

# CHAPTER I

## INTRODUCTION

### **1.1 Background of the Study**

Nepal has always been a challenging environment to do business. Global recession, uncertain political strikes, endless political uncertainties, transporters strike, fuel shortage, power cuts, rising interest cost, straight inclined inflation rates, cut throat competition and fragile exchange rates has always been the major external environment risk to the Industry.

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

Inventory means all moveable items in store either ready for sale or for consumption in the course of production with a view to convert them into finished stock for sale. Thus, inventory includes stock of raw materials; work in process, finished goods and accessories. Inventory is the stock of the materials or products, which frequently occurs in the manufacturing organization especially. When the materials are purchased by an organization they have to be stored until they are into the production process. When the production is over the finished product have to be stored again until they are sold. Thus, inventory involves high amount of cost in terms of occupying the space and blocking the capital. However, we cannot avoid inventories, because without inventory it may effect even badly by creating obstacles on continuous production and ultimately on supply requirements. So inventory should be maintained in appropriate quantity so as to avoid both under-stock and overstock situation for this proper inventory management is necessary. It is because the aim of

inventory management is to avoid excessive and inadequate level of inventories and to maintain optimum level of inventory for the smooth production and sales operation.

An Inventory is the stock of any idle item or resource in a firm for future use. In manufacturing organizations, typically have inventories of raw materials, components, sub-assemblies, tools and equipment, Semi-finished goods etc. In service organizations, inventory refers to the tangible items to be sold and used in various service operations. In traditional concept Inventory Comprises only finished goods or stock in trade owned for sale to customers in normal course of business. In modern concept, inventory management can be traced with acting independently, developed an economic lot size equation which minimized the sum of carrying or holding cost for where the demand was known and constant. Inventory management is an integral part of financial management. It is primarily concerned with minimizing; investment in inventory maintaining designed levels of inventory should be effectively managed. The real task for top management lies in formulating policies that will lead to optimal inventory investment for a attainment of designed objectives. Inventory management is determining how much inventory there should be on hand to serve the purpose of the business most economically.

Thus, management should pay adequate attention to the inventory management to reduce the cost of production (manufacturing) Sales (non-manufacturing) and working capital requirements. Inventory should be maintained in appropriate quantity so as to avoid both under stock and overstock situation. For this purpose, inventory management is necessary it is because the aim of inventory maintains optimum level of inventory for the smooth production and sales operation. Therefore inventory management means to maintain desired level of inventory and minimizing total cost of inventory investment for the plans and policies that will lead to optimal inventory investment for attainment of desired objective.

Manufacturing means any industries that make product from raw material by the use of labour or machinery, which is usually carried out systematically with a division of labour. JEMC is one of the manufacturing and processing companies of soft inks, which supplies sufficient quantity of quality products at the right time at reasonable price. In the context of globalization, companies are free to enter the market of any nation. If the finished products are not sufficient to meet the demands of the costumers regularly, the customers may shift to the other close substitutes resulting into permanent loss to the firm. So to solve the great problem of demand and supply of raw material and finished product the company should use the scientific techniques of inventory management.

Janak education materials center limited (JEMC) was established in 2035 (B.S) under company Act 2021 (now company Act 2053), with the assistance of the USA. Normal production capacity of 13.2 million copies of text books annually, it utilizing its full capacity. It is providing employment to about 755 workers. JEMC's center office is located at sanothimi, bhaktapur. It has three directorates, nine departments, five regional offices and one monitoring office. It was established for the purpose of production, sales and distribution of school level educational materials including text books throughout the kingdom.

Public enterprises may be established with various objectives, but there are some major problems, which have hindered the success of JEMC. Public enterprises (PES) are facing uncountable problems due to the lack of sound management of inventory. Performance of public enterprises including JEMC is highly affected by the absence of proper management of inventory.

Inventory management can play important role on success of organization. To overcome in various difficulties inventory management tries to mange such types of difficulties. Inventory management being a specialized function of general management has a great importance to a manufacturing

enterprise. It helps in industrial promotion. Therefore, the inventory management needs a serious consideration in the part of general management.

Inventories are the stocks held in the business. Stocks may be of finished goods, work in progress and raw materials. There may also be stocks of supplies. Thus, inventory is the valuable assets to all industries. The large part of the capital is invested on inventories. This varies is not only in the number and nature of the goods hold but also due to uncertainty of demand and supply of goods. Raw materials are inputs required to produce finished goods to satisfy the customer's demand. Inventories of work-in- progress are semi-finished products, which helps in the smooth production process. Inventories of finished products are the stocks of finished goods ready for sales. Stock of supplies includes the materials required for day to day operation of office like stationery, spares for cleaning and operation of machinery. Inventory management helps to avoid over and under investment in inventories and also help to maintain adequate level of inventory required for production process and distribution. It also helps to fix the ordering level and quantity for minimizing the cost for ordering and holding of inventory.

Inventory management involves planning of the optimal level of the inventory and control of inventory cost supported by an appropriate organization structure, which is staffed by trained persons and directed by the top leveled management. It involves both financial dimension as well as physical dimensions and the dimensions are interrelated and can't be looked in isolation (Agrawal, 2000).

The importance of material management can be better realized by understanding the proportion of product cost increased on purchasing, shipping, handling and storing of materials. This cost typically moves from 2 percent to 90 percent of total production cost depending upon the nature of the industry. Generally the good rule of separation is about 70 percent of product

cost. Due to this fact, control of such important segment of the cost factor is a matter of much importance (Banjade, 1981).

Inventories are link between production and sale of a product. Inventory means not only maintaining stock, it refers the investment of the organizations as well as of the country. It is a major part of investment and affects the economy of the country is very essential. There should be a good inventory policy and controls. The set of policies and controls refers the inventory system of the organization.

An inventory constitutes a major share of working capital of the business. Inventories are less liquid asset. The management of inventory affects on the liquidity position of the business organization. Changes in inventory levels affect the fund management. It also affects the marketing, production and purchase management of the organization. As such financial manager's attention is required for inventory management. Financial manager has to play an important role for maintaining optimum level of inventory required to different functional areas of the organization for increasing the wealth of the firm. In order to ensure that funds acquire form numerous sources are allocated efficiently in inventories, the finance manager must help production and marketing manager in formulation such inventory policies as are consistent with firm's financial position.

Management of every organization is always working against risk and uncertainties. Organization should be alert in deciding their personnel, financial resource and requirement of inventory equally. General management of the organization should actively involve in developing the better was of managing their inventories. If so, the product cost can be controlled and minimized. This makes the firm able to exist in the highly competitive world of today. The organization's investment on inventories is productive, but in the absence of proper management it could block the capital, which can be better utilized in other alternative having high profitability. On the other hand, it could loose the

market share of the firm. Finally, it may have bad impact for achieving goal of the organization. Proper inventory management helps to overcome in under and over stocking of material. Therefore, it is obvious that inventory management plays vital role in the profitability of the organization.

This study is related to the inventory management system in Janak education materials center limited, which analysis and presents the prevailing condition of inventory management in JEMC.

## **1.2 Statement of the Problem**

The Inventory must be managed in such a way that is does not lead to disadvantage of production stoppage. The lower the stocks maintenance, the more susceptible is the business interruption to the manufacturing process by the cessation of the outside supplies. Making the smooth flow of production must be the sole objective of ideal inventory policy in the context of Nepalese manufacturing enterprises. Production oriented enterprises should held a sizeable level of inventory. Effective and efficient inventory management system can only yield expected profit of the corporation. The suitable adaptation of inventory level is crucial for an organization. It should be balance in such a way that should neither be excessive nor be inadequate. The excessive carrying cost and risk of liquidity where as the inadequacy of inventory causes either product holds up or failure to meet the demand of costumer.

JEMC Ltd is one of the largest and well-known manufacturing public enterprises in Nepal fulfilling the requirement of educational materials in the country. In the past due to many reasons public enterprises went into either liquidation or stopped production. Lack of enough investment, negligence of management, lack of effective managerial skill , lack of information etc; are the main reasons of liquidating the manufacturing enterprises. The vital reason that lack of study on effective and efficient inventory management tools and techniques for controlling inventory. Due to lack of study on inventory management, huge amount of capital fund to be locked on the inventory. How

much amount should be company invested in the inventory, how much inventory should be stocked, how can be minimized ordering, carrying/holding and other related cost, what is to be EOQ level etc, are the major problems.

Nepalese public enterprises are unable to implement the efficient tools for inventory control. A number of public enterprises are running at losses. The management of the organization is not conscious about inventory management is the main reason of increasing in cost of production and decreasing in the market share. Since last 3-4 years JEMC running at loss, that's the main reason of not operating the effective inventory management system and problem of over-staffing also. The capacity utilization of the center is 100% of its installed capacity.

Nepalese manufacturing PES is seriously suffering from the poor material management system. JEMC is not free from this problem. Thus, this study is concentrated on the problems faced by JEMC in the area of inventory management.

### **1.3 Objectives of the Study**

The main objective of the study is to analyze the inventory management in Janak Education Material Center. Besides this, following specific objectives have been made:

1. To study the current inventory position of JEMC.
2. To analyse the trend of total sales and costs of educational materials.
3. To assess the present practice of raw materials purchased by JEMC.
4. To analyse the performance of JEMC.
5. To recommend suggestions package based on the analysis.

## **1.4 Significance of the Study**

As we know that inventory management plays a vital role in manufacturing as well as trading organization equally. Without efficient and effective inventory management, an organization cannot achieve its objective. So a topic chose by me will be useful to both i.e. organization as well as researchers. The knowledge of sound keeping inventory management helps both i.e. organization and customers. So this study will try to emphasis on the importance of inventory management in the organization. Which tools and techniques can be used while keeping sound inventory management in the organization? What is the weakness of the organization while keeping sound inventory management system? There are lots of theses on this topic. Although, thesis related on this topic as a cooperative study are not found more. This study can provide a significant background to the managers and if will open the doors for further research in the field of management.

## **1.5 Limitations of the Study**

Following are the limitations of the study:

1. The study was specific in inventory management system in JEMC Ltd.
2. The study may not be applicable in general situation of all manufacturing PEs.
3. The study provided value and quantity of inventory as far as possible, but it is very complicated to consider quantity due to their varieties in measuring units.
4. The words 'materials management and inventory management' were interchangeably used in the research.
5. The study was carried within a range of latest four fiscal years, starting from the fiscal year 2064/65 to 2067/68.

## 1.6 Organization of the Study

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

**Chapter-I: Introduction:** The first chapter entitled 'Introduction' introduces the subject, presents the research problems with the objectives of the study, along with the significance of the study & limitations. Organizational structure and production system of JEMC also present in this chapter.

