

CHAPTER 1

INTRODUCTION

1.1. Background of the study

Inventory is defined as a list of goods and materials which are available in stock for business. An accounting inventory is considered as an asset. Inventory management is about specifying the size and the placement of stocked inventory. Inventory management is essential for different locations or within multiple locations for a supply network to protect the regular and planned production against running out of materials or goods. The scope of inventory management also concerns with the fine lines between stock up of lead time, carrying costs, forecasting of inventory, physical inventory, space available for inventory, quality management, stock up, returns of effective goods and demand forecast of inventory. Inventory management deals with active control program with the management of sales and purchase department, providing good understanding of inventory and capacity to control the financial cost, control the operating cost and it helps to identifying the inventory requirement, stock up techniques and actual and projected inventory status. (Sharma and Arya, 2016). Inventories make a link between production and sale of a product. Generally, inventories are used in manufacturing and non-manufacturing companies. The forms of inventories exist in manufacturing companies are Raw materials, Work in process, Finished goods, Parts and supplies. Every company associates inventory as their nature. Manufacturing companies should have raw material mostly as well as work in process and finished goods. The company, in which the processing procedure is long, keeps as the large amount of work in process. But commercial enterprises and wholesalers do not invest their capital on raw material and work in process. They only keep finished goods inventory (Shardeo, 2015).

Effective inventory management provides opportunities to create sustainable competitive advantage and enhance the competitive position of companies. This entails reduction in cost of holding stocks by maintaining just enough inventories, in the right place and the right time and cost to make the right amount of needed products. High levels of inventory held in stock affect adversely the procurement

performance out of the capital being held which affects cash flow leading to reduced efficiency, effectiveness and distorted functionality. Inventories are the stock of products a company holds to further its production and sales (Pandey, 2003). Stock can come in various forms such as raw materials, work-in-progress, finished goods and goods ready for sale (Levis, 2009). Inventory represents an important decision variable at all stages of product manufacturing, distribution and sales, in addition to being a major portion of total current assets of many organizations. Inventory often represent as much as 40% of total capital of industrial organizations (Moore, Lee and Taylor, 2003). Inventory management is vital in the control of materials and goods that have to be held (or stored) for later use in the case of production or later exchange activities in the case of services. Inventory management refers to a science based art of ensuring that just enough inventory stock is held by an organization to meet demand (Jay & Barry, 2006).

A reliable inventory system implies higher confidence of customers and their attendant continuous patronage. Inventory management systems are mostly applied in manufacture settings, where its viability and potential economic value are duly attained. Inventory is kept to meet reliability of operations, flexibility in production scheduling, change in raw material, delivery time a change in economic purchase order size (Inyama, 2006). An inventory system provides the operating policies and organizational structure for maintaining and controlling goods to be stocked. A proficient management of inventory system requires an appropriate way of making decisions about how much to order and when to order and a means of keeping track of items in inventory. Decision on inventory in any organization depends on facts about on-hand stock level, demand information with regards to the forecasted quantity, lead time and lead time variation, inventory holding costs, ordering cost and shortage cost. Installation of a proper inventory control system in any organization is of paramount necessity.

Inventory is the availability of any stock or resources used in an organization. An inventory system is the set of policies that controls and monitors inventory level and determine what level should be maintained, how large orders should be made and when stock should be replenished. Inventory control is the supervision of the storage,

supply and accessibility of items to ensure an adequate supply without excessive oversupply (Miller, 2010). Inventory control means availability of materials whenever and wherever required by stocking adequate number and kind of stocks. The sum total of those related activities essential for the procurement, storage, sales, disposal or use of material can be referred to as inventory management. Inventory managers have to stock-up when required and utilize available storage space resourcefully, so that available storage space is not exceeded. Maintaining accountability of inventory assets is their responsibility. They have to meet the set budget and decide upon what to order, how to order and when to order so that stock is available on time and at the optimum cost (Benedict and Margeridis, 1999). Inventory is a key to profitability; inventory velocity turns assets into profits. The faster inventory turns, the greater the profitability. Inventory is the key issue to supply chain management success. Customers demand that their orders be shipped complete, accurate and on time. That means having the right inventory at the right place at the right time. However, it is a challenging task to implement goods inventory management practice (Koumanako, 2008). Inventory refers to stores of goods and stocks. In other words, inventory is any stored resource that is used to satisfy a current or future need for smooth operations of the firm (Shrestha & Manandhar, 2057).

Today, inventory management is not limited to documenting the delivery of raw materials and the movement of those materials into operational process. The movement materials as they go through the various stages of the operation are also important. Typically known as a goods or work in progress inventory, tracking materials as they are used to create finished goods also help to identify the need to adjust ordering amount before the raw materials inventory gets dangerously low or is inflated to an unfavorable level. Finally, inventory management has to do with keeping accurate records of finished goods that are ready for shipment. This often means posting the production of newly completed goods to the inventory totals as well as subtracting the most recent shipment of finished goods to buyers. When the company has return policy in a place, there is usually a sub-category contained in the finished goods inventory to account for any return goods that are reclassified as refurbished or second grade quality. Accurately maintaining figures on the finished

goods inventory makes it possible to quickly convey information to sales personnel as to what is available and ready for shipment at any given time (Munyao, 2015).

1.2.Statement of the problem

Manufacturing firms facing problems in their replenishment processes force upstream suppliers to build excessive stock (Battini, Faccio, Persona and Sgarbossaa, 2009). To be able to compete in today's global market; manufacturing firms need to have control over their inventory levels (Yuanjie, 2013). The more inventory manufacturing firms keep the more exposed they are to uncertainty costs associated with holding them. High inventory levels can lead to scrap, outdated products, increased inventory carrying costs and warehousing costs (Jonsson and Mattsson, 2011).

In many firms, the management of Inventory of Physical goods is based on the intuitive determinations of the purchasing manager, who decides which items to buy, when to buy them and what quantities to buy. When a company is small and the number of items to be stocked is few such informal procedures may work well. However, as a company grows and begins to require a wide variety of inventory items having different rates, systems tend to create problems that can result in higher costs and interruptions in production and the supply of end items (Buffa and Surin, 2000).

Many enterprises cannot achieve their targeted objectives and goals because of mismanagement of the organization system within an organization and without well management of inventory an organization cannot get its' goal. Almost all companies in Nepal seem to be failed to practice the inventory management. Nepalese companies are unable to manage and control the inventories. The management does not forecast how much money company should invest in the inventory. How much inventories to be stocked, how to minimize the ordering quantity, how many times should be ordered etc.

This study is concentrated to compare the Inventory management of Dabur Nepal Private Limited and Unilever Nepal Limited. Actually various newspapers articles, Journals and their annual performance reports etc. depict the lack of efficient

inventory management in both of the organizations. All these have raised the question; whether those organizations are able to manage inventory or not. This research paper intends to explore the following research questions:

1. What is the inventory position of Nepalese manufacturing companies?
2. What are the techniques applied by Nepalese manufacturing companies to maintain inventory?
3. What is the impact of inventory in companies' profitability?

1.3. Purpose of the study

This study attempts to draw a vital conclusion about Nepalese manufacturing companies regarding their management capability in respect to inventory management. The main objective of this study is to study and examine the practice of inventory management in DNPL and UNL. However, following are the specific objectives:

1. To analyze the inventory position of Nepalese manufacturing companies.
2. To compare the inventory management of Nepalese manufacturing companies using various tools and techniques.
3. To analyze the impact of inventory in profitability of the companies.

1.4. Significance of the study

Management is the back bone of any organization. Effective management minimizes weakness, maximizes strengths and leads the organization towards its goal. Many Nepalese business organizations today are running under traditional management system and they even fail to implement modern management strategies and plans. Inventory management is one of the important management aspects in any manufacturing companies. Without effective and efficient inventory management system no manufacturing company can achieve its goal. So that company should maintain adequate stock to fulfill the production and supply because company's large amount of fund is being invested in inventories.

This study examines the inventory management practice in Dabur Nepal Pvt. Ltd. and Unilever Nepal Ltd. It is concerned with Dabur Nepal Pvt. Ltd.'s and Unilever Nepal Ltd.'s effort towards inventory management. It explores problems and potentialities of industries regarding management of inventory. Moreover, it suggests for reasonable implementation of inventory management which helps top level management to make better and effective decisions. Furthermore, it is more beneficial for various departments, business organizations, lenders, investors and policy makers. The study shows the road maps and guidelines for implementation of effective inventory management. It encourages the organization to apply these tools. It also provides literatures to the interested people in this field.

1.5. Limitation of the study

This study is basically concerned with inventory management in DNPL and UNL. Thus following are the limitation of the Study.

1. This study is concern with the practice of inventory management. It does not consider other functional aspects of the companies.
2. This study is focuses on two manufacturing companies, so finding of the study may not applicable for other companies as well as service companies.
3. Basically, the research is based on secondary data and no attempt is to examine the reliability and accuracy of secondary data.
4. The period has been covered by the study is past 5 fiscal years since 2012/2013 to 2016/2017.

1.6. Chapter Plan

This research has been organized into five chapters. They are

Chapter 1: Introduction

This chapter deals with the general background focus of the study, statement of the problem, objectives of the study, significance of the study, and limitation of the study and chapter plan.

Chapter 2: Review of Literature

This chapter has been included the review of books, articles, journals, reports, thesis, researches and other relevant materials related to this topic.

Chapter 3: Research Methodology

Here is including research design, sources of data, population and sample, data collection, processing and analyzing procedures and statistical tools.

Chapter 4: Data Presentation and Analysis

This chapter attempts to analyze and evaluate secondary data of listed manufacturing company with the help of different tools and techniques.

Chapter 5: Summary, Conclusion and Implication

This chapter deals with summary and conclusion of the study and recommendation will be given to the concerned organization for its welfare.

CHAPTER 2

LITERATURE REVIEW

This chapter focuses to review of theories, previous works performed by different writer and researchers in the field of inventory management, control system and its impact over profit.

Using an extension of a standard inventory-dependent demand model provide a convenient characterization of products that require early replenishment. The optimal cycle time is largely governed by the conventional trade-off between ordering and holding costs, whereas the reorder point relates to a promotions-oriented cost-benefit perspective. The optimal policy yields significantly higher profits than cost-based inventory policies, underscoring the importance of profit-driven inventory management.

2.1 Conceptual Review

Inventory management is more crucial and challenging subject for the business enterprises especially for manufacturing concerns. “Inventory management is the control of inventory in a manner that best achieves the business objectives of your organization” (Piasecki, 2009). It is essential for all kinds of organizations to keep some stocks of items. For example: retail shops buy goods from wholesaler and hold them in order to sell them to customers, a factory keeps stock of raw materials for the production of finished products, financial institutions like banks keep sufficient cash for day to day transactions. So we see that every organization is holding some kind of items in its stock in order to fulfill the future use. “It takes money to make money, of course. But exactly how much money does it take to grow how much?” (Churchill and Mullins, 2001)

Inventory is an idle resource which is useable and has value. The idle resources may be man, money, materials and plant requisitions. (Ahuja, 1996). An inventory system is the set of policies and controls that monitor levels of inventory and determine What level should be maintained, when stock should be replenished and How large orders should be (Gitman, 1988). Inventory is the aggregate of those items of tangible assets

which are: held for sale in the ordering course of business, in the process of production for such sales and to be currently consumed in the production of goods or services to be available for sale. (American Institute of Certified Accountants, 1961). Inventory is composed of assets that will be sold in future in the normal course of operation. The assets which firms store as inventory in anticipation of need are raw materials, work-in process and finished goods. (Khan and Jain, 1992)

(Sharma and Gupta, 2002) The dictionary meaning of inventory is stock of goods or a list of goods. Various authors understand the word inventory differently. In accounting language, it may mean stock of finished goods only. In a manufacturing concern, it may include raw-materials, work in-process and stores etc. To understand the exact meaning of the word inventory, we may study it from the usage side or from the side of point of entry in the operations. Inventory management provides a cushion for future price fluctuations. About 90 percent part of working capital is invested in inventories and it is necessary for every management go give proper attention to inventory management. A proper planning of purchasing, handling, storing, and accounting form a part of inventory management. An efficient system of inventory management will determine. what to purchase, how much to purchase, where to purchase from, where to store.

