished Degree Dissertation Submitted to Faculty of Management, TU.

Basnet Singa Raj (1999) *A Study on Inventory Management of HCCL*. Kirtipur: Unpublished Degree Dissertation Submitted to Faculty of Management. T.U.

Bloomberg, Davids J, Leemay Stephen and Hanna Joe B (2002). *Logistics*. New Delhi: Prentice Hall of India Pvt. Ltd.

Baral, Puspa Raj (1994). *Inventory Management, A Case Study of Gandaki Noodles Pvt. Ltd.* Kathamandu Unpublished Degree Dissertation submitted to Faculty of Management, T.U.]

Brigham, F. Eugene, Gapenski C. Louis, Ehrhardt (2001). *Financial Management*. New Delhi: Prentice Hall of India Pvt. Ltd.

CEDA (1973) *A Study of Transportation Corporation of Nepal*, Kritipur.

Chopra, Sunil and Meindl, Peter (2003). *Supply Chain Management.* New Delhi: Prentice Hall of India Pvt. Ltd.

Dobler, Donal W, T.R. Lamar Lee, Burt David N. (1992). *Purchasing and Material Management.* New Delhi: Prentice Hall of India Pvt. Ltd.

E.J.Laughin (1984). *Financial Management.* Kansas State University.

Elwood, (1998), *Financial Management*, Kansas State University.

Goel, B.S. (1992), *Production and Operation Management*. India: Pragati Prakashan.

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

Jain,S.P and Narang, K.L (1994). *Advanced Accounting***.** New Delhi Kalyani Publishers

Joshi, P R and (2001) *Research Methodology*, Kathmandu: Buddha Academic Publishers and Distributions Pvt. Ltd.

Khan, M.Y and Jain, P.K.(2003) *Financial Management***.** New Delhi: Tata McGraw Hill Co. Ltd.

Kothari, C.R. (1996). *Quantitative Technique.* New Delhi: Vikas Publication House Pvt. Ltd.

Levi, David Semchi; Kaminsky, Philip and Levi, Edith Simchi (2003). *Designing and Managing the Supply Chain.* U.S.A. : MC-Graw Hill Companies.

Magee, John F. (1956). *Inventory Policy*. Harvard Business Review Solier Field Bost: Reprint Department.

Munakarmi, Shiva Prasad and Shrestha Bijaya Prakash (2003). *Cost and Management Accounting***.** Kathmandu Educational Publishing House.

Nair, N.K. (1994). *Purchasing and Material Management*. New Delhi: Vikash Publishing House Pvt. Ltd.

Panday, I.M. (1999). *Financial Management*. New Delhi:Vikas Publishing House Pvt.Ltd.

P, Gopi Krishna (1993).*Purchasing and Material Management***.** New Delhi: Tata Mc-Grow Hill Co. Ltd.

Panta, P.R.(2003) *Business Environment in Nepal***.** Kathmandu Buddha Academic Publisher and Distribution Pvt. Ltd.

Pradhan, R.S (2004). *Financial Management*. Kathmandu: Buddha Academic Publishers and Distributors Pvt. Ltd.

Puskar, Bajracharya (1993). *Management Problem in Public Manufacturing in Nepal. Kathmandu: CEDA.*

Rizal, Saroj (1997). Inventory management: A Case Study of AIC Kirtipur: Unpublished Degree Dissertation Submitted to faculty of Management. T.U.

Roseoe, Edwin Scott (1956). Organization for Production. Illinois U. S. A.: Richard D. Irwin In

Goyal, S. N. and Man Mohan (1997). Principles of Management Accounting. Agra: Sahitya Bhawan.

Saradhi, V Sisthtia, P. (1982). *Working Capital Management in Public Enterprises***.** Yugoslavia: The International Centre for Public Enterprises in Developing Countries.

*Shrestha, Surendr (1988). An Inventory Management***:** A Case Study of Gorkhapatra Corporation. Kirtippur: Unpublished Degree dissertation submitted to faculty of management T. U.

Sharma, R.K.and Gupta, S, K. (1984), *Management Accounting Principle and Practice*. Ludiyana: Kalyani Publishers.

Sharma Bijaya (1983), *Inventory Management a Case Study of AIC* regarding seeds unpublished degree dissertation submitted to faculty of management T. U.

Shrestha. Sunity and Silwal, Dhurba Prasad (2000), *Production and Operation management*. Kathmandu: Taleju Prakashan.

Shrestha, Manohar Krishna (1980). *Financial Management*. Kathmandu: Curriculum Development Center. T. U.

Van Horne, James C. (2003). *Financial Management and Policy*. New Delhi: Prentice Hall of India Pvt. Ltd.

Waston, J. Fred and Copeland, Thomas E, (1992) *Management Finance*. USA New York: A Hart Brace Jovanvich College Publisher. The Dryden Press.