**Chapter-II: Review of related literature:** The second chapter deals with review of the literature. This chapter is concerned with the study of inventory management system reviewing and presentation in the first part and review of selected studies in Nepal in second part.

**Chapter-III: Research methodology:** The chapter third explains research methodology used in this study. It comprises research design, population, sources of data, and their collection methods, and also the procedures and statistical tools applied.

**Chapter-IV: Data presentation and analysis:** The fourth chapter focuses on presentation and analysis of data. This chapter is also divided into no of sub-section. Data are analyzed applying the statistical tools, such as percentage, index, coefficient of correlation and ratio. In the last of this chapter extracted major findings on the basis of analysis have presented.

**Chapter-V: Summary, conclusion and recommendations:** This fifth chapter presents summary conclusion and recommendations of the study based on facts found from observation and analysis of data has been presented in the fourth chapter.

Finally, bibliography and appendices are added to the end of this research.

## **CHAPTER-II**

### **REVIEW OF LITERATURE**

The first chapter has already highlighted the problem and objectives of the study. This chapter deals with review of literature regarding inventory management. Those literatures provide the bases and input for the study. Only limited number of study has been conducted so far in the field of inventory management.

Review of literature means taking knowledge from different sources. In this chapter the researcher has reviewed various published materials. A literature review is essential part of all studies. It is a way to discover what other researchers have covered and left in the area. A critical review of the literature helps the researcher to develop a thorough understanding and insight into previous research works that relates to the present study. It is also a way to avoid investigation problems that have already been definitely answered. Thus a literature review is the process of locating, reading and evaluating the research literature in the area of the students' interest. The purpose of literature review is to find out what research studies have been conducted in one's chosen field of study and what remains to do. The primary purpose of literature review is to learn not to accumulate.

#### **2.1 Theoretical Concepts**

##### **2.1.1 Meaning of Inventory**

Inventory refers to the physical stock of goods. Which though remain idle in the store but is essential for smooth selling of the company and hence has economic value. Inventory is composed of assets that will be sold in future in the normal course of business operation (Khan and Jain, 2003).

The dictionary meaning of inventory management is stock of goods or a list of goods. Various authors have given his inventory meaning differently. In according language inventory denotes stock of finished goods. In a

manufacturing concern, it may include raw material, work in progress and stocks etc.

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

Any thing that a firm kept meeting in future requirement of production and sale is called inventory. The basic reason for holding inventory are to keep up the production activities unhampered It is neither physical possible nor economically suitable to wait for the stocks to arrive at when they are actually required. There, keeping up inventory is a must for efficient working of a business unit (Jain and Narayan, 2002:132).To understand the exact meaning of inventory the word inventory we may study it from the usage side and from the point of entry in the operation (Sharma and Gupta, 1984).

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

Those inventories which are kept in practice in every manufacturing organization are discussed below.

### **1. Raw materials**

Raw materials are inputs required to produce finished products through the manufacturing processes. Raw materials inventories are the inputs purchased and stored for further production (Pandey, 1984).

Materials refer to the physical commodities used to make the final end product. That is, materials include physical commodities used to make the final

end product. Materials are of two types- direct materials and indirect materials. Direct material is generally defined to include all materials and contribution can be directly identified. Indirect materials are generally defined as materials used in manufacturing process as supporting materials. Industries may require basic, auxiliary, lubricants, mechanical and general materials. There are following types of raw materials held by JEMC Ltd.

- i) Paper materials
- ii) Printing materials
- iii) Ink and other raw materials
- iv) Construction materials
- v) Lubricants materials
- vi) Mechanical materials
- vii) Miscellaneous materials

## **2. Work-in-progress**

Inventories of work-in-progress are semi-finished products, which helps in the smooth production process. “Work-in-progress represents the semi-finished goods, they include those materials that have been committed to production process but have not at been converted into finished goods”( Jain and Narayan, 1993).

This type of inventory has to be maintained for the continue production of succeeding process. There is not very difficult to identify which are semi-finished goods because the same materials may be work-in-progress as well as finished goods in other industry it depends upon the nature of production.

## **3. Finished Goods/Final Products**

Inventories of finished goods are the stock of completed products ready for sale. Finished goods are the final output of production process of the manufacturing organization. Final products sell to their respective customer as per the order by manufacturing organization. If a firm doesn't have finished

goods inventory it would have to wait for the completion of the production process before inventory could be sold thus demand could not be satisfied when it arrives. When demand arrives there is no inventory to satisfy the demand of a stock out situation exists. In such situation the firm will be in danger position of losing the customers to competitors permanently. Janak Education Materials Center Limited produces, sells, and distributes the following name of final products.

- i. Text books of school level.
- ii. Exercise copies.
- iii. Miscellaneous products (Educational Materials).

#### **4. Supplies, Stores and Spare Parts**

The materials required for day to day operation of office like stationery, spares for cleaning and operation of machinery, soap, oil fuel, lights, bulb etc. are called supplies. These materials don't directly enter into production, but essential for production process. Usually, these supplies are small part of the total inventory and don't involve significant investment (Pandey, 1984).

##### **2.1.2. Objectives of Inventory Management**

Inventory management helps to determine level of inventory which avoid and over and under investment in inventory. In other words, the main objectives of inventory management are to maintain optimum investment in inventory. And other objectives of inventory management are: (Munakarmi, 2003)

1. To maintain adequate stock of raw materials and finished goods for smooth production and sales operation.
2. To utilize available storage spaces properly and prevent stock levels from exceeding space availability.
3. To have suitable organization for management of inventory for maintaining adequate accountability of inventory assets.

4. To ensure an adequate supply of materials and others of required quality with a reasonable price.
5. To minimize stock out and shortages and avoid cost of interruption in operations.
6. To optimize investment in inventories and keep down inventory carrying cost and to minimize others loss like obsolescence, thefts, carelessness, etc.
7. To eliminate the possibility of duplication in ordering.
8. To decide which items to stock and which items to produce on demand.
9. To provide a perpetual inventory system for eliminating differences between actual and recorded stock and provide inventory value for the preparation of financial statement.
10. To provide information about inventories for planning and control of inventory.
11. For providing flexibility in production plans.
12. For adequate customer service.
13. For lower borrowing and credit for lack of funds.
14. For making possible economies in transportation clearing and forwarding charges.

### **2.1.3 Need/Importance/Advantages of Holding Inventory**

Inventories play vital role on the success of the organization. Inventory means not only maintaining stock, it refers the investment of the organization as well as of the country. It is major part of investment and affects economy of the country as well. Thus, the inventory is very essential assets of the organizations.

Inventory serves the regularity of the business by regularizing production and marketing. According to E.S.Buffs, “inventories serve the vital function of developing to various operations in the sequence beginning with

raw materials, extending through all the manufacturing operations and into finished goods.

**Advantages of holding inventory in general are:(Munakarmi, 2003)**

1. To avoid loss of sales.
2. To gain quantity discount.
3. To reduce ordering cost.
4. To achieve efficient production runs.
5. To take advantages of lower price.
6. To provide safety stock.
7. To meet specific customer order.
8. To meet seasonal sales requirement.
9. Investment in inventory can be maintained for smoother production operations and increase consumer satisfaction; and
10. Total inventory cost can be minimized.

**2.1.4. Function of Inventory**

According to Richard I. Levin and Charles A.Kirkpatrick the functions of inventory can be summarized as below.

1. Inventory makes possible lower production cost.
2. Inventory fills gap between supply and demand.
3. Inventory stores the labour costs.
4. Inventory allows organization to cope with the items that are not always available.”(Levin and Charles A.Kirkpatrick, 4<sup>th</sup> edition)

**2.1.5. Inventory Costs**

Cost of inventory includes price of raw materials, transportation, insurance, store charge etc. All these costs directly affect cost and price of goods. To maximize profit of an organization, management should focus on minimization of inventory cost. Thus, inventory cost can be classified in the following categories.

## 1. Cost of Items

The price paid to the supplier for buying items of inventories are cost of items, which directly affects the cost of production.

## 2. Carrying/Holding Cost

Carrying/Holding costs are incurred for keeping stocks in the store. It includes rent, insurance, security, heat, light, power, taxes, thefts leakages, spoilage, maintenance and running, material holding cost etc. “Total carrying costs generally increases in direct proportion to the average amount of inventory carried. Inventory carried in term depends upon the frequency with which orders are placed”(Weston & Brigham, 1996) carrying costs generally increase in proportion to the average amount of inventory held.

**Total carrying cost can be calculated by using following formula:**

$$CC = C \times PP \times A = C \times PP \times Q/2$$

Where,

CC = Total carrying costs

C = Percentage carrying costs.

PP = Price per unit

A = Average inventory

Q = Unit per order.

## 3. Procurement/Ordering Costs

It includes those costs, which are incurred for placing order or the set up cost it goods are manufactured. 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 costs decreases with the increasing size of inventory.

According to Weston & Brigham-“ It is assumed that carrying costs are entirely variable and increase in direct proportion to the average size of inventory, ordering cost usually are fixed regard less of average size of inventory. For example, the cost of placing and increasing in an order generally inter office memos, using fax transmission or long distance telephone calls and taking delivery-essentially are fixed regardless of average size of an inventory(Weston & Brigham, 1996)

Generally, ordering costs are the cost involved in placing and receiving an order or purchase items. The expenses involved in ordering costs are: cost of placing and order, requisition cost, transportation and shipping cost, receiving and storing costs, sales tax and customs, clearing and forwarding cost, stationary cost, bank commission/LC charges, telephone/fax and postage expenses, and cost incurred when the raw materials are in transit, etc.

**Total ordering cost can be calculated by using following formula:**

$$TOC=O*N=O*A/Q$$

Where,

TOC= Total ordering cost

O= Fixed cost per order

N= Number of orders placed per year

A= Annual requirement or demand

Q= Inventory quantity for each order

#### **4. Shortage/Stock –out Costs**

Stock out refers the shortage of stock to meet demand of customers. Stock out cost includes the cost of back order, loss of goodwill, loss of the profit, expenses incurred for receiving the stock from supplier and notifying the customers when goods are arrived.

According to the Everette, Ronald and Ebert, “Stock out cost is associated with demand. When the sales are lost due to stock out; the firm loses both the profit margin in unmade sales 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. Back order cost includes loss of goodwill, money paid to re-order goods and notification to customers when goods arrive”.

#### **2.1.6. Aspects of Material Management**

Material plays a significant role in the success of an organization. It directly affects cost and quality of products. The price of the product is determined by the cost of raw materials. Out of total cost 20 to 75 percent cost is related to material cost based on nature and types of product. Material determines investment, and cost for storage, transportation, insurance, wastage etc. An effective management ensures the availability of raw materials at right time, cost, quantity and place.