Pradhan (2003) conducted a study on the “Estimates of inventory demand by Nepalese corporations.” This paper derives the transaction demand for inventory equations so as to investigate whether transactions inventory balances vary proportionately or less than in proportion to changes in the volume of sales. It also investigates the effect of capital costs on inventory holdings of the corporations. The study has used the data from 9 manufacturing companies of Nepal and the financial reports referred were from year 1973 to 1984 i.e. 12 years. The financial data on inventories and other related variables used in the paper has been collected mostly from the official annual reports brought out by the office of the auditor general. The paper describes the model that attempt to explain firms demand for inventories. It also states the nature and sources of data used in statistical analysis. The findings of the study were the estimated pooled regression results showed the presence of economies of scale with respect to the demand for the inventories. The result of the study

suggests strongly that the demand for inventoried by corporations is a function of both sales as well as their holding costs. The interest rate coefficient is a statistically significant with a significant with a theoretically correct sign. The adjustment speed of actual to desired levels of inventories has been observed to be much slower.

Safi (2014) in his research paper on "Management of Inventories in Textile Industry: A Cross Country Research Review" The objective of the research to examine the inventory management systems presently prevalent in the textile industry and to examine the weakness. While going through the available literature it was found that almost each country that has a growing textile sector is trying to tackle with the problem of deciding the efficient Inventory level. Many researchers have shown interest in the field of inventory management and have come up with beautiful work. As the field of inventory management is not very old, so many aspects are yet believed to be explored. The textile sector is again a growing sector which gained its importance in recent past. Not much amount of work has been done on this area of managing inventories in Textile sector. So it leaves an ample scope for this study.

Kasisomayajula (2014) "An Analytical Study on Inventory Management in Commercial Vehicle Industry in India", The objective of the study was to study the size of inventory of the selected units in Indian commercial vehicle Industry and another objective of this study was to examine the composition of inventory in these units. The researcher concludes that while managing the inventory position of the company we have to concentrate the four aspects of inventory management viz., size, composition, circulation and growth of inventory. In this, overall analysis of inventory of all units in the Indian commercial vehicle industry is very good in their management of inventory. Among the firms in the commercial vehicle industry TML occupies the first place in the management of inventory. It is evidently proved through strong correlation between inventory and sales. FML's average growth rate of sales has been more than the growth rate of inventory which indicates that very good administration of inventory, but the moderate correlation registered between sales and inventory. Thus, proper management of inventory is important to maintain and improve the health of an organization. Efficient management of inventories will improve the profitability of the organization.

2.1.1 Types of Inventories

Generally, organization maintain following types of inventories

A. Raw Material

The raw materials are those inventories which need to be purchased for obtaining finished product. Raw materials are those basic inputs, which are converted into finished products through the manufacturing process. Materials used in factory are traditionally classified as direct materials and indirect materials. Direct material is generally defined to include all materials and parts that are integral part of the finished product and their contribution can be directly identified. Indirect materials are generally defined as materials used in manufacturing process as supporting materials. These are the goods that are not committed to the production in the manufacturing firm. "The raw materials inventory contains items purchased by the firm, mainly for production purpose. Raw materials are those basic inputs which are converted into finished products through the manufacturing process. Raw materials inventories are those units which have been purchased and stored for future production. (Pandey, 1995)

B. Work-in-Process

Work in process represents the semi-finished goods, they include those materials that have been committed to production process but haven't yet been converted into finished goods. For example, in garment factories the clothes cut but not stitched are the work-in-process inventory. Works in process inventories are semi-manufactured products and they need more work before they are converted as finished product for sale. These items are normally, partially finished goods at some intermediate stage of production. It is neither a final product nor a raw material. In other way, those materials that have been committed to production process but have not yet been converted into finished goods. (Jain and Narang, 1988)

C. Finished Goods

These are completed products waiting for sale. In the manufacturing firm, they are the final output of the production process. Firm carry finished goods to ensure that order can be filled when they are received. If a firm don't have finished goods inventory it would have to wait for the completion of the production process before inventory could be sold thus demand couldn't be satisfied when it arrives. When demand arrives and there is no inventory to satisfy that demand a stock out situation exists. In such situation, the firms will be in danger position of losing the customers to competitors permanently. These inventories are those completely manufactured products which are ready for sale. Stocks of raw materials and work-in process facilitate production while stock of finished goods is required for smooth marketing operation. Therefore, finished goods are completed goods waiting for sale. In a manufacturing concern, they are the final output of production process. (Pandey, 1995).

D. Spare Parts and Supplies

Firms also maintain the forth kind of inventory i.e. of supplies. Supplies include office and plant cleaning materials (soap, broom etc) oil, fuel, lights, and bulls etc which are used not directly in the production process but are important for smooth production process in any organization. Usually those supplies are small part of the total inventory and don't involve significant investment. (Pandey, 1995)

2.1.2 Objective of Inventory Management

Efficient management of inventory should ultimately result in maximization of the owner's wealth. The objective of inventory management is to improve profitability by minimizing the costs associated with investment in inventory like most financial decision.

The main objective of inventory management is operational and financial. The operational objectives mean that materials and spares should be available in sufficient quantity so that work is not disrupted for want of inventory. The financial objectives mean that investment in inventories should not remain idle and minimum working

capital should be locked in it. The following are the objectives of inventory management.

1. To ensure continuous supply of materials spars and finished goods so the production should not suffer at any time and the customers demand should also be meet.
2. To avoid both over-stocking and under-stocking of inventory
3. To maintain investment in inventories at the optimum level as required by the operational and sales activities.
4. To keep material cost under control.
5. Providing flexibility in production plans.
6. Making possible economies in transportation clearing and forwarding charges (Banargee and Prasad, 1985).

Therefore, the objectives of inventory management should be to avoid excessive and inadequate levels of inventories and maintain sufficient inventory for the smooth production and sales operations. Efforts should be made to place an order at the right time with the right sources to acquire the right quantity at the right price.

2.1.3 Purpose of Holding Inventories

The fundamental reason for carrying inventories is that it is physically impossible and economical impractical for each stock item to arrive exactly where it is needed and when it needed. Inventory is vitally important to almost every type of business; whether that is manufacturing or service business. There are basically two reasons that the organization should keep inventories. (Pandey, 1995)

1. Primary
2. Secondary

Primary Purpose

The primary purpose of holding inventory is that it is physically impossible to get right amount of stock at right time of need and economically impractical to get right amount of stock at exact time of need. (Pandey, 1995)

Secondary Purpose

The secondary purpose of holding inventory is to meet expected customer demand, to run production process smoothly, to decouple internal operations, as a hedge against stock out, to take advantage of economic lot size, and as a hedge against price increase etc. (Pandey, 1995)

2.1.4 Needs and Importance of Holding Inventory

Inventory management is vitally important to almost every type of business. Whether manufacturing or service oriented, inventory control touches almost every fact of operations. The importance of inventory management can be realized when it is said that purchase account for nearly 50% of an organization's annual expenditure. That nearly 80% of the working capital is tied up in inventory and the carrying cost is almost 25% a year. That material represents 40 to 60% of the sales price or 60 to 80% of the production cost of a product and that even a saving of 5% in material cost will substantially increase the profit margin of an enterprise. Although holding inventories involves blocking of times funds or expensive to hold it, there are three general motives for holding inventories (Drury, 2000).

1. The transaction motives occur whenever there is a need to hold stock to meet production and sales requirement, and it is not possible to meet these requirements instantaneously.
2. The precaution motive applies only when future demand is uncertain a firm might also decide to hold additional amounts of stocks to cover the possibility that it may have underestimated its future production and sales requirements.
3. The speculative motive arises when it is expected that future inputs prices may change; a firm might maintain higher or lower stock levels to speculate on the expected increase or decrease in future price.

2.1.5 Inventory Valuation Method Under Cost Basis

The primary basis of accounting of inventory is cost, which has been defined generally as the price paid or consideration given to acquire an asset. As applied to inventories, cost means in principle the sum of the applicable expenditure and charges

directly or indirectly incurred in bringing an article to its existing condition and location (American Institute of Certified Public Accountants, 1961).

Conceptually, the process of valuing the inventory is simple. We can calculate inventory value that multiplying physical quantity of goods by cost per unit. But in practice, many organizations purchase different type of raw materials at different price at different time. Price of materials changes time to time. If the same purchase price is paid for all lots of a given material, no difficulty would be encountered in the valuation of that material when it is issued to jobs or work orders.

However, that is not the case and the price always changes in accordance with the market conditions. The stock of a given material will, therefore, consist of purchases made at different times at different process, which poses a problem as to what should be the price when the material is issued. In this situation there are many methods, which are based on historical cost, used in determining the values of inventory are;

2.1.5.1 Specific Identification Method

Under this method, materials issued to production are priced at their purchase prices. The basic assumption in following this method is that materials in the stores are capable of being identified as belonging to specific lot. In this method, the items have serial numbers or are distinguishable by model, color or size to identify the particular items but specific items separate at first and recorded in stock book. This method is more suitable to low volume, high cost item such as automobiles. It is not very practical when the firm purchases large quantities of identical units of various times and prices. It is mainly suited to the needs of a small business enterprise when a small number of items of materials are purchased and stored which can be easily identified.

2.1.5.2 First-In-First-Out (FIFO) Method

Under this method material is first issued from the earliest consignment on hand and priced at the cost at which that consignment was placed in the stores. In other words, materials received first and issued first. This method is most suitable in times of falling prices because the issue price of materials to jobs or works orders will be high while the cost of replacement of materials will be low. But in case of rising prices this

method is not suitable because the issue price of materials to production will be low while the cost of replacement of materials will be high. It is simple to use and appears to coincide with the established merchandising principle of selling the oldest items first. (Drury, 2000).

2.1.5.3 Last-In-First-Out (LIFO) Method

This method assumes cost flow is exactly the opposite of FIFO method. The title of this method assumed that the cost of the items sold was attributable to the most recent items purchased. As against the First in First out method the issues under this method are priced in the reverse order of purchase i.e. the price of the latest available consignment is taken. This method is suitable in times of rising prices because material will be issued from the latest consignment at a price that is closely related to the current price levels. This method has become popular since the procedure became an acceptable method for use in determining the income taxes. Unlike weighted average, these separate purchase groups can't be averaged in the inventory records. They must be maintained separately in the event that the ending inventory is less than the beginning inventory. In such case, the firm must be able to identify the oldest remaining items for inventory valuation purposes. (Drury, 2000).

2.1.5.4 Standard Cost Method

LIFO, FIFO and Average Cost Method are often awkward to work within the subsidiary records for materials under a perpetual inventory system. For this Standard Cost Method may be used in accounting for individual items in materials inventory. Standard price is the predetermined price and both the receipts and issues will be valued at this price. This method charges material unit into the factory at a predetermined budgeted or estimated price reflecting a normal or an expected future price. Receipts and issues of materials are recorded in quantities only on materials cared thereby greatly simplifying the record keeping. Then, there is a basis for comparing existing costs from day-to-day, which should exist under normal condition. (Drury, 2000).

2.1.5.5 Base Stock Method

Each concern always maintains a minimum quantity of material in stock. This minimum quantity is known, as safety or base stock and this should be used only when an emergency arises. The base stock is created out of the first lot of the material purchased and therefore, it is always valued at the cost price of the first lot and it is carried forward as a fixed asset. This method works with some other method and is generally used with FIFO or LIFO method. The objective of this method is to issue the material according to the current prices. This objective will be achieved only when the LIFO method is used together with the Base stock method. All the methods have their advantages and disadvantages. However, the method chosen is significant for efficient inventory management especially in its financial dimension. (Drury, 2000).

2.1.6 Inventory Control

Inventory control is the activity that maintains stock keeping items at desired levels. In the manufacturing sector, inventory control focuses on material control, similarly in the service sector the focus is on the service i.e. inventory control focuses more on supplies and less on materials. As the term inventory control has two functions, which are quite different but related to each other only in that they both require the maintenance of adequate records of inventories as well as receipt and issues. These functions are accounting control and operating control.