Material management is the process of managing materials, parts, components, and equipments for production. It is relating to materials parts or components of organization. In other words, it can be defined as the grouping of management functions supporting the complete cycle of material flow from purchase and internal control of production material to the planning and control of work in process to the warehousing, shipping and distribution of the finished goods (Buffa, Elwood and Sari, 1994)

It is a process of managing activities relating to flow of materials into and through an organization. Material management concerns with managing purchasing functions, which is related to acquisition of materials and parts from suppliers, producers and others.

## **2.1.7. Purchase Management**

### **1. Meaning of Purchasing**

Purchasing of the first stage of materials management it is the activity, which concern with procuring material and supplies consumed during the production. In other words, purchasing means procurement of materials parts and components to produce desired goods and services in organization. The main objectives of purchasing is to purchase or procure correct equipment, materials, parts, components, and supplies in the right quantity from right origin at right time and cost.

Purchase management should be effective otherwise it hamper in the quality of production. A goods purchasing management has played important role in the manufacturing companies. The production of company is hampered by the scarcity of raw materials on time purchasing department should take greater responsibilities and should analyzed the existing procurement policy and should tune with the overall organizational objectives and policies. The efficiency of any business activity depends upon having materials, supplies and equipment available in proper quantity with proper utility at the proper place, time and proper price. Thus, purchasing is an operation of market exploration to procure goods and services of desired in quality, quantity at lower price an in the desired times. Purchase management can improve by the help of standardization, value analysis, material substitution, transport saving, cost reduction of packing modification. In the process of purchasing, the suppliers who can provide standard items at the competitive price are selected and by giving the purchase responsibility to a specialist the firm can obtain greater economize in purchasing.

Purchasing is a managerial activity that goes beyond the simple act of buying and includes the planning and policy; objectives covering wide range of related and complementary activities included in such activities are the research

and development required for the proper selection of materials and sources from which these materials may be brought (Westing, 1976).

Purchasing function is performed by considering these questions: when to purchase, what to purchase, how much to purchase, at what price to purchase and from where to purchase?

## **2. Objectives of Purchasing**

The basic objectives of purchasing function are as follows: (Regmi & Joshi, 2002)

- i) **Goods Value:-** Value of goods is the combination of its price and quality which determines the competitive strength of organization. An effective purchasing ensures competitive price through acquisition or quality raw materials, parts and components at the low costs.
- ii) **Reliable Schedules:-** In order to meet deliver schedules, on time delivery of quality materials is essential. It can be ensured only by an effective purchasing system. Therefore a goods purchasing system ensures timely delivery of materials, parts and components for production to meet delivery schedule of customer's orders.
- iii) **Minimized Investment:-** Cost of inventory includes price of materials, ordering cost, carrying cost, and stock out costs. All these costs determine investment on inventory. All effective purchasing function minimizes all these costs. As a result it minimizes the investment needed on inventory.
- iv) **Efficient Administration:-** In order to maintain good relations with others there should be an efficient administration for purchasing materials at low cost with co-ordination with other functions and maintaining goods correlation with suppliers.

According to L.N Gupta, "The responsibility of the purchasing department is to buy materials of the right quality in the right quantity at the right price form the

right source, with delivery at the right place. This is the way of stating the objectives of sound purchasing.”

**The following are the main objectives of the purchasing: (Gupta, 1997)**

1. Procurement of required quality and quantity of materials at the best price not necessary the lowest price.
2. Procurement of materials, which best suit the product and the purchase for which they are intended.
3. Purchasing for the time ultimately been a schedule sufficiently in advance of the demands of the production department so that the production works shall not suffer due to lack of material.
4. Buying the quantity which is neither too much that involves belonging of capital not too little that holds up the regular supply for productions.
5. Avoidance of duplication of material, leading to waste of materials and equipment.
6. Maintaining continuity supply to ensure production schedule at a minimum investment.
7. Improvement of product with reference to quality and the distribution by means of selection of adequate material.
8. Creation of goodwill for the company through dealing with supplies.
9. Maintenance of company competitive position in the market by having company's quality standards in accordance with the demand of the customers.
10. Developing, fullest co-operation and co-ordination and maintenance of internal relationship among various department of the company.
11. It is the effective commitment of the company's funds.

Above stated basic and main objectives of purchasing ensured that it helps to determine right price, right quality, right time, source, right material, right place and right mode of transportation, right quantity and right attitude of products/goods.

In the word of J.H. Westing “The objective of the sound purchasing is avoidance of duplication, waste and obsolescence to the various items purchased.”

Hence the sound purchasing is the development of the internal relationship that leads to understanding and harmony among the various organizational units with the company. It should be uninterrupted and smooth production to provide regular service to the customers at the lowest possible cost.

### **3. Centralized versus Decentralized Purchasing**

Decentralization is the process of buying inventory from two or more departments places or divisions whereas centralized purchasing refers the process of purchasing, inventory from one place, department and division. Centralized and decentralized purchasing policy depends on many factors like size of organization, availability of resources, nature of resources, scope of organization, philosophy of management.

#### **The advantages of centralized purchasing are as follows:**

- i. Consistent buying policy.
- ii. Maximum purchasing power.
- iii. Inform purchasing records and organization.
- iv. Economic purchasing due to ordered purchased.
- v. Minimize economy carrying costs and investment.
- vi. Bulk purchase can be made at a cheaper rate and at a goods trade discount.
- vii. Better layout of stores is possible.
- viii. Quality of materials can be maintained through the specialized knowledge of personnel.

#### **The advantages of decentralized purchasing are as follows:**

- i. Greater flexibility to react rapidly to change.

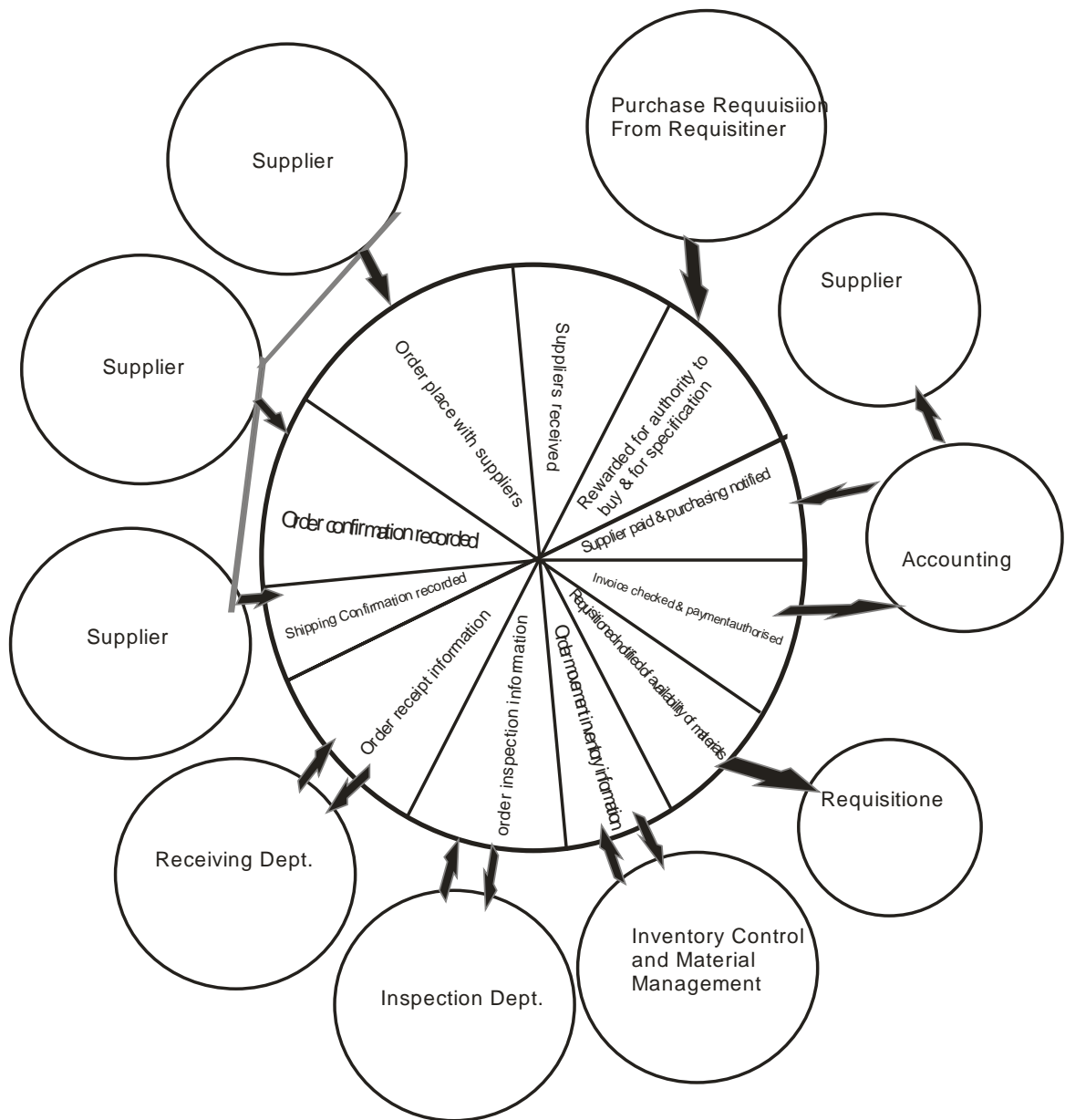
- ii. Close contact with customers.
- iii. Autonomous in buying.
- iv. It helps to reduce high initial cost.
- v. It eliminates the delays in getting materials from central store.

#### **4. Purchasing Principles**

**Following are the some important principles of purchasing:**

1. The acceptance of order is to be specific and not implicit. Preferably, it should be acknowledged by either of sides before it is binding.
2. Ambiguity and misinterpretation should be avoided specially in respect of quality, delivery, service, discount or any other such changes.
3. The Indian sales of goods act lays down that unless a specific provision is made regarding the time of payment or any other stipulation as to time being essence of contract, the same is not implied. It has to be stipulated.
4. The supplier takes warranty of goods as per specification laid down in tender and not whether these are fit of intended use. If it is so required that detailed information has to be stipulated well in advance or through negotiation.
5. The other features are buyers right to reject unwanted goods; liquidation for damages; passing of ownership etc, are covered in legal aspects.

**Figure 2.1: Purchasing Cycle**



Source: Ahuja, 1993.

## **6. Purchasing Information Flow**

**Under this function the following activities are performed:**

### **a) Value Analysis**

Under this, the value of the materials is analyzed. Value analysis of any material makes organization able to find out the lowest cost of material available. Value analysis of material should include the transportation cost also.

## **b) Product Specification**

Under this activity of product specification materials to be purchased are decided in terms of quality and quantity.

## **c) Supplier Selection**

Under this function, supplier of materials is selected. For branded and patented items there may be a single supplier. But for most of the items there will be a number of suppliers of which one has to be selected. The supplier of the materials is to be selected depending upon the reliability, price history, delivery record of the supplier and other services rendered by the suppliers.

## **6. Purchasing Transactions**

Under purchasing transactions, there are various buying methods, which are listed below (Goel & Gupta, 1992).

### **a) Purchasing by Requirement**

Under this method purchase are made only when required. This method is suitable for goods, which are not regularly purchased and kept in stock.

### **b) Market Purchasing:**

Purchase made to take advantage of price changes is known as market purchasing. Such purchase result in lower purchase price, greater margin of the profit on finished goods and saving in purchasing expenses. But sometimes it is argued that such a purchasing may not suit entirely the needs of production.

### **c) Regular buying**

This method results in low prices of materials and delivery to meet scheduled future requirements. This is a very scientific method of buying. This method ensures the organization of adequate supplier and prevents excessive purchases as well as below the requirements.

#### **d) Purchasing with Special Order**

It can also be termed as contract purchasing. Under this method, special order is placed to purchase the special goods required. A contract is made with supplier for the purchase of goods regarding schedule of supplier, means of transportation and term of payment.

#### **e) Speculative purchasing**

Under this method, purchased are made in excess of needs at the time market price is low. This purchasing helps the company to save money in purchasing and to increase income in sales.

### **7. Purchase Control**

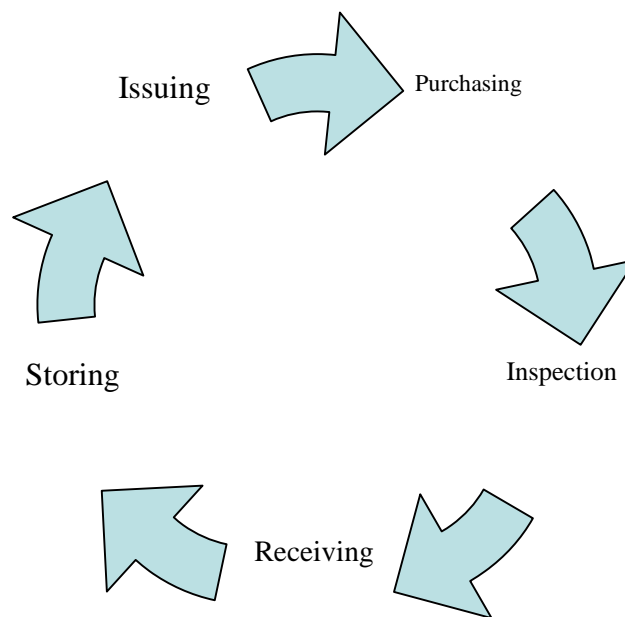
Purchase control is one of the aspects of material control. It generally starts with initiation of purchase requisition and ends with receipt of materials by store and payment of the bills. Purchase control refers to the purchase of material of right quality in right quantity at right price in right time. Purchase control avoids purchasing of unnecessary materials and purchase at unreasonable price (Goel & Gupta, 1992).

### **8. Receiving and Store Keeping**

On the arrival of the consignment, all details relating to actual material received should be entered in goods received note. After proper inspection quality control, goods should be passed into store. The store function involves both keeping the store of materials and keeping the store records, the former being physical task and the later being accounting task. The stores are classified as centralized and decentralized stores depending upon the nature and requirements of the organizations (Agrawal, 1981).

## 9. Store Routing Procedures

Store routing refers to the procedures relating to materials. Store routing includes purchase procedures, inspection and receiving materials, store keeping procedures and issuing procedures. Store routing procedure maintains adequate control over each stock and accuracy of stock on hand. Procedure relating to materials can be depicted in the following figure:



**Figure 2.2: Store Routing Procedure**

Source: Ahuja, 1993.

### 2.1.8. Pricing the Inventory

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

and other method is lower of cost or market. Both methods give different results (Eugene).

“The primary basis of accounting for 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 “Accounting Resources and Terminology Bulletins,” Final Edition New York, 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 types of raw materials at different prices at different times. Price of materials changes over time. There are various types of raw materials remaining in stock. It is not always possible to identify the individual particular purchase group. At that situation firms have faced difficulties in valuing the inventory. In this situation there are many methods, which are based on historical, used in determining the value of inventory are as follows:

### **1. Specific Identification Method**

This method requires that each unit in inventory be identified with the particulars of the time it was purchased. In this method, the items have serial numbers or are distinguishable by model, colour 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 items such as automobiles. It is not very practical when the firm purchases large quantities of identical units of various times and prices.

## **2. First-in-First-out(FIFO) Method**

Under this method, materials are issued in order in which they are received in store. Issue of material is made out of the earliest consignment or lot on hand in chronological order under this method. i.e , the material received first will be issued first. First come first serve, that is, old stocks are issued first. Therefore, issues are charged at the price paid for the earliest lots in stocks. As a result, closing stock of materials is valued at the latest price.

During the period of the rising prices, this method will result in a larger amount being assigned as the cost of ending inventory then would be assigned under the average cost method. FIFO is the most commonly used method for valuing inventory. It is simple to use and appears to coincide with the established merchandising principle of selling the oldest items first.

## **3. Last-in-First-out (LIFO) Method**

Under this method materials received last are issued first. That is, issues are made from the latest purchases. The issues are priced at the unit cost of the latest lot or most recent purchases. As such the balance on hand is priced at the unit cost of the earliest purchases. Prices of the last purchase are used for accounting regardless of actual material flow. The issues are not in chronological order and the cost of the material reflects current market price.

LIFO method has become popular since the procedure became acceptable method for use in determining the income taxes. Unlike weighted average, these separate purchase groups can not 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 a case, the firm must be able to identify the oldest remaining items for method; inventories are valued at the oldest lots on hand giving a price which is out of date with current invoice prices.

#### **4. Weighted Average Cost/End-of-the Month Method**

Under this method, issue prices of raw materials are fixed at the calculated average unit price.

It assumes that goods are removed from the beginning inventory and purchase group in proportion to the number of units in these groups. Consequently, cost of the ending inventory also represents a proportional distribution from the beginning inventory and the various purchase groups. The weighted average cost computed by dividing the total cost of goods available for sale by the total number of units available for sale by the total number of units available for sale for during the period.

**The weighted average price is determined as follows:**

$$\text{Weighted average} = \frac{\text{Total cost of goods available for sale}}{\text{Total units available for sale}}$$

This method is widely used by organizations that hold item of inventory long period of time because it average out of the effects of price increases and decreases. In addition, weighted averaging process is satisfactory when there are both increases and decreases in cost within the accounting period. After following this method for valuing inventory, it does not require that the ending inventory cost be associated with any particular purchase group. A common criticism of the methods is that it attaches no more significance to current prices than to price that prevailed several months earlier. This method will give very incorrect result when prices fluctuate considerably.

#### **5. Standard Cost Method**

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 used 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.

“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.”(Goyal, 1992)

## **6. Base Stock Method**

According to this method a certain constant quantity or base stock of materials is assumed to be necessary to keep the concern going. The base is valued at the cost prevailing at the time firm began or when the method was adopted. Any additional layers of materials in the inventory at close beyond the unit the base may be cost on the basis of FIFO, weighted average etc. method.

All the methods, which are explained above, have their own advantages and disadvantages. However, the method chosen is significant for efficient inventory management especially in its financial dimension.

### **2.1.9. Inventory Cost Control**

Dr. Govinda Ram Agrawal has stated that the process of inventory cost control as follows:

Predetermining the standards for each item inventory both in terms of cost and quantity, the establishment of standard specifications for material is starting point in cost control.

- ) Measuring actual performance of each item of inventories both in term of cost and quantity.
- ) Comparing actual performance with standard to isolate variance, analyzing variances as to their incidences and causes.
- ) Taking corrective action to eliminate variance.

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

According to Bajracharya and Shrestha, inventory cost can be controlled from the following ways:

- ) Incurring loss expenditure on purchased materials and services by reducing cost of purchased items by a continuous search for material, which are cheaper, more reliable in quantity and obtainable from sources, which facilitate smooth delivery and using less material per unit of production or increasing yield and reducing waste.
- ) Reducing the cost of acquisition and procession of material by reducing cost of buying i.e. reducing the administrative costs associated with securing material and effective receiving, banding and storage operation.
- ) Reducing the cost of being without by providing for continuity of study.

#### **2.1.10. Inventory Control**

##### **A. Concept of Inventory Control**

Inventory control means regulating inventories by accounting and physical method. It can be defined as the system used in the firm to control the firm's investment in stock. This includes monitoring of stock levels, deciding when and how many to order. Inventory control is very essential in every organization; there should be a good inventory policy and controls. The set of policies and controls refer the inventory system of the organization.

“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”(Gupta, 1992)

Kuchhal in his book “Financial Management” clearly stated motive of inventory control as to provide customer service in the fact sales and production fluctuations, to take action against expected increase in sales, to handle production variations, to manufacture goods economic production run, to promote flexibility in plant scheduling make advantage of favorable raw material price, to take advantage distribution cost, to provide suffer for over runs and miss-runs, to keep storage equipment, operational, to speculate against cost and price changes to minimized cost of maximized profit.

The purpose of inventory control is the stock of an adequate balanced inventory of material and to reduced storage and handling costs, obsolescence and deterioration costs, insurance and interest charges and risk of price level changes. Hence the overall objective of inventory control is to minimize, in total, the costs associated with stock.

## **B. Inventory Control Techniques**

For effective and efficient control of inventory, the following technique are employed.

### **1. Fixation of stock levels:**

- a. Minimum stock level
- b. Maximum stock level
- c. Re-order level
- d. Average stock level
- e. Safety stock
- f. Danger level

### **2. Determination of re-order quantity or Economic Order Quantity**

### **3. Selective inventory control ABC analysis**

### **4. Perpetual Inventory System**

**In detail of above stated inventory control technique are given below:**

**1. (a) Minimum Stock Level**

This is the lower limit below which the stock of any item should not normally be allowed to fall or minimum stock level represents the minimum quantity of inventory, which must be maintained in hand at any time. Carrying of minimum stock avoids a situation of stock out resulting in the stoppage of production. This stock is a buffer stock or safety stock to be used only under abnormal condition or in an emergency.