1. Accounting control of inventories is concerned with the safeguarding of the undertakings property in the form of raw materials, work-in-progress and semi-finished as well as a finished product, and the proper recording of finished products, and the proper recording of receipt and consumption of materials as well as flow of the goods through the plant into finished stock and eventually to customer.
2. Operating control of inventories is concerned with maintaining inventories at the optimum level keeping in view the operational requirements and financial resources of the business.

The technique of maintaining the size of the inventory at some desired level, keeping in view the best economic interest of an organization is known as inventory control.

Every organization holds inventory at necessary level. The under and over stocking of any inventory is evil for business. Therefore, "Inventory control may be defined as the planning, ordering, and scheduling of materials used in the manufacturing process. It is possible to exercise control over the three types of inventories recognized by accountants i.e. raw materials, work in process and finished goods.

"Financial Management" clearly states the motive of inventory control as, to provide customer service in the face of sales and production fluctuations, to take action against expected increase in sales, to handle production variations, to manufacture goods in economic production, run, to promote flexibility in plant scheduling, to make advantage of favorable raw material price, to take advantage of distribution cost, to keep storage equipment, operational, to speculate against cost and price changes, to minimized cost and maximize profit (Kuchal, 1982).

More specifically, the purpose of inventory control is the stock of an adequate balanced inventory of materials and to reduced storage and handling costs, obsolescence and deterioration costs, insurance and interest charges and risk of price level changes. Therefore, the technique of maintaining the size of the inventory at some desired level, keeping in view the best economic interest of an organization is known as inventory control.

2.1.6.1 Objectives of Inventory Control

Inventory control refers unit controls and value controls. On the other hand, financial managers are mainly concerned with control of inventories. They have to think resources invested in inventory will be efficiently and effectively utilizes. A fundamental objective of a goods system of operating control of inventories is to be able to place at the right time from the right source to acquire the right quantity at right price. Overall objectives of Inventory control may be amplified into the following objectives, which have to be kept in view while developing and maintaining a system of inventory control.

1. Service to customer
2. Effective use of capital

3. Promotion of manufacturing efficiency
4. Economy in purchasing

2.1.6.2 Selective Inventory Control (ABC Analysis)

Manufacturing organizations find it useful to divide materials into three categories for the purpose of exercising selective control on materials. An analysis of the materials costs will show that a smaller percentage of items of materials in the store may contribute to a large percentage of the value of consumption and on the other hand a large percentage of items may represent a smaller percentage of the value of items consumed between these two extremes will fall those items the percentage number of which is more or less equal to their value of consumption. Items falling in the first category are treated as "A" items and items of the second category as "B" items and items of third category are taken as "C" items. Such an analysis of material is known as ABC analysis.

The report of Indian Productivity Team on "Stores and inventory control in USA, Japan and West Germany" gives the example of ABC analysis with allocate the name of name of group- percentage of items- percentage of cost respectively is as; A-8%-75%, B-25%-20% and C-67%-5%. The significance of this analysis is that a very close control is exercised over the items of "A" group which account for a high percentage of costs while less stringent control is adequate for categories "B" and very little control would sufficient for category "C" items (Jain & Narang 1997).

It is understandable that all the items in the inventory are not of equal importance in terms of money invested profit potential, sales volume of usage volume and stock out penalties. Therefore, it is unrealistic to devote equal attention to each of these items. Rather, it is more reasonable to pay attention to the items according to their relative importance in the total inventory system. The system of giving priority to the items is called priority system or "ABC Inventory system," The ABC system classifies all the items in the inventory into A, B, C, criteria's according to their relative importance or priority.

"A-criteria" includes those few items, which share maximum investment of the firm.

“B-criteria” includes those items with moderate unit and moderate volume.

“C-criteria” includes those large numbers of items, which account for very small money values.

2.1.7 Inventory Management Techniques

Adequate inventory management system facilitates smooth production activities and provides safe delivery system to customers. On the other hand, excessive inventory is idle resource for the organization and can prove costly whereas little inventory burdens production and supply problems in the organization. The quantitative approach of inventory management furnishes the basic information to control the burden of excessive and deficit inventories. It provides both numerical and logical information to the organization to maintain optimum level of stock so as to minimize the inventory costs (Hampton, 1986).

A primary objective of the firm is the maximization of wealth. To achieve this objectives firm should maintain optimum level of inventory. Optimum level of inventory could be set on the basis of trade-off between cost and benefit to maximize the owner’s wealth. To manage inventories efficiently and effectively answer should be sought to the questions: A) How much should be the order? B) When should be the ordered? The first question, how much to order, relate to the problem of determining Economic Order Quantity (EOQ) and is answered with an analysis of cost of maintaining certain level of inventories. Whereas the second question, when should be the ordered relate to the re-order point. To manage its inventories effectively, a firm should use a systems approach to inventory management. A system approach considers in a single model that affect the inventory. A system for effective inventory management involves three sub-systems i.e. economic order quantity, re-order point and stock level (Hampton, 1998).

2.1.7.1 Economic Order Quantity (EOQ) Model

A decision about how much to order has great significance in inventory management. EOQ is the size of the lot to be purchased which is economically viable. This is the quantity of materials, which can be purchased a minimum cost. Generally, EOQ is the

point at which inventory-carrying costs are equal to ordering costs. Hampton defines economic order quantity as “The order size that will result in the lowest total of order and carrying costs for an item of inventory.

Furthermore, he states the importance of economic order quantity as if a firm places unnecessary order it will incur unneeded order costs. If it places too few orders, it must maintain large stock of goods and will have excessive carrying costs. By calculating an economic order quantity, the firm identifies the number of units to order that results in the lowest total of these costs. The order size associated with such minimized annual cost is called economic order quantity. Hence economic order quantities are the number of units to be ordered a time to minimize the cost of order and carrying of the year.

It refers to the order size that will results in the lowest total cost (total ordering cost + total carrying cost) for an item of inventory. If a firm place many orders it will incur un-needed ordering costs. If it places too few orders, it will have excessive carrying costs. By EOQ model we can identify the number of units to order that results in the lowest total costs. EOQ seeks that how much units of inventory should purchase at an order, which minimizes the total cost. When we are going to calculate EOQ one thing should be keep in mind to calculate the cost involve in the carrying and ordering costs will introduce a much smaller error (10%) in the determination of the EOQ. We can compute EOQ with the help of forecasting usage, ordering and carrying costs. In EOQ calculation, we must use marginal cost only, do not include fixed costs. As inventory is determined as the most important factor which affects the operations, then a mathematical model was developed to control the inventory levels. The most widely used model is EOQ model. It was first developed by Haris in 1913 but still Wilson is given credit for this model due to his early in-depth analysis. This model is also known as Wilson EOQ model. According to this model, some costs like ordering costs are declined with inventory holdings while some costs like holding costs rise and thus total inventory cost curve has a minimum point where inventory costs can be minimized (Lee, 2002).

$$EOQ = Q^* = \sqrt{2AO/C}$$

Where,

Q^* = Economic Order Quantity

A = Annual demand / sales

O = ordering cost

C = carrying cost per unit

Assumptions

The EOQ model is intuitively attractive because it minimizes the total cost associated with the inventory replenishment in applying the model however here are some important assumptions (Baffu and Sarin, 1998).

1. Average demand is continuous and constant represented by a distribution that doesn't change with time.
2. Supply lead-time is constant and known. The lead time from order placement to order delivery is therefore always a fixed number of days.
3. This is independence between inventory items. The EOQ model assumes that the replenishment of one-inventory item has not effect on the replenishment of any other inventory items.
4. Purchase price and cost parameters are constant.
5. The order of the EOQ is equal to the delivery quantities. If delivery lots are smaller, the average inventories in the EOQ model are not valid.

Approaches to set the EOQ

The Main approaches to set EOQ are as follows;

1. Trial and Error Approach or The Long Analytical Approach
2. Formula Approach or Mathematical Approach
3. Graphical Approach

Trial and Error Approach

A firm has different alternatives to purchase its inventories. For instances it can buy its entire requirements in one single lot at the beginning of the inventory planning period. Alternatively, the inventory may be procured in small lots periodically,

weekly, monthly, and quarterly and so on. If the purchase is made on one big lot, the firm's average inventory holding would be relatively large. High average inventory would involve high carrying costs. On the other hand low the inventory holdings are associated with high ordering cost. The trial and error approach for the determination of EOQ uses different permutation and combination of lots of inventory purchases as to find out the least ordering and carrying cost combination. In other words, according to this approaches the carrying and ordering cost for different sizes of order to purchase inventories are computed and the order size with the lowest total cost (ordering plus carrying) of inventory is the economic order quantity.

Formula Approach

The trial and error or long analytical approach is tedious to calculate the economic order quantity. As easy way to determine, EOQ is to use the order formula approach. The Economic Order Quantity can be calculated by the following equation,

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

Where,

A= Total annual requirement

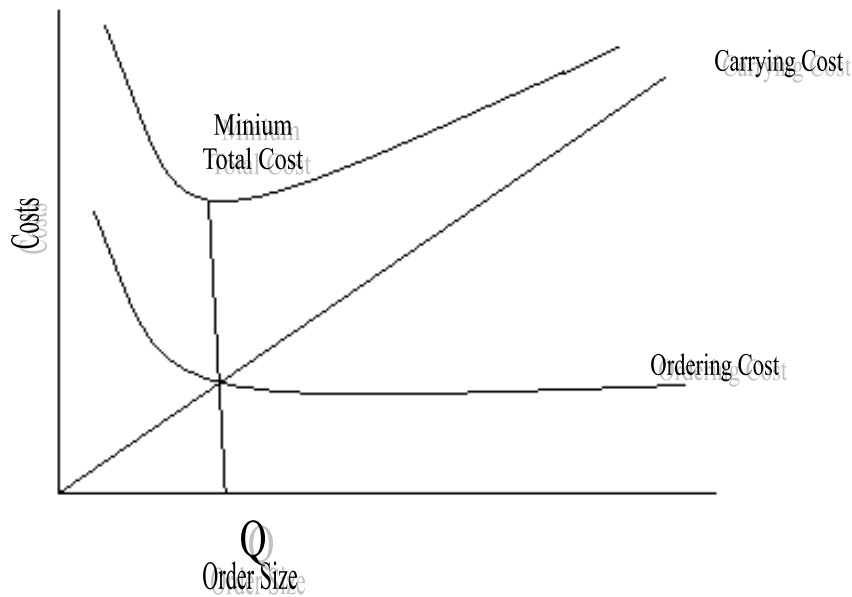
O= ordering cost per order

C= carrying cost per unit

The Graphic Approach

The Economic Order Quantity can also be found graphically.

The following figure illustrates the EOQ functions.



In figure carrying, ordering and total costs are plotted on vertical axis and horizontal axis is used to represent the order sizes. Total carrying cost increases as the order size increases because on an average a large inventory level will be maintained and ordering cost decline with increase in order size. The behavior of total cost line is noticeable since it is a sum of two types of costs that behave differently with order size (Pandey, 1989).

The total cost decline in the first stage, but they start rising when the decrease in average ordering cost is more than offset by the increase in carrying cost. The economic order quantity occurs at the point Q where the total cost is minimum. If the order size increases, carrying costs exceeds ordering costs that are saved. Thus, the firm operating profit is maximized at point Q. Therefore, the Q is the optimum point and is called Economic Order Quantity (EOQ).

2.1.7.2 Re-order Point

It is the point at which, if stock of material in store approaches, the store-keeper should initiate the purchase requisition for fresh supplies of materials. This level is fixed somewhere between the maximum and minimum level in such a way that the difference of quantity of the materials between the reordering level and the minimum level will be sufficient to meet the requirements of production up to the time the fresh supply of the materials is received (Jain & Narang, 1979). Re-order point subsystem answers the important questions in any organization inventory management. The question is “when an order should be placed so that the firm does not run out of stock?”