**The minimum stock level is determined by using following formula:**

$$\text{Minimum stock level} = \text{Re-order level} - (\text{Normal consumption} * \text{Normal Re-order period})$$

**1. (b) Maximum Stock Level**

It is a stock level that can be maintained on the basis of requirement. It is a quantity that can be maintained on the basis of need. It is the stock level above which stock should not be allowed to rise. It is an upper limit beyond which the quantity of any items is not normally allowed to rise. The quantity is fixed so that there may be no overstocking. Holding of stock more than maximum limit will increase material and storage cost, tied up working capital unnecessarily. The maximum stock level is affected by availability of financial resources, store space, lead time and nature of material, reasonability of material and government control.

**The maximum level is determined by using following formula:**

$$\text{Maximum stock level} = \text{ROL} + \text{ROQ} - (\text{Maximum Consumption} * \text{Minimum Re-order Period})$$

### 1. (c) Re-Order Level (ROL)

It is the point at which the storekeeper should initiate purchase requisition for fresh supply. Whenever an item of stock touches the re-order level, the purchase procedure is automatically activated so that fresh stock can be procured in time. Re-order level depends upon the lead time, rate of consumption and economic order quantity.

“Re-order point is the sub-system which answers the important questions in any organization’s inventory management. The question is, when an order should be placed so that firm doesn’t run out of stock.”(Hampton, 4<sup>th</sup> edition)

“The Re-order point is the level of inventory at which the firm places an order in the amount of the economic order quantity. If the firm place the order the inventory reaches the Re-order point, the new goods will arrive before the firm runs out of goods to sell.”(Hampton, 4<sup>th</sup> edition)

“Re-order level is fixed somewhere between the maximum and minimum level in such a way that the difference of quantity of the materials between the Re-ordering level and the maximum level will be sufficient to meet the requirements of production up to the time the fresh supply of the materials is received.”(Jain & Narayan, 1993)

**The re-order level is generally calculated by one of the following formula:**

ROL = Maximum Consumption/Usage × Maximum Lead Time

OR

= Minimum Level + Consumption During Lead Time

OR

= Safety Stock + ( Lead Time × Daily Consumption)

### 1. (d) Average Stock Level

An average stock level indicates the average stock held by the firm.

**It is calculated by the following formula:**

Average Stock Level = Minimum Level +  $\frac{1}{2}$  of Re-order Quantity

OR

= Minimum Level + EOQ/2

### **1. ( e ) Safety Stock Level**

In normal sense, minimum stock is safety stock. This minimum of inventory stock may be expressed in term of several day's production and sales. Safety stock is necessary for an uncertain demand of the costumers. The demand for goods may fluctuate day by day or from week to week. If the actual usage or sales go up and delivery of goods in delayed, the provision of safety stock makes the organization able to face the problem.

According to Lais J. Rago: “ Safety quantity, which the plan, must keep to make sure that the line never runs out of materials which could help up the movement of the production line as a whole”

**Safety stock is determined using following formula:**

Safety Stock = Average Usage  $\times$  Lead Time

### **1. ( f ) Danger Level**

This is the level below the minimum quantity. It is a level at which normal issue of the materials are stopped but issued under special instructions. It is a signal to the concerned people to arrange for the procurement of materials urgently to avoid stock out.

**Danger level is determined by applying the following formula:**

Danger Level=Average Consumption  $\times$  Maximum Emergency period

## **2. Economic Order Quantity(EOQ) or Re-Order Quantity**

How much to order or produce is one of the main problem of inventory management. That is the determination of a quantity for which the order should be placed is one of the important problems concerned with inventory management.

The correct quantity to buy is the quantity at which the cost of acquisition equals the cost of possession. That is technically known as the economic order quantity or the re-order quantity. Economic order quantity refers to the quantity of order which minimize the total inventory cost. Holding and ordering cost constitute the total cost of inventory excluding material cost. Increase in ordering number increase the ordering cost, but decrease the holding cost and vice versa. Generally, economic order quantity equals a carrying, ordering cost and minimum in total. Therefore it is necessary to calculate economic order quantity which minimizes carrying and ordering Cost.

J.J Hampton defines economic order quantity as “The order size that will result in the lowest total of ordering & carrying costs for an item of inventory. Further more he states the importance of economic order quantity as if a firm places unnecessary orders it will incur unneeded order costs. If it places too few orders, it must maintain large stock of goods & 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”

### **Assumptions**

The main assumption of economic order quantities are as follows:

- ) The forecast\demand for a given period is known.
- ) The usage\demand is even through at the period.
- ) Inventory order can be replenished immediately–no delay in planning and receiving order.

- ) There are two cost associated with inventories: ordering cost and carrying cost
- ) The cost per order is constant regardless of the size of order.
- ) The cost of carrying is a fixed percentage of the average value of inventory or carrying cost depends on average inventory.

### **Determination EOQ**

The EOQ can be determined by (a) Formula method (b) Trial and error or Tabular method and (c) Graphic method, they are explained below:

#### **a) Formula Method**

Economic order quantity, optimum number of order and total cost at EOQ can be determined by applying following formula:

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

$$\text{Optimum no. of orders} = A/EOQ$$

$$\text{Total cost at EOQ} = \sqrt{2AOC}$$

Where

EOQ = Economic Order Quantity

A = Annual Requirement

O = Ordering Cost Per Order

C = Carrying Cost Per Unite Per Year.

#### **b) Trial and Error or Tabular Method**

A tabular arrangement of data relating to items of material may allow the determination of approximate EOQ. A firm may have different alternatives to purchase its inventories. For instances it can buy its entire requirements planning period. Alternatively, the inventory may be produced in small lots periodically say weekly, monthly, quarterly and so on. If the purchase is made

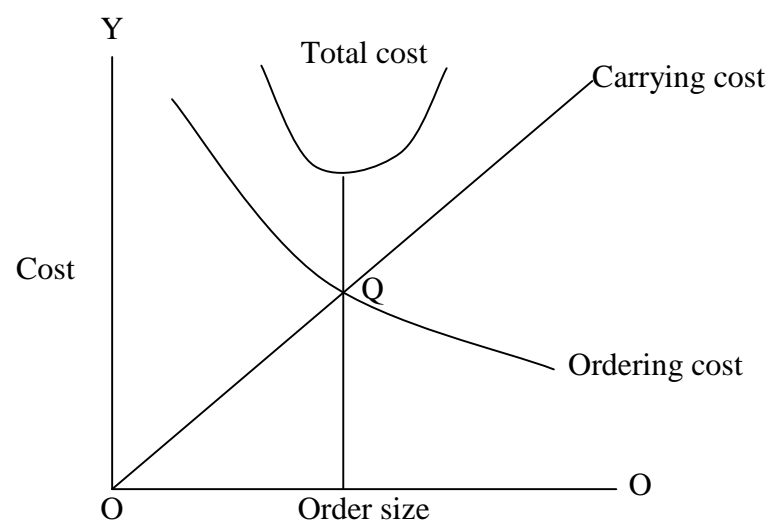
on one big lot, the firm's average inventory holding would involve high carrying costs. On the other hand low the inventory holding are associated with high ordering cost. The trial and error method for the determination of EOQ uses different permutation and combination of lots of inventory purchase so as to find out the least ordering and carrying cost combination. In other words, according to this method the carrying and ordering cost for different sizes of order to purchase inventories are computed and the order size with the lowest total cost of inventory is the EOQ. In this method following points are included:

- i) No. of order – Increase no. of order decrease order size.
- ii) Order size – Annual requirement divided by no. of orders.
- iii) Average inventory – Equal to half of order size.
- iv) Ordering cost – No. of orders  $\times$  Ordering cost per order.
- v) Carrying cost – Average inventory  $\times$  Carrying cost per unit.
- vi) Total cost – Ordering cost + carrying cost.

EOQ = Minimum Total cost order size.

### c) Graphic Method

Under graphic method the quantity of the point where ordering cost line and carrying cost line meet, will be the Economic Order Quantity.



**Figure 2.3: Graphic EOQ**

In the above figure carrying and total cost are plotted on OY axis and OX 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 decrease with increase in order size. The total cost line is decreasing at first stage, but they start rising when the decrease in average ordering cost is more than offset by the increase in carrying cost<sup>2.3</sup> in the same figure, Q represents the economic order quantity where the total cost is minimum, if the size of order increases, carrying cost exceed ordering cost that are saved. Thus, the firm operating profit is maximized at point Q.

**EOQ = Q units**

### **3. Selective Inventory Control ABC Analysis**

Usually a firm maintains large number of inventory of several types. It is impractical and impossible to control all these inventories with equal attention. The main reason is that all inventories are not equally important to firm from the view points of cost, profit, sales, availability etc. therefore, firm should pay more attention to those items whose value is the highest. In other words, the firm should focus on the most important item in the inventory. Therefore, always better control ABC analysis is a technique which concerns with classification of inventory into three groups. Under this technique of inventory control, inventories are listed in A, B and C group in descending order based on money value of consumption as follows:

- ) High priced inventories – A
- ) Medium priced inventories – B
- ) Low priced inventories – C

According to chase and Aquila's, ABC approach divides this list into three grouping by value A item constitute roughly the top of 15% of the items, B items the next 35% and the C items the last 50%.

The classification based on actual percentage of inventory items are annual value of such items by plotting in a graph called ABC distribution curve (Pareto curve).The typical exhibition of ABC analysis is given below.