The reorder point is stated in terms of the level of inventory at which an order should be placed for replenishing the current stock of inventory. In other words, reorder point may be defined as that level of inventory when fresh order should be placed with the suppliers to procure additional inventory equal to the economic order quantity." (Khan and Jain, 1992)

2.1.7.3 Safety Stock

Safety stock is necessary for an uncertain demand of the customers. The demand for goods may fluctuate day by day or from week to week. Uncertainty prevails in the real world of business. Inventory management also cannot be kept out of uncertainty. It is most necessary to maintain some secure stock to avoid the situation of stock out. Therefore, an organization maintains a certain amount of stock which is known as safety stock.

In practice, demand or usage of stocks is not known with certainty. In addition, there is usually a degree of uncertainty associated with the placement of an order and delivery of the stocks. To protect itself from conditions of uncertainty, a firm will maintain a level of safety stock for raw materials. Work-in-process and finished goods. Thus, safety stocks are the amount of stocks that are carried in excess of the expected use during the lead time to provide a cushion against running out of stocks (Drury, 2000).

2.1.7.4 Stock Level

This stock level sub-system keeps track of the goods held by the firm, the issuance of goods, and the arrival of the orders. It is made-up of the records accounting for the goods in stock. Thus the stock level sub-system maintains record of the current level of inventory. Stock level can be divided into three headings; maximum stock level, minimum stock level and danger stock level.

2.1.8 Inventory Cost

The goal of the inventory management is to provide the inventories for sustaining operation at the lowest possible cost. The first step in inventory management is to identify all the costs involved in purchasing and, maintaining inventories typical costs associated with the inventories are described below.

2.1.8.1 Carrying/ Holding Cost

The carrying cost or holding cost includes the cost of maintaining the inventory warehouse and protecting the inventory items. Typical costs include insurance, security, rent, heat, and light, taxes, lost due to pilferage, spoilage or brokerages. The holding cost also includes opportunity cost associated with having funds tied up in inventory that could be used elsewhere. These costs generally increase in proportion to the average amount of inventory held. Capital or opportunity cost, handling cost, storage cost, depreciation cost and system cost includes in carrying cost.

2.1.8.2. Ordering Cost

The "ordering cost" includes cost of placing an order, set up cost, cost of postage, telephone made to vendor, fax, email lab our cost involved in purchasing and accounting receiving cost. Ordering cost are generally expressed as a fixed cost amount per order size.

Furthermore, ordering costs are the cost involved in placing and receiving an order or purchased items. The expenses involved in this cost are;

1. Cost of placing an order

2. Requisitioning cost
3. Transportation/shipping cost
4. Receiving, inspecting and storing costs
5. Sales tax, customs etc
6. Clearing and forwarding cost
7. Insurance of raw materials
8. Stationary cost
9. Bank commission/LC charges etc
10. Telephone/fax/postage expenses to follow up
11. Cost incurred when raw materials are in transit.

Ordering cost increases with the number of orders, thus more frequency in inventory acquired higher the firms ordering cost. On the other hands if the firm maintains large inventories levels there will be a few orders placed and ordering cost will be relatively small. Thus, ordering cost decrease with the increasing size of inventory. The fixed costs associated with ordering inventories as O and if we placed N orders per year, the total ordering cost is given as,

$$\begin{aligned} \text{Total ordering cost (TOC)} &= O \times N \\ &= O (A/Q) \end{aligned}$$

Where, TOC=Total ordering cost

O = Fixed cost per order

N = Number of orders placed per year

Q = Inventory quantity for each order.

A = Annual demand

2.1.8.3 Stock out Cost

Stock out cost is associated with demand. The depletion in stock results in loss of sales or back order costs. When the sales are lost due to stock out; the firm losses both the profit margin on unmade sale and the firm's goodwill. If the customer uses another business elsewhere, future profit margin may also be lost and back order cost is needed to convince customers to use again after inventories have been replenished.

Backorder cost includes loss of goodwill, money paid to re-order goods and notification to customers when goods arrive (Adams and Ronald, 2000).

2.1.9 Inventory Cost Control

Cost control aims at reducing inefficiencies and wastages and setting up predetermined costs and in achieving them. Inventory cost control is exercised through setting standards or targets and comparing actual performance there with a view to ascertaining deviation from set targets or standards and taking corrective action to ensure that future performance conforms to the set standards or norms or targets.

Process of inventory cost control as below;

1. Predetermining the standards for each item inventory both in terms of cost and quantity, the establishment of standard specifications for material is the starting point in cost control.
2. Measuring actual performance of each item of inventories both in terms of cost and quantity
3. Comparing actual performance with standard to isolate variance, analyzing variance as to their incidences and causes.
4. Taking corrective action to eliminate variance.

Most of the inventories costs are controllable cost all aspect of inventory management like material planning, purchasing, receiving, store keeping, issuing are the primary areas of controlling. Cost control can be effectively exercised on acquisition, holding and stock out costs of inventories (Agrawal, 2000)

2.1.9.1 Just-in-Time (JIT)

A Japanese production management concept states that JIT can be used to reduce dependent demand of inventory. It is a basic philosophy. This applies equally to manufacturing and non-manufacturing organization. It is about total requirement with no waste, i.e. no unnecessary use of materials, human or physical resources. Therefore, it can be seen that this philosophy applies equally to running a chemical

plant, a management consultancy, but both organizations have not applied this concept fully.

2.2 Review of Previous Works

This chapter is devoted to theoretical analysis and brief review of related and pertinent literature available. Where conceptual and theoretical review of study, it includes a discussion on the conceptual framework and review of related material like previous thesis, Browsers booklets, journal, articles and reports, magazine etc.

2.2.1 Review of Articles in Journals

Various articles could be available in the field of Analysis of Inventory Management. More than dozens of articles have been published. But not found related to Nepalese manufacturing companies. More or less all the manufacturing companies perform similar functions and inventory activities. Although their problem may differ to some extent, methods and techniques of analyzing inventory management may resemble. Therefore, the articles on various manufacturing companies of developing countries like Kenya, Nigeria and India have been reviewed keeping in mind to what extend to this study will stand distinct from them. Some of the articles made on Inventory Management are considered relevant; which are reviewed as follows;

Baldenius and Reichelstein (2000) examined inventory management from an incentive and control perspective. The study demonstrated that the residual income performance measure based on historical cost accounting provided managers with incentives to make optimal production and inventory depletion decisions. The lower-of-cost-or-market rule is shown to be effective in situations where inventory may become obsolete due to unexpected demand shocks. Rajagopalan and Malhotra (2001) numerous normative models have been developed to determine optimal inventory levels and several articles and case studies have been written about the concerted efforts and practices adopted by manufacturing firms in the United States to reduce inventories. The analysis provided an encouraging picture about the results of U.S. manufacturing inventory-reduction efforts. Cuthbertson and Gasparro (1993) developed a model of inventory holding which embodied most of the key ideas of

earlier theoretical work. Previous theories include the production level smoothing and production cost smoothing models, the accelerator principle and the precautionary model. The result able to modify the above models to incorporate financial effects and technological change which might affect inventory holdings. The study found that the level of manufacturing inventories had unit elasticity with respect to output, was positively related to the conditional variance of output and negatively related to the overall gearing position of the firm.

Lieberman (1994) have focused on work-in- process and finished goods inventories, but they have also examined determinants of raw materials inventory, production and delivery lot sizes, and manufacturing throughput time. The findings pointed to the importance of both technological and managerial factors in determining inventory levels. Their results on the role of technology factors were consistent with predictions derived from the EOQ formula and related models of optimal inventory holding. Inventories were higher when the underlying technologies required longer setup and processing times.

The study finds the evidence that management and workforce practices had substantial influence on inventory levels. Greater employee training and problem solving activity had a strong effect in reducing inventories. These general workforce characteristics facilitate a reduction in manufacturing process variability, thereby reducing the need for large inventory buffers. They found a strong connection between the frequency and extent of supplier-assembler communication and the supplier's level of inventory. Findings are consistent with models that view inventory and communication as substitutes.

Lai (2006) has provided empirical evidence that the market cannot differentiate between good and bad inventory, the market punishes firms when it can tell that inventory decisions are «bad» and the inventory levels do not statistically explain firm value. Lai (2006) has proposed that in a world with signaling incentives, short-termism and information asymmetry, inventory has a signaling role. Firms and the stock market understand this, resulting in separating or pooling equilibrium and this is one channel in which inventory translates into market valuation. Finally, the model

has been worked out as if the firm is a monolithic, aligned entity, without agency problems between managers and shareholders. Suppose managers are keen to not only increase share price for shareholders, but also their private benefits related to inventory and the latter benefits could come with higher levels of inventory.

Balakrishnan et al. (2005) addressed the problem of jointly optimizing price and stocking quantity for demand-stimulating inventories by considering two alternative models for incorporating the dependence of demand on price a distribution-lifting model and a multiplicative model. For both models, the study showed that the optimal policy can be derived via a sequential procedure that first optimizes price and then sets the order quantity. The analysis of the firm's profit maximization problem has led to a better understanding of the structure of the optimal policy. Ozer (2009) found that effective inventory management was a capability necessary to lead in the global marketplace. The study found four fundamentals of effective inventory management; managers requires to know how best to use available information, managers need to quantify the value of information and need to coordinate decentralized inventory operations.

The new raw material inventory management policy is targeted at solving the existing problem of having excessive inventory by optimizing current raw material inventory level based on scientific models (Wang, 2010). The traditional inventory models focus on characterizing replenishment policies in order to maximize the total expected profit or to minimize the expected total cost over a planned horizon. They provide the perspective on inventory management that treats inventory problems within a wider context of financial risk management. The inventory control problem is formulated as a continuous stochastic optimal control problem with fixed and proportional transaction costs under a continuous value-at-risk constraint. The results illustrate how the raw material price, inventory level and value-at-risk constraint are interrelated.

Several papers have attempted to link inventory levels with financial performance. Balakrishnan (1996) examined the effect of JIT adoption, which decreased inventory, on firms' profitability and found that there was no statistically significant association

between return on assets and JIT adoption. Lieberman and Hiller (1994) found a strong association between higher productivity and inventory reduction. Gaur et al. (2002) found that return on assets, sales growth, standard deviation of return on assets and financial leverage explained more than 50% of the variation in stock returns for periods of ten years or more as well as retailers in different segments achieved similar return on assets and return on equity by following very different strategies with respect to their gross margins and inventory turns. High gross margin correlated with low inventory turns and with high selling, general and administrative expenses as well as risk of bankruptcy was related to the mismatch between how fast a company attempted to grow versus what growth rate it realized. Randall et al. (2005) found that the probability of bankruptcy is lower when firms align inventory decisions with environmental and strategic factors.

Based on an analysis of more than 900 excess inventory announcements made by publicly traded firms during 1990-2002, Signal (2005) has documented that firms that experienced excess inventory situations substantially underperformed a sample of matched firms from the same industry and of similar size. He estimated that the mean (median) abnormal return due to excess inventory was -37.22%. The evidence has suggested that the stock market partially anticipates excess inventory situations, firms do not recover quickly from the negative effect of excess inventory, and the negative effect of excess inventory is economically and statistically significant. Chen et al. (2005) found decreasing trends for relative inventory in manufacturing and wholesaling sectors for the period 1981-2003 and some- what mixed evidence in the retailing sectors. Their study shows that firms with abnormally high inventories had abnormally poor long-term stock returns and also found that the relationship between Tobin's q and abnormal inventory was absent in the cross- sectional domain.

The study of Roumiantsev and Netessine (2005) is the first to systematically analyze the relation- ship between companies' inventory management policies/operational environment (as captured by the relative inventory level, lead time, demand un- certainty and inventory elasticity, with respect to several environmental variables) and accounting returns as reflected by return on assets. Roumiantsev and Netessine (2005) found that superior earnings are associated with the speed of change or

responsiveness in inventory management after controlling for industry and firm-specific effects. The study also found that inventory elasticity with respect to sales, lead times and sales uncertainty is consistently positively associated with both current and forward returns on assets. This result provides statistical evidence that public companies that are more responsive in inventory management are more profitable. The findings indicate the importance of matching supply to demand in volatile environments, whereby one must pay attention not only to the level of the inventory, but also to the speed of change in inventory, which can be used as an indication of the quality of management control. The importance of inventory management for small and medium-sized manufacturing companies proved Cook (2012) who analyzed its influence on economic performance. His study was aimed especially at machine tool industries sector in India which was an extremely inventory intensive. The results showed that inventory management had really some impact on labor productivity, capital productivity and returns to scale in respondent companies.

Manufacturing companies can manipulate production to shift fixed costs between cost of goods sold and inventory accounts, thereby managing earnings either upward or downward. Considering two earnings targets, avoiding losses and consensus analyst forecasts, Cook (2012) used a large sample of manufacturing companies to study how production cost structure and inventory valuation method affect this strategy. They reported the following results: Companies with high fixed-cost ratios were more likely to manipulate inventory but made smaller abnormal inventory changes than companies with low fixed-cost ratios. Panigrahi (2013) has examined the relationship between inventory conversion period and firms' profitability and the results indicate that there is a significant negative linear relationship between inventory conversion period and profitability.

Several researches have attempted to link inventory levels with financial performance and have found little or no relation between them. We also attempt this approach and find little relation between the inventory level expressed in terms of different ratios and profitability expressed in terms of return on total assets.

2.2.2 Review of Previous Thesis

Inventory management is wide subject but no one pays attention in this field. Many modern techniques to control inventory management have been realized; still many problems/ difficulties have been faced by the manufacturing company. In Nepal there are many public enterprises have been established. Many analyses have been made, out of that only few are about inventory management. From the various studies of thesis, dissertations business reports and other sources, it is found that no public enterprises are applying modern method or techniques to manage the inventory as per the requirement. So far some of the related studies made on inventory management are considered relevant, which are shown below.

Sharma (1996) has conducted a research work on the topic of "Inventory Management: A case study of Royal Drug Ltd.". In his study he has set the objectives as to check the effect of inventory management on its profitability, methods of inventory management and analyze the used tools and techniques are applicable or not. he also has given his findings on his study areas; investment in chemical material inventory was more than other stock of raw material, order size, price of inputs is determining unscientifically, no any analytical tools are used, and found gap between the placing and receiving a new order is not given proper attention.

Guragain (2006) has conducted a study on "Inventory Management: A Comparative Study on DDC & SGML. Mr. Guragain was set the objectives to examine the present inventory management system of DDC and Sitaram Gokul Milks and to analyze the impact of inventory in profitability and laid down the findings he found that DDC was in the problem of under stocking of materials and production and sales plan of the factory was not practicable and realistic

Dhital (1996) has conducted his study on the topic of "Inventory Management: A case study of Nepal food corporation." Objectives of the study was to assess the trend of inventory turnover in Nepal Food Corporation, check the purchasing, selling and distribution decision ware related with inventory or not, method of scientific inventory was applying or not and find the condition of food as inventory in the corporation and he found the result is as, due to lack of separate inventory

management department there is serious problem in the application of inventory management techniques and methods, corporation is being unable to fulfill the market demand as well as all the raw materials are purchased domestically and the trend is very fluctuating.

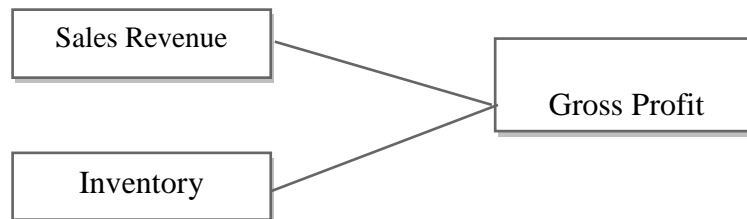
Lamichhane (1996) conducted the research work on "Inventory Management of Nepal Liver Limited". With setting the objectives of study as to identify the current inventory position, evaluate the inventory tools and techniques used, analyze the effect of inventory in the profitability of Nepal Liver Limited. He has recommended his findings on his study are; company's policy of maintaining inventory is inappropriate, company was suffering from internal and external political influences, due to lack of appropriate inventory policy and ineffective demand forecast, fluctuation is found in each case and uncertainty about the future supply of materials.

2.3 Conceptual Framework

Inventory management is crucial in effective and efficient organizational operation. It is very vital in the control of materials and goods that have to be held for later in the case in the case of production or later exchange activities in the case of services. Inventory is a key to probability. Inventory velocity turns assets in profit. The faster the inventory turns; the greater will be the profitability. Inventory is the key issue to supply chain management success. Customers demand that their orders be shipped complete, accurate and on-time. That means having the right inventory at the right place at the right time according to Reddy (2008). The inventory management applies to all inventories- finished goods, raw materials parts and components, and work-in progress. It includes new products and existing products. It covers all types of business-manufactures, distributors, wholesalers, retailers and other in about every industry.

2.3.1. Relationship between Dependent and Independent Variables

Inventory performance:



Independent Variables

Dependent Variable

2.4. Research Gap

Most of the manufacturing companies' success is depend upon the well managed inventory system. About 45 % to 60 % amount is to be invested in inventory as per the nature of the organization. Profitability is also depending upon inventory management. Most of researcher has researched about public limited company as well as public limited enterprises. This research has been done of such manufacturing company whose motto is to earn high profit. So, the chosen multinational manufacturing company (DNPL and UNL) should pay their attention for the proper management of inventory level.

Many studies have reported that; implementation of scientific inventory management is essential in Nepalese business organizations. However, there has been very little research reported on the effectiveness of such use. To practice the scientific inventory management tools, it is most essential to improve the organizational effectiveness along with well trained and experienced professionals.

Besides, the data taken for analysis are up to date and range from FY, 2012/2013 to 2016/2017 thus incorporating the current stock troubles seen in the market. Moreover, this research report has considered various measures for calculating the latest problems and shortcomings faced by the company in the preset competitive environment. Similarly, suggestions and recommendations given in this report are based on the interpretation and analysis of annual report and current data of the company.

CHAPTER -3

RESEARCH METHODOLOGY

This chapter deals with the various systematic steps adopted by the researcher in gathering all the information required for the study and making sense of the data collected. It covers research design, nature and sources of data, population and sample, data collection procedures and the various tools and techniques used for analyzing the collected data.

3.1 Research Design

The research design is a planned structure and strategy for investigation of the facts in order to achieve the conclusion. The research design follows in this study is descriptive as well as analytical. This study is mainly concentrated on comparative study of inventory management of two manufacturing companies and the data are mostly secondary. Therefore, as per nature of the study, analytical and descriptive research design has been followed with the comparative research approach.

3.2. Population and Sample

The leading five manufacturing companies within the country has considered as the total population of the study. However, the samples drawn are DNPL and UNL.

3.3. Sources of Data

This study is based upon the secondary data only. Secondary data is compiling through annual reports of both companies, articles, related thesis and websites. During the completion of this research, different libraries, information agencies will also have been consulted. Secondary data is use to fulfill the objectives of this study.

3.4. Data Collection Procedure

Secondary data is collection from annual reports and records of both companies. Collected data has tabulated in order to make analysis easy.

3.5 Data Processing Procedure

The collected data are presented and arranged in tabulation forms and different financial and statistical tools are used to extract valuable information relevant for this research. All the secondary data is shown by the table and diagrams in MS-Word and Excel sheet.

3.6 Reliability and Validity

The reliability of a measure indicates the stability and consistency with which the instrument is measuring the concept and helps to access the goodness of a measure. The reliability of the secondary data is high because it is collected from the trusted institution like SEBON, NEPSE and the companies' annual reports.

3.7 Data analysis Tools and Technique

Collected data from various sources is thoroughly review and sorted on the basis of their homogeneous nature and resemblance of the facts. The sorted data is arranging and presenting systematically in suitable tables. The processed and tabulated data are analyzing through different statistical tools such as Percentage, Simple Average, Standard Deviation, Coefficient of Variation and Coefficient of Correlation for clear and systematic presentation of findings as well as financial tool are ABC Analysis and Ratio Analysis.

3.7.1. Financial Tools

3.7.1.1 Stock Position

Position of an item of inventory based on relationship between demand and needs, quantity on hand and orders that are outstanding. A position held in a particular stock characterized by the quantity of materials held and whether it is long or short the market. he status of an inventory item based on its availability to meet expected demand or procurement requests.

3.7.1.2 ABC Analysis

“A” items are very important for an organization because of its high spend value. Normally A items are those items for which an organization spends close to 80 or even 90% of its money. “B” items or suppliers are those that an organization spends about 10% to 15% of its money. These are not that high in priority but still may need to pay some attention. “C” items or suppliers are those where spend is very low. Usually companies will have around 75% to 80% of suppliers in this category. While supplier consolidation is one of the common strategies used with C suppliers, it does not mean to repudiate the relationship with the C items/suppliers.

3.7.1.3 Ratio Analysis

1. Inventory Turnover Ratio

The inventory turnover ratio indicates the efficiency of the firm’s inventory management. This ratio explains the relationship between sales and inventory. It shows the number of times inventory is replaced during the year. Higher inventory turnover indicates the good inventory management system whereas lower inventory turnover implies excessive inventory level has not been used efficiently. The inventory turnover ratio indicates whether the inventory has been properly managed or not in an organization. Mathematically

$$\text{Inventory turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Average inventory}} \text{ or } \frac{\text{Sales}}{\text{Inventory}} = (\text{times})$$

2. Inventory to Current Assets Ratio

This ratio explains the relationship between the current assets and the inventory. It shows the actual percentage of current assets in the form of inventory. The increase in the ratio is an indication of Liberal investment policy followed by company. If the percentage of ratio increases, it means greater part is occupied by inventory. The ratio of inventory to current assets of manufacturing company should be 45-50%. Mathematically,

$$\text{Inventory to Current Asset Ratio} = \frac{\text{Inventory}}{\text{Current Assets}} = (\%)$$

3. Inventory to Total Assets Ratio

This ratio explains the relationship between the total assets and the inventory. It shows the actual percentage of total assets in the form of the inventories. The increase in the ratio is an indication of Liberal policy and demonstrates that the firm is willing to increase its working capital in order to have sufficient material in stock. According to Weston S Brigham, a company should hold 15 - 30% inventory to total asset. Mathematically,

$$\text{Inventory to Total Assets Ratio} = \frac{\text{Inventory}}{\text{Total Assets}} = (\%)$$

4. Net Profit Margin

This ratio establishes a relationship between net profit and sales and indicates management's efficiency in manufacturing administering and selling the products. This ratio is the overall measure of the firm's ability to turn each rupee of sales into net profit. If the net profit margin is inadequate, the firm will fail to achieve satisfactory return on owner's equity. Mathematically,

$$\text{Net Profit Margin} = \frac{\text{Net Profit after tax}}{\text{Sales}} = (\%)$$

3.7.2. Statistical Tools:

3.7.2.1 Arithmetic Mean or Average

In short, arithmetic mean, also known as average, is a single value within the range of the data that represents all the value in the series. It is a representative of the entire mass of homogeneous data, with its value lying somewhere between the two extremes, i.e. largest and smallest item. Mathematically, arithmetic mean of a given set of observations is calculated as the sum of the observations divided by the number of observations, which is given by the following formula:

$$\text{Mean } (\bar{x}) = \frac{\sum X}{N}$$

Where,

$\sum X$ = Sum of all variables of the observations

N = No. of observations

X = Value of observations.

3.7.2.2. Standard Deviation (S.D.)

Standard deviation, denoted by S.D., is the widely used measure of dispersion and is often used to describe the variability in the data distribution. It is defined as the positive square root of the mean of the square of the deviations taken from the arithmetic mean. It is denoted by σ (read as sigma).

$$\text{Standard Deviation } \sigma = \frac{\sqrt{\sum (X - \bar{x})^2}}{n}$$

Where,

x = value of the variant

\bar{x} = arithmetic mean of the variable

n = no. of observations

The greater the standard deviation, greater will be the magnitude of the deviation of the values from their mean. A small standard deviation means high degree of the as well as homogeneity of the series and vice versa.