**Table No. 2.1**

**Value analysis of ABC grouping**

<b>Item number</b>	<b>Annual usage(\$)</b>	<b>% of total value</b>
22	95000	40.69
08	75000	32.13
27	25000	10.71
03	15000	6.43
82	13000	5.57
54	7500	3.21
36	1500	0.64
19	800	0.34
23	425	0.18
41	225	0.10
<b>Total</b>	<b>23345</b>	<b>100%</b>

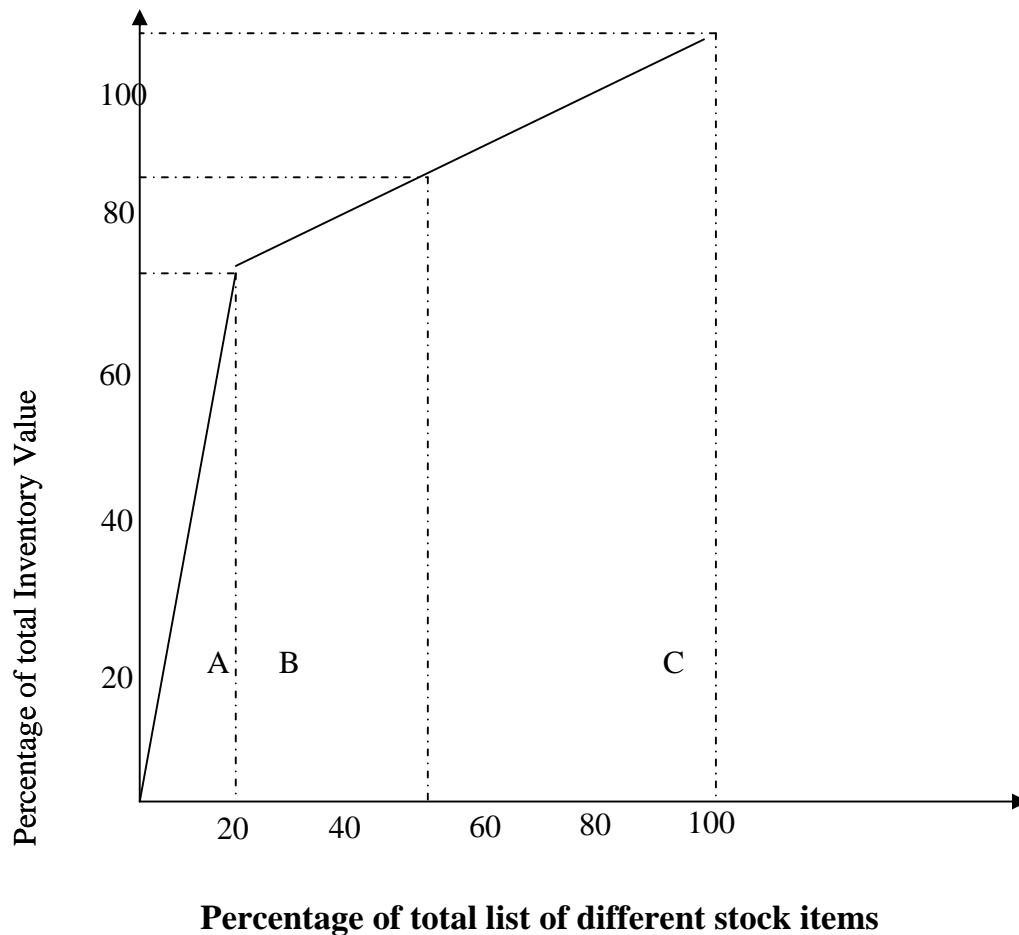
**Table No. 2.2**

**ABC grouping of inventory**

<b>Classification</b>	<b>Item number</b>	<b>Annual Usage(\$)</b>	<b>Total percentage</b>
A	22,08	1,70,000	72.82
B	27,03,82	53000	22.70
C	54,36,19,23	10450	4.48
	<b>Total</b>	<b>233450</b>	<b>100%</b>

The graphical presentation of above exhibit is given below:

**Figure No. 2.4**  
**Graphical presentation of ABC analysis**



There is very difficult to monitor and control the enormous number of stock items. As such manufacturing organizations find it useful to divide materials into three categories for the purpose of exercising selective control on inventory. ABC analysis is a control technique that divides items into sub classification and uses different control systems for each group of materials.

**Control for class A items:**

The item included in group A involves the largest investment or the highest value item. Therefore, inventory control should be most rigorous and intrusive and the most sophisticated inventory control should be applied to these items.

### **Control for class C items:**

C group consists of item of inventory, which involves relatively small investment although the number of item is fairly large. The items deserve minimum attention or the routine control should be adequate for those items.

### **Control for class B items :**

B item falls in between two categories. It deserve less attention than A but more than C. So it requires reasonable attention of management.

Thus selective inventory control technique is ABC analysis. There is required more ideas about various items of inventory. Simple and less expensive controls are applied to category 'C' items while vigorous control, i.e, purchase, stores, and issue are to be strictly applied in case of the items of 'A' group.

## **4. Perpetual Inventory System**

Perpetual inventory is "A system of records maintained by the controlling department. Which reflects to physical movements of stock and their current balance?" ICMA. Under the perpetual inventory system, inventory account is up-to-date at the end of the accounting period and therefore is not involve in the closing process. Under this method, the balance of stock will be ascertains after every receipt and issue of materials through stock records. Thus, this is a method of ascertaining balance after every receipt and issue of materials, which facilitate regular checking and also avoid closing down for stock taxing (Munakarmi, 2003).

### **C. Inventory Control Procedure**

There are many inventory control systems. They are followed in maintaining adequate control over each inventory item, and ensuring accuracy of stock on hand. The following are some controlling systems.

### **a) One Bin System**

It is a periodical replacement system of inventory control. In this system, inventory for a fixed period such as a week, month, quarter etc. is purchase up to predetermined maximum inventory level. Whenever inventory is used, they will be reduced in certain periods.

### **b) Two Bin System**

Under this method, two bins are used. First bin contains the items for day to day operations and second bin provides the stock required for replacement. In order word, the second bin contains the stock of item equals to re-order point. When stock in the first bin is finished, stock would be brought from second bin and an order will be placed to replenish stock in the second bin as well as in the first bin. This process will continue till the date of inventory planning.

### **c) Mini-max System**

This is one of the oldest systems and is still in use for each type of inventory maximum level is set that demand safely required to prevent out the stock condition. The minimum level also governs the ordering point. In order to sufficient of size is placed to bring inventory to maximum point when the minimum level is reached.

### **d) Statistical Inventory Control System**

A number of firms with widely spread distribution system find the use of mathematical model and electronic pattern inventory location level best reconcile consideration of customer service, manufacturing and have been developed to help inventory management decision, on us more operation research has been devoted controlling the inventories than to any other problem area in business and industry.

### **e) Cardex File System**

A cardex file system is a manually operated inventory system, in which inventory card represents each stock items with transaction kept on the cardex. Following are some characteristics of the cardex file system.

- ) A card for every item is fixed on a rotating down on file cabinet
- ) On the top of the each card is the computed economic order quantity and re-order level.
- ) Balance of the card refers the ledger of the beginning inventory, order placed, order received, issues from stores and current inventory levels.

When transaction occur the entry with corresponding date is recorded. When physical inventory are taken cards are adjusted to show current inventory levels.

### **f) Management accounting and production information control system**

It is a computerized common data base system for manufacturing information and control. It includes many models such as financial order processing, accounting, and manufacturing for implementation of planning. Key models for controls are product data management requirement planning, inventory management and production costing and control applications.

Inventory management application reduces times, increases overall plant capacity, reduces investment stock and space, improves customers services, and provides inventory data and reports.

## **2.1.11 Dependent demand inventory systems**

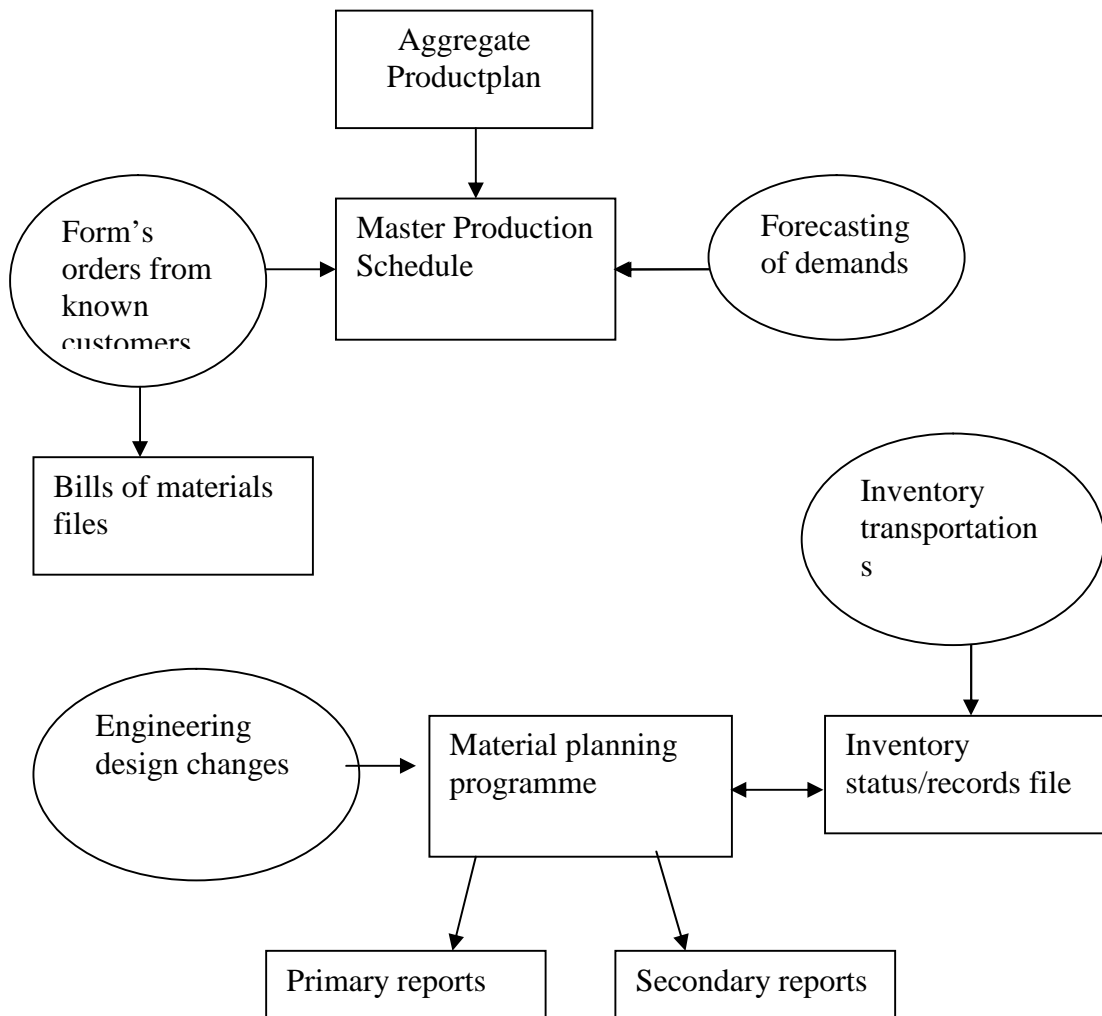
### **1. Material requirement planning (MRP) System**

Material requirement planning (MRP) is a system, which creates schedules identifying specific parts and material required in producing products. It determines the exact quantity and number of parts and components, the date orders to be released and production cycle time. Therefore, it is an information system for planning and controlling both material and capacity

required in manufacturing products. The main objective of MRP system is to control inventory levels, assign operating priorities for items and plan capacity to load the production system. The objectives of MRP can be outlined as follows:

- ) To order right parts and component in right quality at right time
- ) To order with the right due dates and kept it valid.
- ) To plan for complete and accurate load for an adequate time to view future load
- ) To minimize inventory investment
- ) To maximize production capacity efficiently

**Figure 2.5: Structure of MRP system**



Source: Ahuja, 1993.