3.7.2.3 Coefficient of Variation (C.V.)

If standard deviation is the absolute measure of dispersion, then the relative measure of dispersion based on the standard deviation is known as the coefficient of standard deviation. Hence, the coefficient of dispersion based on standard deviation multiplied by 100 is known as coefficient of variation (C.V.). Mathematically, it is calculated as:

$$\text{Coefficient of variation (C.V.)} = \frac{\sigma}{\bar{x}}$$

Where,

C.V. = Coefficient of Variation

σ = Standard deviation of the distribution

\bar{x} = Arithmetic mean of the distribution.

C.V is independent of unit, so, two distributions can be better compared with the help of C.V. for their variability. Less the C.V. more will be the uniformity, consistency, etc. and more the C.V. lesser will be their uniformity and consistency.

3.7.2.4 Coefficient of Correlation

Two variables are said to have 'correlation', when they are so related that the change in the value of one variable is accompanied by the change in the value of other. The measure of correlation called the correlation coefficient summarizes in one figure, the degree and direction of movement. One of the widely used mathematical methods of calculating the correlation coefficient is the Karl Pearson's correlation coefficient. It is denoted by r_{xy} or simply r and is defined by the formula

$$\text{Coefficient of Correlation } r = \frac{\sum xy}{n\sigma_x\sigma_y}$$

Where,

$x = X - \bar{X}$

$y = Y - \bar{Y}$

\bar{X} and \bar{Y} = Arithmetic mean of X series and Y series respectively.

σ_x and σ_y = Standard deviation of X series and Y series respectively.

n = No. of observations

The value of correlation coefficient always lies between +1 and -1. However, there are following rules for interpreting the value of r .

When $r = 1$, there is a positively perfect correlation between the two variables.

When $r = -1$, there is a negatively perfect correlation between the two variables.

When $r = 0$, the variables are uncorrelated.

Nearer the value of r to +1, closer will be the relationship between the two variables and nearer to 0, lesser will be the relationship.

3.7.2.5 Coefficient of Determination

Coefficient of Determination is a very useful and better measure for interpreting the value of correlation coefficient. It measures the percentage variation in the dependent variables explained by independent variable. Its value can have ranging from 0 to 1. Coefficient of Determination is the square of the correlation coefficient.

$$\text{Coefficient of Determination (r}^2\text{)} = [\text{Correlation Coefficient (r)}]^2$$

3.7.2.6 Regression Analysis

Regression analysis is a mathematical measure of the average relationship between two or more variables in terms of the original units of the data. The regression analysis studying the relationship between one dependent and one independent variable is known as simple regression analysis, and relationship between one dependent and set of two or more independent variables is known as multiple regression. The models of simple regression as well as multiple regression used in this study are described as follows.

1. Simple Regression Analysis

The regression equation of y on x which is used to describe the variation in the value of y for given change in the value of x.

$$Y = a + b_1X \text{ ----- [Regression equation of y on x]}$$

In this model the inventory is regressed against sales and profit separately. Similarly, net worth regressed against profit and profit is regressed against sales. The equations are

$$I = a + b_1S \text{ ----- (i)}$$

$$I = a + b_1P \text{ ----- (ii)}$$

$$NW = a + b_1P \text{ ----- (iii)}$$

$$P = a + b_1S \text{ ----- (iv)}$$

Where y = Dependent variable, a = Regression constant

x = Independent variable, b = slope of regression line or regression coefficient of y on x and measures the change in y per unit change in x,

I = inventory, S = sales, P = Net Profit, NW = Net Worth.

2. Multiple Regressions Analysis

The multiple regression equation of the dependent variable y on independent variables x1 and x2 is given by

$$Y = a + b_1x_1 + b_2x_2 \text{ (multiple regression equation of y on x1 and x2)}$$

In this model Inventory is regressed against sales together with profit. Inventory is taken as the function of sales and profit may state as follows

$$I = F(S, P)$$

The multiple regression equation of the model is:

$$I = a + b_1 S + b_2 P \text{ ----- (V)}$$

Similarly, this study examines the relationship of Profit with inventory and sales of two Nepalese manufacturing companies and Profit may be regarded as subject to the constraints and dependent variable and other variables as independent. The equation is;

$$P = a + b_1 I + b_2 S \text{ ----- (VI)}$$

3.8 Limitation of the Methodology

This study does not cover all the Nepalese manufacturing companies, it therefore, implies that the conclusion drawn are of a tentative nature. Since the study is preliminary analyzed based on statistical tools, the errors caused by small size has been tried to be minimized. The findings of this study remain valid as far as the tools used in this study are accepted. The statistical calculation used here made by Microsoft Excel.

CHAPTER- 4

RESULTS

This chapter deals with the detail analysis and presentation of data in line with the objectives of the study. The data are presented and analyzed in a systematic order using the various financial and statistical tools. The facts received from these tools are simultaneously presented in diagrammatic forms such as line graphs. For the easy perusal of the readers, the tables and diagrams have been constructed in a simple and understandable form, with each result interpreted along with it.

4.1. Financial Tools Analysis

The financial tools analysis includes various ratio analysis that clearly depict the position of liquidity and credit management of the sampled companies and attempts to correctly analyze the results emerging henceforth.

4.1.1 Stock Position of DNPL and UNL

The following table shows the inventory stock position of selected manufacturing companies.

Table no. 4.1

DNPL (Amount in Million)				UNL (Amount in Million)			
FY	Inventory	Actual increment (%)	Index	FY	Inventory	Actual increment (%)	Index
2012/ 2013	1160.20	-	100.00	2012/ 2013	462.00	-	100.00
2013/ 2014	1231.60	6.15	106.15	2013/ 2014	502.10	8.68	108.68
2014/ 2015	1118.80	-9.16	97.00	2014/ 2015	556.10	10.75	119.43
2015/ 2016	1226.20	9.60	106.59	2015/ 2016	674.70	21.33	140.76
2016/ 2017	1584.00	29.18	135.77	2016/ 2017	620.00	-8.11	132.65
Mean	1264.16	-	-	Mean	562.98	-	-
S.D.	184.89	-	-	S.D.	67.50	-	-

(Source: Annual reports of DNPL and UNL, FY: 2012/2013 to 2016/2017)

Table 4.1 shows the stock position of Inventory of DNPL and UNL for different financial year, their mean, standard deviation, and percent increase or decrease in inventory is calculated in above table.

According to the table 4.1, for DPNL, the highest percentage increase in inventory stock is in 2015/ 2016 with 29.18% and lowest percent increase in the year of 2013/ 2014 with 6.15% and stock maintenance rate is reduced by 9.16% in the year of 2014/ 2015. Average of the inventory is 1264.16 million and standard deviation is 184.89%. It shows the deviation between the stock positions of inventory of study period.

Similarly, for UNL, the highest percentage increase in inventory stock is in 2015/ 2016 with 21.88% and lowest percent increase in the year of 2013/ 2014 with 8.68% and inventory maintenance rate is reduced by 8.11%, in FY 2016/ 2017. The average of inventory is 562.98 million and slandered deviation is 67.50%.

4.1.2 ABC Analysis

Following the ABC categorization of DPNL and UNL.

Table no. 4.2

Year	DNPL					
	A Category		B Category		C Category	
	Value	%	Value	%	Value	%
2012/ 2013	782.67	67.46	282.51	24.35	95.02	8.19
2013/ 2014	887.12	72.03	275.14	22.34	69.34	5.63
2014/ 2015	709.88	63.45	325.35	29.08	83.57	7.47
2015/ 2016	642.04	52.36	435.91	35.55	148.25	12.09
2016/ 2017	948.18	59.86	254.23	16.05	381.59	24.09

Year	UNL					
	A Category		B Category		C Category	
	Value	%	Value	%	Value	%
2012/ 2013	245.92	53.23	171.49	37.12	44.58	9.65
2013/ 2014	306.43	61.03	168.61	33.58	27.06	5.39
2014/ 2015	450.55	81.02	78.24	14.07	27.30	4.91
2015/ 2016	359.14	53.23	216.38	32.07	99.18	14.7
2016/ 2017	415.90	67.08	66.77	10.77	137.33	22.15

(Source: Microsoft Excel Outputs)

Table no. 4.2 shows that, ‘A’ Category of DNPL includes the products like health supplements, digestives, cough & cold, energizers, women’s health, body care, food et. ‘B’ Category includes the products like hair oil, shampoo and skin care and ‘C’ Category includes the products like oral care, home care and ethical items. Similarly, in UNL ‘A’ Category includes products like detergents, toilet soaps and personal care items, ‘B’ Category includes the products like hair care, lounging, cosmetic items and other personal care items and ‘C’ Category includes the products like food, drinks and water purifier etc.

Above basis of the classification of the products under the category A, B and C were taken from the business reports published by both companies. Both selected companies i.e. DNPL and UNL give more emphasis on inventory items in terms of their investment and value.

4.1.3 Inventory Turnover Ratio

Inventory turnover ratio shows the relationship between the cost of goods sold and average inventory or net sales and closing inventory. It measures the efficiency on inventory management and how quickly inventory can be sold. It shows the speed with which stock rotated into sales. In general, high inventory turnover ratio is better than low inventory turnover ratio. A high inventory turnover ratio indicates the efficient inventory management. The table below shows the relationship between sales and inventory of DNPL and UNL.

Table no. 4.3

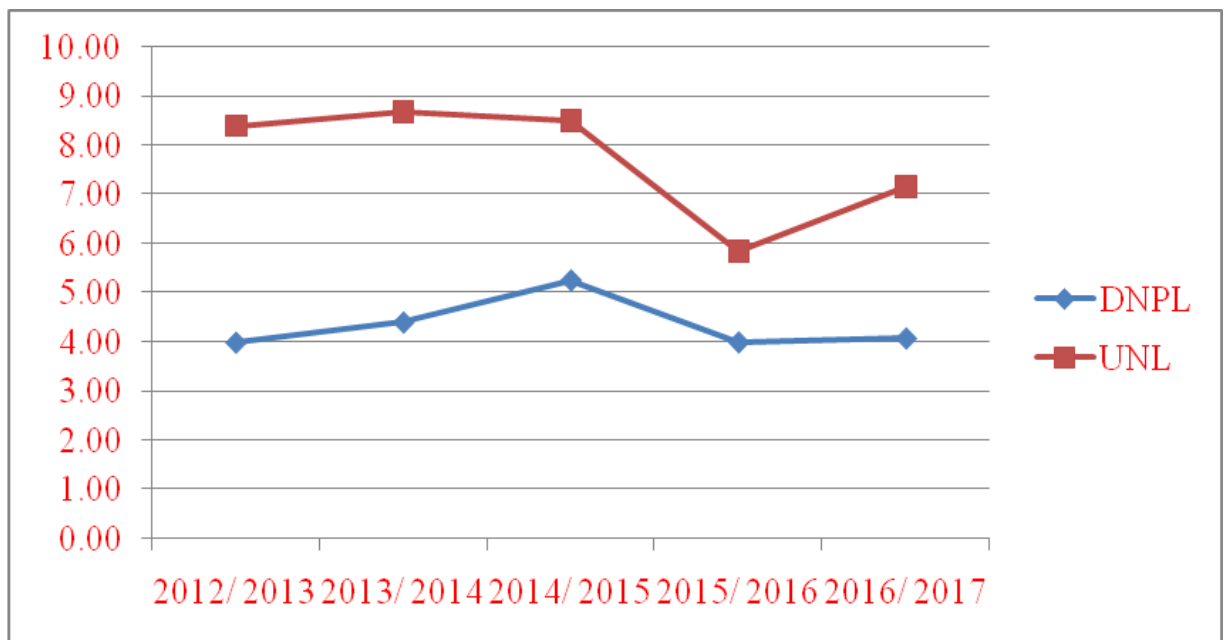
Company	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	Mean	SD	CV
DNPL	3.98	4.39	5.25	3.99	4.07	4.34	0.54	0.12
UNL	8.40	8.69	8.50	5.85	7.17	7.72	1.21	0.16

(Source: Microsoft Excel Outputs)

Table 4.1 shows the relationship between sales and inventory, which is inventory turnover ratio. The average ITR of DNPL is 4.34 times. The highest ITR of DNPL is 5.25 times in FY 2014/2015, and lowest ITR is 3.98 times in FY 2012/2013.