## **2. Manufacturing Resources Planning and Implementation (MRP-II)**

Manufacturing resources planning systems were originally developed on a segregation basis rather than a part of highly integrated information system. At present many information subsystems have been beginning to relate with MRP-II system. Bills of material with engineering information system data order release, and order receipt data with order bills and account payable information system are the examples of subsystem relating to MRP-II system. These types of information system are stimulus for manufacturing planning and control system.

Manufacturing resource planning does not take into account of capacity implication. It is a system, which handles material aspects of production and operations control. Therefore manufacturing resources planning has been developed. MRP-II is a sophisticated system, which takes master production schedule and looks at the resources implication at an aggregate level such as department wise or selection wise. In other word, MRP-II is a means of stimulating to provide information in the use of resources for various assumed plan. Information about inventory investment levels, plant expansion needs, and work free requirement are useful for coordinating marketing, finance, engineering and manufacturing efforts to achieve the company's business plan.

MRP-II process begins from developing production plan to specify many production levels for each profit line based on the business plan. Production plan is developed by consequence of executives because production plan affects the other functional departments. Production department expects to produce at the desired level, sales department to sell levels.

## **3. Just- In-Time Inventory System**

Modern business enterprises are applying new strategies for inventory management. It is just-in-time inventory system. This system is very popular in Japan. The ordered material and parts should arrive only at the time of

production, of production function are completed only at the time of supply to customers which are just-in-time. The system helps in saving the cost. Products are not manufactured or inventory are not ordered unless need arises under the system. Thus, inventory is not maintained or maintains relatively a low inventory level. The main objective of the system is to avoid or reduced the level of inventory.

## **2.2 Review of Previous Studies**

Inventory management is one of the important aspects of general management in any organization. Without effective and efficient inventory management, no manufacturing organization can achieve its goal. But no one pays attention in this field. There are developed many more inventory management techniques and has been realized but also many problems and difficulties have been faced by the manufacturing organization. In Nepal there are numbers of public enterprises have been established and analysis had been made but only the aspect of financial analysis and performance. A few researchers made the research in the field of inventory management of manufacturing organizations. Some of the important studies done so far in the field of inventory management in Nepal have been carefully reviewed and their findings have been listed as under:

**Pant (1999 A.D.)** Mr. pant and conducted a research work on “Impact of Inventory The profit, A case study of Gorkhapatra Corporation”. He has reflected some problems as due to the application of unscientific planning and control techniques. Corporation is bound to bear unnecessary inventory holding and procurement cost. The procurement procedure of required inputs looks not reliable because in casual circumstances the corporation has taken the bases of local purchase which is nearly double costly than the L/C purchase. Not any tools and techniques have been used to improve as well as prevent causes of wastage and leakage of cost. But these costs are the economic parameter for corporation’s decision models. Moreover, lack of transit home facility dissatisfaction among employees, biasness in

performance appraisal, lack of accountability, towards the work and the poor vision of top authority are also the major problems.

The objective his studies were to explore the underlying constraints in exiting management and control system of inventory and their impact towards the Gorkhapatra Corporation's profitability. To examine the existing inventory system applied by GPC.

To determine optimal inventory level of major raw material i.e. Newsprint, ink, film sheets and Aluminum sheets in GPC, assets the relevant financial ratios, analyze the relationship between inventory, material cost and profit and to provide appropriate suggestion based on the major findings.

The major findings of this study were that the corporation did not use any tools and techniques to manage inventory. Inventory turnover ratio is flexible, net profit margin is in constant, return on total assets is more flexible, return on net worth is also in constant. Regression and correlation analysis have shown the positive relationship between the inventory materials costs and profit and variance analysis is highly significant as indicated by F value 17.3 and 17.41 respectively.

**Pathak (2000)**, carried out a research study on "Inventory management of Hetuda Cement Industry Limited" to examine the profitability and efficiency of HCIL regarding Inventory management. To find out the efficiency level, she has investigated various inventory related factor. Such as raw materials consumption and collection procedure, store and warehousing techniques, production and supply techniques and its schedules etc.

Ms. Pathak has used both secondary and primary data for analysis of the inventory management system of HCIL. She has applied all accounting; financing and statistical tools to evaluate and analyze the gathered data, some of her remarkable findings were,

- ) HCIL is not running even in its average capacity due to lack of raw materials.
- ) The company could not keep by proper balance between yearly demanded and supply trend so the inventory stock is fluctuating every year.

) The company could not apply even basic inventory management system, so it needs to apply the inventory control system to strengthen the organization.

(**Joshi**) (2001). Research on the topic of inventory management of Herbs processing and production co. he found the following problems in the area of inventory management in the HPPCI, like,

- ) What types of inventory problems do they face?
- ) Do they have any plan for inventory management?
- ) What are the bases for such plan?

Are there any plans and policies to increase profit, reduce expenditures through improving size of inventory in future, if yes, what, if no, why?

Researcher sets some objectives, which are given below:

- ) To identify present position of inventory in HPPCL
- ) What types of problems faced by HPPCL in the management cost and profit that should be identifies.
- ) Provide the appropriate recommendation and suggestion improvement of inventory management in HPPCL on the basis of above study and findings.

Researcher conducted after study, if the company want to be success, it was necessary to apply the theoretical and practical methods in collection, production, distribution management, marketing, proper remuneration and rewards and punishment etc. The company had given extra facilities and inspiration to the farmer to produce the raw materials to reduce the loss of inventory expenses. Transportation high charge and loss of company would reduce if the company were able to fulfill derived raw materials from private resources.

**Dahal** (2002) has carried out a research on “A comparative study on inventory management of Dabur Nepal Pvt Ltd and Nepal Lever Ltd.”

His aim of study was to examine and find out the present position of inventory management of both the companies.

Mr. Dahal has used both primary and secondary sources of data along with previous studies, articles and published, unpublished official records of both organization for the sake of examination and analysis. He used various accounting, financial and statistical tool to analyze the data. His findings were:

- ) The organization use raw materials from local, India and third countries where they are unable to practice inventory management.
- ) Purchasing of raw material in NLL is fluctuated whereas DNPL has increasing trend of raw materials procurements because of sound management of demand and supply.
- ) They both have invested huge amount in inventories but do not apply dynamic inventory management system.
- ) The researcher has suggested that the both companies should apply the control of stock level to get better performance.

**Pokherel** (2005) “A study on inventory management in Janakpur Cigarette factory” was carried out by to examine the performance of Janakpur Cigarette factory, collection procedures of raw materials, materials consumption, comparison between profit and production and present inventory position of the factory.

Mr. Pokhrel has used both primary and secondary data for analysis of JCF. He applied accounting and financial records, published and unpublished information and direct contract with the concern officials for data collection. He concludes that Janakpur cigarette factory has no proper target for material purchase in the factory. For material purchase of JFC is highly dependent upon India, selling and cost prices of cigarette are increasing from year to year.

**Dhungana** (2006): “inventory management and its impact on profitability, a case study of Udayapur cement Industry Limited (UCIL)” to identify the applied techniques used to acquire and to manage the inventories, to examine the profitability & efficiency of Udayapur Cement Industry Ltd. due to inventory management and to analyze the different aspects of inventory management in Udayapur cement Industry Ltd. with the help of statistical & financial tools to provide logical suggestion for improvement on the basis of the study diagnosis. The study has been carried out with in a range of latest fiscal year data starting from 2053/054to 2062/063.

**Baral** (2007) “inventory management, a case study of Gandaki Noodles Pvt Ltd”, was introduced by to highlight the inventory management and their consequences on the cost and profit, inventory management system.

In this study Mr. Baral has used primary and secondary data and nature of data used are descriptive and analytical. To collect data and related information, he uses personal observation, interview, reports, published and unpublished data and financial statement i.e. balance sheet P/L account.

To analyze and interpret the data, percentage index, average and correlation approaches are used. This study covers years from the fiscal year 2000/01 to 2005/06.

Mr. Baral found there is the highest degree of correlation between selling and cost price. The inventory management was not sound, weak inventory control in the production department. Factory does not follow economic order quantity and ABC analysis.

**Gyanwali** (2008), Research on the topic of impact of profitability Nepal Balaju Limited found the following finding;

- ) BNL has not followed proper method of inventory management technique like porches order, EOR, Re order part act.
- ) Store control device practice; in BNL the store control device adopted No Bin Cord & store ledger. The company has not applied ABC analysis techniques to control various types of inventories in the store.
- ) There is no any special department for inventory management and control. Management accounting and finance control department which carry out the process of inventory control.

But also holding minimum amount creates the problem of shortage. For this forecasting and proper planning is necessary. Again it suggests that the procurement department with the co-operation of production and marketing department should analyze and annual required materials following an appropriate purchasing polices. For this, if possible maximum stock level, minimum stock level and re-order level as well as economic lot size should be fixed. This helps the management to strike balance between liquidity and profitability in the company.

**Thapa** (2008), “inventory management, A case study of Nepal Oil cooperation Limited”, the main objectives of this study were to high light the NOC’s key elements, which reduce and control the cost and increase profitability of NOC. The trend of sales and distributions (demand & supply) of NOC and finding the pricing mechanism of petroleum products in NOC.

On the basis of sets of objectives, the researcher recommended some suggestion. In the present situation, NOC is not properly managing its inventory analysis; time, trend analysis, regression analysis, time series etc. should apply to forecast purchase and sales. Similarly to reduce the cost price petroleum products NOC should follow according to the agreement between IOC and NOC i.e. purchase of crude oil and IOC is cheaper than the existing practice on which NOC is purchasing refined oil.

**Sigdel** (2009) has conducted the research work regarding "Inventory Management of Agriculture Input Corporation." His objectives was to analyze the relationship among purchase, sales and inventories, to analysis ordering system of the company and to suggest proper inventory model to RDL bases on analysis.

His major findings were as follows:

- ) Agriculture input corporation was not using scientific model of inventory management. Although they don't calculate EOQ for the supply of chemical fertilizer, they order lots of 1000 to 2000 metric tons.
- ) They were ignoring discount while purchasing and lead-time is not al;so calculated properly.
- ) ABC technique was used by Agriculture input corporation.

**Acharya** (2010) has conducted the research work on the topic of "Inventory Management of Nepal Food Corporation". His main objectives were to analyze the relationship among sales and inventories, to analysis ordering system of the company and to suggest proper inventory model to RDL bases on analysis.