Similarly, the average ITR of UNL is 7.72 times which is relatively higher than DNPL. The highest ITR of UNL is 8.69 times in FY 2013/2014 and the lowest ITR is 5.85 times in FY 2015/2016. All ITR of UNL is relatively higher than DNPL. During the study period which implies that UNL has good turnover ratio than DNPL

Figure no 4.1



(Source: Microsoft Excel Outputs)

The result shown by the above figure no. 4.1, the UNL's ITR is not very fluctuation but after FY 2014/2015 is decreasing in trend. Similarly, ITR of DNPL is increasing trend in FY 2013/2014 and 2014/2015. Comparatively UNL's Inventory turnover ratio is higher than DNPL in every year. It indicates that UNL has efficiency of the firm's inventory management and also indicates inventory has been properly managed.

4.1.4 Inventory to Current Assets Ratio

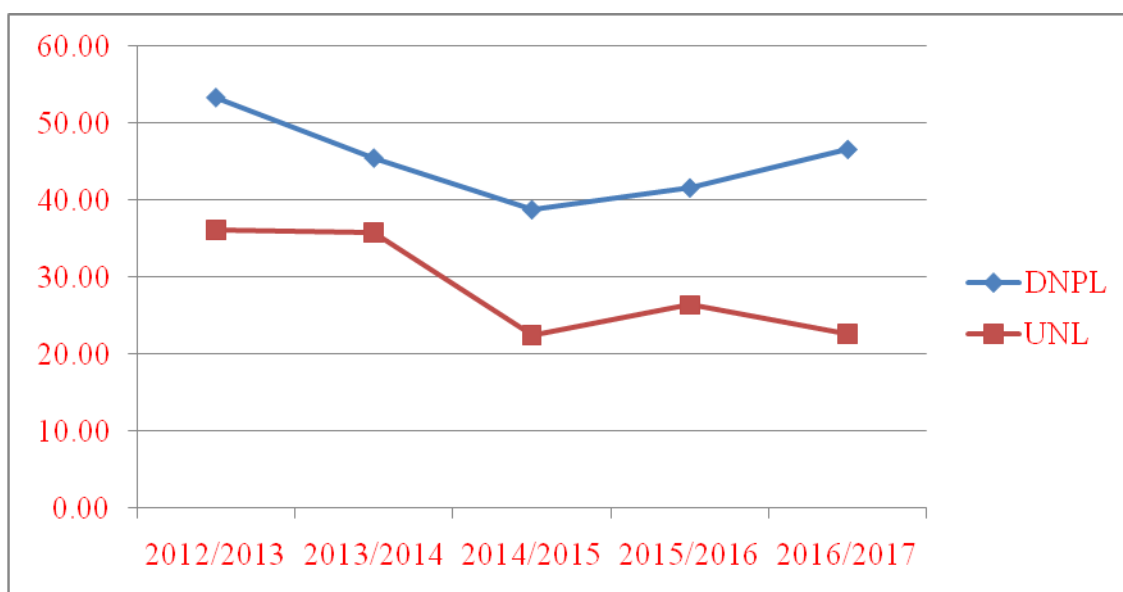
It explains the relationship between the current assets and the inventory of both companies. It shows the actual percentage of current assets in the form of inventory.

Table no. 4.4

Company	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	Mean	SD	CV
DNPL	53.37	45.49	38.75	41.60	46.61	45.16	5.55	0.12
UNL	36.10	35.70	22.46	26.39	22.63	28.66	6.80	0.24

(Source: Microsoft Excel Outputs)

Table 4.2 presents the inventory to current assets ratio of DNPL and UNL during the last 5 years. The average inventory to current ratio of DNPL is (45.16 times) greater than UNL (28.66). The highest average inventory to current assets ratio of DNPL is 53.37 times and lowest is 38.75 times. Similarly, the highest average inventory to current assets ratio of UNL is 36.10 times and lowest is 22.46 times. Comparatively DNPL has higher inventory to current assets ratio than UNL. However, the higher level of CV shows UNL (24%) has the greater risk posed by this company in terms of its inventory to current assets than DNPL (12%).

Figure no 4.2

(Source: Microsoft Excel Outputs)

The result shown by the above figure no. 4.2, the UNL's inventory to current assets ratio is fluctuation and decreasing in trend. Similarly, inventory to current assets ratio

of DNPL is decreasing in trend up to FY 2014/2015 after that increasing in trend up to 2016/2017. Comparatively inventory to current assets ratio of DNPL is higher than UNL.

4.1.5 Inventory to Total Assets Ratio

Inventory to total assets ratio explains the relationship between the total assets and the inventory. It shows the actual percentage of total assets in the form of the inventories.

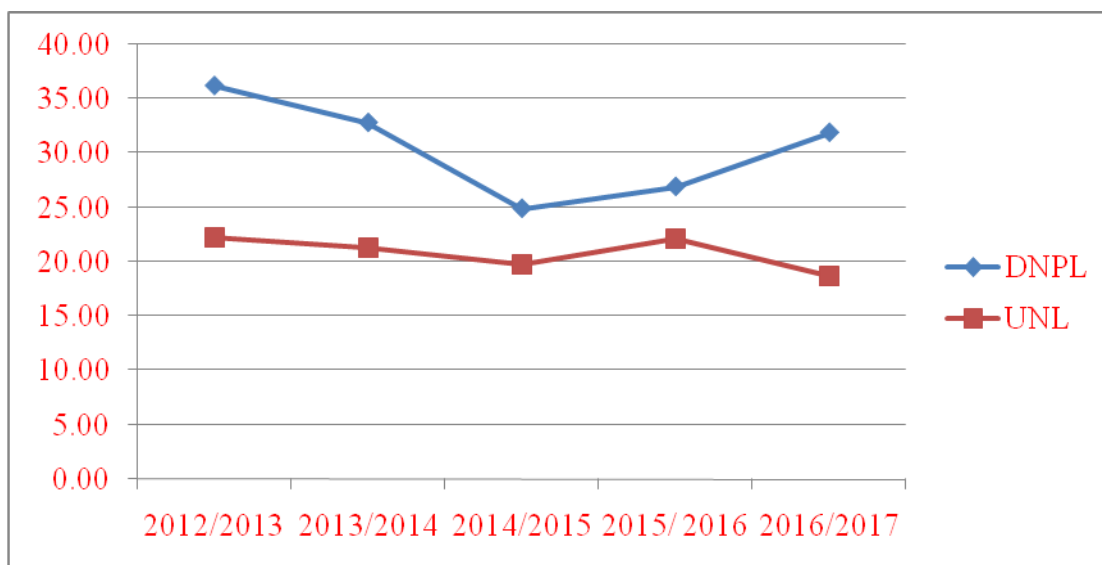
Table no. 4.5

Company	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	Mean	SD	CV
DNPL	36.17	32.77	24.88	26.90	31.87	30.52	4.57	0.15
UNL	22.27	21.30	19.77	22.15	18.66	20.83	1.57	0.08

(Source: Microsoft Excel Outputs)

Table 4.3 presents the inventory to total assets ratio of DNPL and UNL. The average inventory to total assets ratio of DNPL is (30.52 times) greater than UNL (20.83). The highest average inventory to total assets ratio of DNPL is 36.17 times and lowest is 24.88 times. Similarly, the highest average inventory to current assets ratio of UNL is 22.27 times and lowest is 18.66 times. Comparatively DNPL has higher inventory to total assets ratio then UNL. However, the higher level of CV shows DPNL (15%) has the greater risk posed by this company in terms of its inventory to current assets then UNL (8%).

Figure no 4.3



(Source: Microsoft Excel Outputs)

The result shown by the figure no. 4.3, UNL's inventory to total assets ratio is not very fluctuation or similar in trend during the 5 years. Similarly, inventory to total assets ratio of DNPL is decreasing in trend up to FY 2014/2015 after that increasing in trend up to 2016/2017. Comparatively inventory to total assets ratio of DNPL is higher than UNL.

4.1.6 Net Profit Margin

Net profit margin is the percentage of revenue left after all expenses have been deducted from sales. The measurement reveals the amount of profit that a business can extract from its total sales.

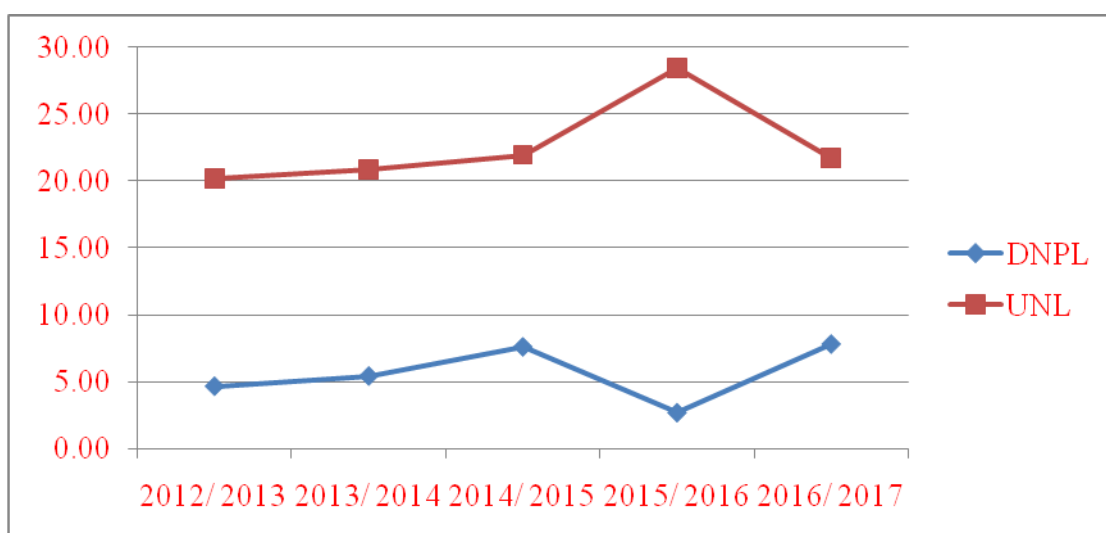
Table no. 4.6

Company	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	Mean	SD	CV
DNPL	4.70	5.46	7.64	2.72	7.85	5.67	2.14	0.38
UNL	20.15	20.85	21.93	28.42	21.73	22.62	3.32	0.15

(Source: Microsoft Excel Outputs)

Table 4.4 shows the relationship between net profit after tax and sales. The average NPM of DNPL is 5.67 %. The highest NPM of DNPL is 7.85 % in FY 2016/2017, and lowest NPM is 2.72 % in FY 2015/2016. Similarly, the average NPM of UNL is 22.62 % which is relatively higher than DNPL. The highest NPM of UNL is 28.42 % in FY 2015/2016 and the lowest NPM is 20.15% in FY 2012/2013. This ratio shows that UNL has better profit than DNPL.

Figure no 4.4



(Source: Microsoft Excel Outputs)

The result shown by the above figure no. 4.4, the UNL's NPM is almost similar in range up to FY 2014/2015 and increase in FY 2015/2016 after that decreasing in FY 2016/2017. Similarly, NPM of DNPL is increasing in trend up to FY 2014/2015 after that there is some fluctuation in next two years. Comparatively UNL's NPM is higher than DNPL in every year. It indicates that UNL has more profit than DNPL.

4.2 Statistical Analysis

4.2.1 Correlation Analysis Between Dependent and Independent Variables

The correlation is one of the most common and most useful statistics. A correlation is a single number that describe the degree of relationship between two variables. The value of correlation lies between -1 and +1. When Pearson's r is close to 1 then there is a strong relationship between two variables. This means, change in one variable are

strongly correlated with the change in the second variable. When Pearson's R is closed to 0 then there is a weak relationship between two variables. This means change in one variable is not correlated with the changes in the second variables. However, we cannot make any other conclusions about this relationship, based on this number. The following table shows the correlation analysis between dependent and independent variables of different models used in this study.

Table 4.7

Variables	DNPL			UNL		
	GP	Sales	Inventory	GP	Sales	Inventory
GP	1			1		
Sales	0.924921	1		0.373691	1	
Inventory	0.4746	0.669533	1	0.645829	0.033816	1

(Source: Microsoft Excel Outputs)

Table 4.5 shows the relationship between the dependent variables and independent variable. In the table it has been observed that DNPL has lower degree of positive correlation between inventory and gross profit having correlation of 0.4746 however, UNL has higher degree of positive correlation for the same having 0.6458.

Similarly, there is also positive correlation between sales and the gross profit. Here DNPL has high degree of positive correlation between sales and gross profit having 0.9249 whereas, UNL has lower degree of positive correlation between sales and gross profit having 0.3737.

4.2.2 Simple Regression Analysis

Regression analysis is a mathematical measure of the average relationship between two or more variables in terms of original units of the data. The regression analysis studying the relationship between one dependent and one independent variables is known as simple regression analysis.

4.2.2.1 Simple Regression & Multiple Regression Analysis of Sales on Gross Profit

Following table shows the simple regression analysis of sales on gross profit for both, DNPL and UNL.

Table 4.8

Name of Company	UNL	DNPL
Multiple R	0.373	0.924
R Square	0.139	0.855
Adjusted R Square	-0.147	0.807
Standard Error	3797.356	3235.550
Observations	5	5

(Source: Microsoft Excel Outputs)

The table 4.6 determines the simple regression analysis of sales on profit. According the above table, R square of both companies were found 0.139 and 0.855 which indicates that 13.90% and 85.50%. Similarly, the Multiple R of UNL is 37.3% and DNPL has 92.4% of total variation on profit is explained by sales in UNL and DNPL respectively. But these results were statistically not significant at 0.01 and 0.05 level of significance.

4.2.2.2 Simple Regression & Multiple Regression Analysis of Inventory on Gross Profit

The simple regression analysis of inventory on gross profit for both, DNPL and UNL are as follows.

Table 4.9

Name of Company	UNL	DNPL
Multiple R	0.656	0.475
R Square	0.427	0.235
Adjusted R Square	0.223	-0.033
Standard Error	759.441	1879.166
Observations	5.000	5.000

(Source: Microsoft Excel Outputs)

The table 4.7 determines the simple regression analysis of inventory on profit. According the above table, R square of both companies were found 0.427 and 0.235 which indicates that 42.70% and 23.50%. Similarly, the Multiple R of UNL is 65.6% and DNPL has 47.5% of total variation on profit is explained by inventory in UNL and DNPL respectively. But these results were statistically not significant at 0.01 and 0.05 level of significance.

4.3 Major Findings

The study observed the two Nepalese listed manufacturing companies. After all these analysis of data with different variables and by using different tools following major findings are given below.

1. The average amount of inventory of DPNL is NPR 1264.16 million and for UNL is NPR 562.8. million. Inventory of DNPL is higher than UNL, but inventory fluctuation rate is higher in DNPL than UNL.
2. Both companies are implementing ABC Analysis as a technique to control their inventory and both companies maintain the standard of ABC technique.
3. The average ITR of DNPL is 4.34 times. The highest ITR of DNPL is 5.25 times in FY 2014/2015, and lowest ITR is 3.98 times in FY 2012/2013. Similarly, the average ITR of UNL is 7.72 times which is relatively higher than DNPL. The highest ITR of UNL is 8.69 times in FY 2013/2014 and the lowest ITR is 5.85

times in FY 2015/2016. All ITR of UNL is relatively higher than DNPL. During the study period which implies that UNL has good turnover ratio than DNPL.

4. The average inventory to current ratio of DNPL is (45.16 times) greater than UNL (28.66). The highest average inventory to current assets ratio of DNPL is 53.37 times and lowest is 38.75 times. Similarly, the highest average inventory to current assets ratio of UNL is 36.10 times and lowest is 22.46 times. Comparatively DNPL has higher inventory to current assets ratio than UNL. However, the higher level of CV shows UNL (24%) has the greater risk posed by this company in terms of its inventory to current assets than DNPL (12%).
5. The average inventory to total assets ratio of DNPL is (30.52 times) greater than UNL (20.83). The highest average inventory to total assets ratio of DNPL is 36.17 times and lowest is 24.88 times. Similarly, the highest average inventory to current assets ratio of UNL is 22.27 times and lowest is 18.66 times. Comparatively DNPL has higher inventory to total assets ratio than UNL. However, the higher level of CV shows DNPL (15%) has the greater risk posed by this company in terms of its inventory to current assets than UNL (8%).
6. The average NPM of DNPL is 5.67 %. The highest NPM of DNPL is 7.85 % in FY 2016/2017, and lowest NPM is 2.72 % in FY 2015/2016. Similarly, the average NPM of UNL is 22.62 % which is relatively higher than DNPL. The highest NPM of UNL is 28.42 % in FY 2015/2016 and the lowest NPM is 20.15 % in FY 2012/2013. This ratio shows that UNL has better profit than DNPL.
7. The correlation of DNPL has lower degree of positive correlation between inventory and gross profit having correlation of 0.4746 however, UNL has higher degree of positive correlation for the same having 0.6458. There is significant relationship between inventory and gross profit.
8. DNPL has high degree of positive correlation between sales and gross profit having 0.9249 whereas, UNL has lower degree of positive correlation between sales and gross profit having 0.3737. There is significant relationship between sales and gross profit.

9. The correlation of DNPL has higher degree of positive correlation between inventory and sales having correlation of 0.6695 however, UNL has lower degree of positive correlation for the same having 0.0338. There is significant relationship between inventory and sales.
10. The simple regression coefficient of sales of UNL is positive with gross profit i.e. 13.9 %. Similarly, the simple regression coefficient of sales of DNPL is positive with gross profit i.e. 85.5 %.
11. The simple regression coefficient of inventory of UNL is positive with gross profit i.e. 42.7 %. Similarly, the simple regression coefficient of inventory of DNPL is positive with gross profit i.e. 23.5 %

CHAPTER- 5

CONCLUSION

This Chapter embodies three part of the study; summery, conclusion and recommendations. The first part depicts about the summarization of whole research study, the second depicts about conclusion and final part presents about the recommendations in light of its findings.

5.1 Summery

Inventories are the stocks of the product a company is manufacturing for sale and the components that make up the product. The various forms in which inventories exist in manufacturing companies are: raw materials, work in process (or semi-finished goods) and finished goods. Success of any enterprises basically depends on the efficiency and effectiveness of systematic management, while achieving its objectives with effectively and efficiently. Inventory management is the most important part for any organization. The company has invested the most of the amount for inventory, where the functions are associated as purchasing, storing, selling and distribution etc. Inventory management involves determining how much inventory to hold, when to place orders and how many units to order.

Inventory management helps the management in manufacturing sufficient level of inventory for the smooth production and sales operations avoiding excessive and inadequate levels of inventory. It controls excess investment in inventories and minimizes carrying and holding cost and time. It also minimizes wastage of inventory and ultimately helps to increase the profitability.

The aim of this study is to access the present position of inventory management system and its impact on profitability of two listed manufacturing companies. Manufacturing companies play an important role on the economy of the country. Both the companies use a huge amount of investment in their inventories. For the purpose of this study, two listed manufacturing companies were selected. They are Dabur Nepal Pvt. Ltd. and Unilever Nepal Ltd. The comparative study between them has been done in this study. The necessary data of Inventories, Sales, Profit, total

manufacturing cost and other relative. Variables were collected for the period, FY 2012/2013 to 2016/2017. The financial statement mainly the profit and loss account and balance sheets are collected from the Annual report of Concern Company, which is available in SEBON.

For the analysis purpose descriptive and analytical approach is used to clarify the situation. Financial ratios are used to analyze inventory turnover ratio, inventory to current assets ratio, inventory to total assets ratio, NPAT and statistical tools are used to compute average, standard deviation, correlation, simple regression and multiple regressions. The scope of the study has been limited to inventory management aspect and its impact on profitability of some selected listed manufacturing companies.

5.2 Conclusion

From the secondary data analysis, it was found that there is higher significance of inventory in the probability of the firms, as the inventory maintained by any firm comprise higher portion of the cost any company has to bear. Likewise, the no. of days in inventory has also a significant impact on the demand estimates of the inventory not just the sales level of the companies. Therefore, effective inventory management would lead to the profitability of the firms. This deals with the inventory management of the sample organizations namely: DNPL and UNL by using accounting, financial and statistical tools for analysis. After analyzing the gathered data from secondary data by using appropriate tools the following points are concluded.

1. The theory of inventory management could not be implemented in both companies. EOQ model and other theoretical tools were not used properly.
2. The system of Purchasing and selling department system was not practicable in both companies. Both organizations have not adopted the purchasing policy according to the demand and the environment.

3. Procurement of raw materials in both organizations showed fluctuating trend which indicates that there was lack of appropriate purchasing policy in the organization.
4. The productions were changed as per the sales in DNPL. It indicates that DNPL's factory is running with higher efficiency to meet market demand and the overall activities of the organizations are good. However, the productions were not changed as per the change in sales in UNL. It shows that the UNL's factory has not been able to expand its market due to insecurity and unavailability of raw materials in time.
5. The tool of ABC Analysis was used by both companies but JIT was not used by both of them.
6. Inventory to current assets ratio and inventory to total assets ratio is better in DNPL than UNL.
7. The relationship of closing stock of finished goods and sales, Purchase of raw materials and sales, showed positive in both organizations. But the relationships of closing stock of raw materials on gross profit were negative in both organizations.
8. There was gap between theory and practice of inventory management in manufacturing companies in Nepal.
9. Both organizations purchased the raw materials locally, from India and third countries. Both organizations were not following economic order quantity and reorder level model in making purchase decision.
10. The investment in inventory stock of both organizations was in large amount. The value of inventory was in increasing trend in both companies. Comparatively UNL was able to reduce the inventory stock then DNPL.
11. Both organizations' efficiency in inventory was poor. Both organizations were not able to change its inventory into cash frequently through sales. However, UNL has the satisfactory in inventory turnover ratio than DNL.

5.3 Implications

Based on finding of the study, and taking into considerations of the relevant issues, the following appropriate recommendations have been gathered to ease the study useful to the recipients and the other parties. This study should be fruitful to the stakeholder, researchers and student who are interested to this topic

1. Procurement of raw materials in both organizations in fluctuating trend. It indicates that there is lack of proper planning and policies for purchasing. They ignored the concept of maximum and minimum level as well as EOQ techniques which may lead to the stock out situation. So, both organizations should apply the purchasing policy with scientific inventory management system.
2. If possible maximum stock level, minimum stock level and reorder level as well as economic lot size should be fixed by both organizations. This helps the management to strike balance between liquidity and profitability in the organization.
3. The productions were changed as per the sales in DNPL. It indicates that DNPL's factory is running with higher efficiency to meet market demand. However, the productions were not changed as per the change in sales in UNL. It shows that the UNL's factory has not been able to expand its market. So the organization must do promotional activities to expand its market through the qualitative products. On the other hand, DNPL should follow the improving policies and strategies to remain competitive in the market.
4. Both organizations do not have effective and efficient inventory management system for controlling inventory. Due to this, the huge money is blocked in the inventory. How much money should be the organization invested in the inventory? How much inventories should be stocked? How can we minimize the inventory cost? What is the optimum EOQ and what is re-order level is some questions relating with inventory management in which both organizations should pay more attention for the better performance?

5. Both organizations efficiency in inventory management is poor. During the 5 years' study period, inventory turnover ratio is very poor. It shows that both organizations have more stock of finished goods. Due to more stock, unnecessary investment is tied up on it. Both organizations are not able to change its inventory into receivable/cash through sales. So, DNPL and UNL regards of inventory turnover have to give more attention to accelerate inventory turnover.
6. As we know that in Manufacturing Public Enterprise in Nepal inventories to current assets ratio should about 45% to 50% DNPL has satisfactory situation on average inventory to current assets ratio and UNL has below the standard. So, both organization are recommended to keep the adequate level of inventory to current assets.
7. Separate inventory management department should be opened so that the strategic plan and an effective decision can be taken to regulate purchase, production, sales and inventory management in the competitive market.
8. The management executives, of the concern manufacturing enterprises, should be made aware of inventory management aspects on profitability by various case studies, researches, market studies and to penetrate the market, market survey should be done as huge capacity of production is kept utilized.

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