From the study, his major findings were as follows:

- ) AIC is not using scientific model of inventory management. Although they don't calculate EOQ for the supply of chemical fertilizer, they order lots of 1000 to 2000 M.ton.
- ) There is no evidence of taking discount by AIC. Lead-time is not calculated properly.
- ) AIC was using ABC analysis also.

### **Research Gap**

Up to now various studies have been conducted on inventory management of Nepalese manufacturing and non-manufacturing organization. But the fact is that whatever was found and recommended from the study lacks the clarity in its matter. They found organization profitability and cost better, worse and average but they recommend vaguely (not exact). They found there is lack of proper planning but didn't recommend the way by which planning system can be made properly on inventory management. So this study will be more concerned to avoid these drawbacks and give more clear vision to the related organizations.

## **CHAPTER-III**

### **RESEARCH METHODOLOGY**

#### **3.1 Research Design**

The study entitle “Inventory Management in Janak Education Materials Centre Limited” is a case study of a single organization production, sales & distribution, value, inventory position, inventory turnover ratio, profit etc are the major variables are considered in the study. The descriptive cum-analytical research design has followed in the study.

#### **3.2 Population and Sampling Procedure**

The population for this study is concerned only with Janak Education Materials Center Limited. Various related officials of the JEMC are selected for personal interview according to the requirement of the study.

#### **3.3 Sources of Data**

For this study, the main sources of data are secondary such as previous studies and reports, articles and published and unpublished officials records of JEMC Ltd, financial statements i.e. Balance Sheet and P/L Account, however primary data also considered as per the requirement of the study. Primary information is collected through the observation and informal meeting and interviews with the officials in the JEMC.

#### **3.4 Data Collection Techniques**

In order to gather the required information from the official record of the JEMC, the secondary data for the study have been collected through published and unpublished official records of the JEMC. Journals, Magazines, Government and University publications have been also used the source of secondary data. Personal interviews and observation method have been applied to collect the first hand information about the related study.

### **3.5 Data Analysis Tools**

In order to achieve the organizational goal, there is a need of effective and efficient inventory management system in the organization because inventory management is the most important aspect of the general management. To achieve the findings of the study the collected data have been presented and analyzed in different suitable tables and graphs, percentage, index, mean and correlation analysis have been used as the statistical tools, Ratio analysis has been used as the financial tool to achieve the objectives of the study.

## CHAPTER-IV

### DATA REPRESENTATION AND ANALYSIS

This study is specially designed for analyzing the present practice of inventory management system in JEMC. To accomplish the stated objectives collected information is analyzed in proper way. To achieve the fruitful result, the data are analyzed on the basis of computing the relationship between sales and production cost of educational materials assessing the production and profit of JEMC showing the trend, presenting the relationship between sales and closing stock of inventory and finally assessing the inventory position of JEMC Ltd.

#### 4.1 Inventory Stock Position of JEMC

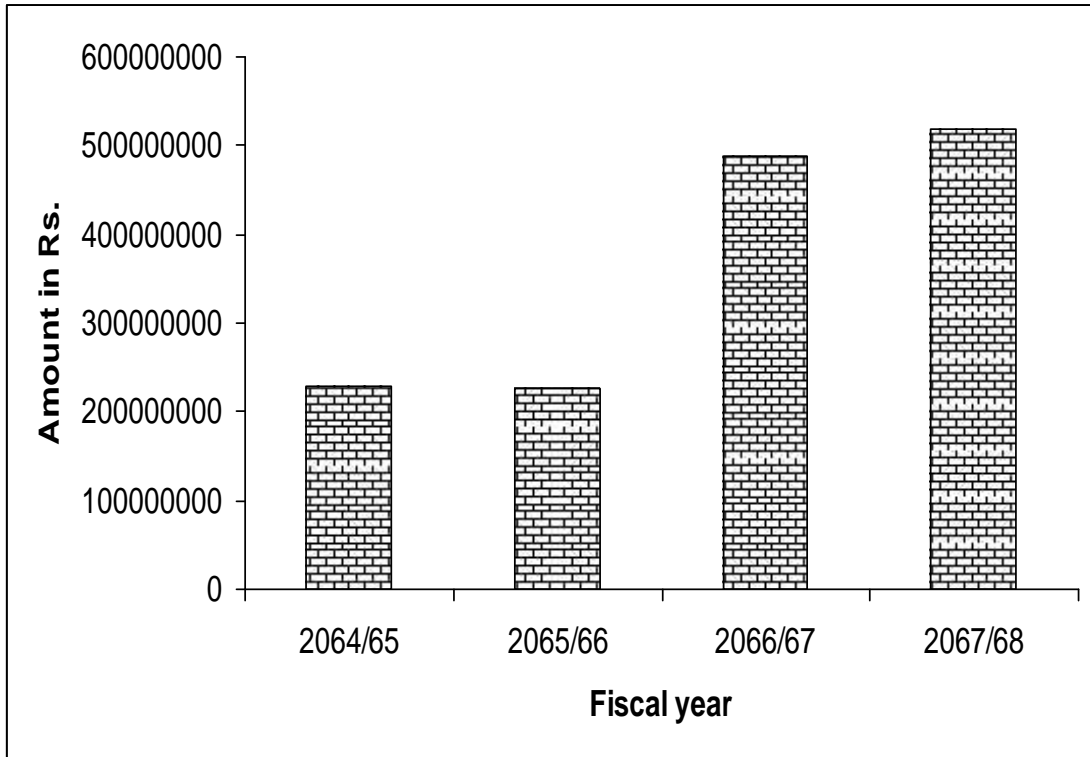
Every business organization, whatever that may be trading, manufacturing or service rendering or however big or small has to maintain some inventory stock inventory can be said the stock of item in reserve for certain time period. Inventory needs investment not only in acquiring but also in holding them. Inventory requires careful management. Therefore, it is said that inventory is one of the integral part of material management. Inventory consist of purchases, semi processed materials and finished products. The inventory stock position of JEMC Ltd is analyzed here under for five fiscal years.

**Table No. 4.1**  
**Inventory Stock Position of JEMC**

Fiscal Year	Value	Annual change%	Index
2064/65	230039557	-	100
2065/66	225538458	-1.96%	98.04
2066/67	488782576	116.72%	214.76
2067/68	519776325	6.34%	221.1

Source: Annual reports of JEMC.

**Figure 4.1**  
**Inventory Position**



The table above presents the inventory position of the JEMC for the last four fiscal years. The values in the table show the sum of inventory stocks. In the fiscal year 2064/65, JEMC had to total inventory stocks of Rs. 230039557. The inventory stocks for the fiscal year 2065/66 amounted to Rs. 225538458. It is decreased by 1.96% in comparison to previous fiscal year. During the fiscal year 2066/67, the value of the inventory stock is increased by 116.72%, in comparison to previous fiscal year 2065/66, and the total value of inventory stock was amounted to Rs. 488782576. Now during the fiscal year 2067/68, the value of inventory stock amounted Rs. 519776325. In this year the value of inventory is increased by 6.34% in comparison to previous fiscal year.

From the above analysis we know that the investment in the inventory stock of JEMC is in huge amount. The value of inventory stock is varying from year to year. It is increasing except the fiscal year 2065/66. A huge increase in the investment on inventory stock is in the fiscal year 2066/67. The above

result may be the outcome of the decline in sales and distribution. The piling up of the stock is growing up due to the non-selling of production.

#### 4.2 Production and Sales & Distribution of Education Materials

**Table No. 4.2**

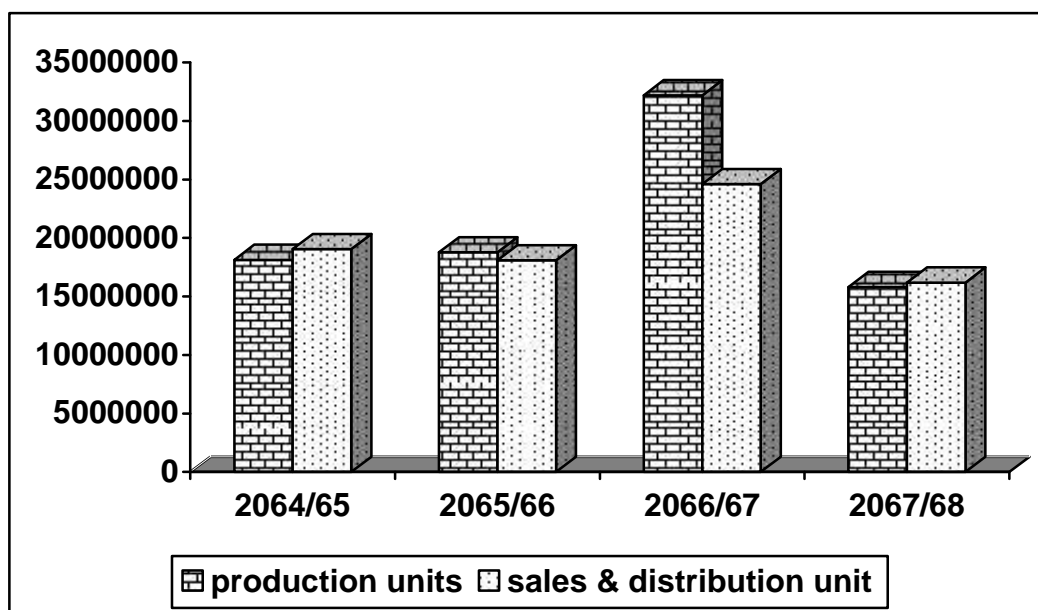
##### **Production and Sales & Distribution of Educational Materials**

<b>Fiscal Year</b>	<b>Production Units</b>	<b>Sales &amp; Distribution Units</b>
2064/65	18126861	19043810
2065/66	18763149	18094690
2066/67	32189361	24592609
2067/68	15806422	16188150

Sources: Annual Reports of JEMC, 2065 to 2068

**Figure 4.2**

##### **Production and Distribution of Educational Materials of JEMC**



Above table and graph shows the production and sales and distribution situation of JEMC limited for 2064/65 to 2067/68. X-axis represents the period of fiscal year and Y-axis represents the production and sales and distribution of educational materials. According to table and graph, JEMC produces 18126861

units and sales and distribution 19043810 units for fiscal years 2064/65. In the fiscal year 2065/66, JEMC produce and sales 18763149 and 18094690 units respectively. Similarly, JEMC produce 32189361 unites and sales 24592609 units in the fiscal year 2066/67. JEMC produces and sells of educational materials or text books of school level in fiscal year 2067/68, 15806422 units and 16188150 units respectively.

From the above analysis, it is found that production and sales and distribution of educational materials is increasing from year 2064/65 to year 2066/67. Here the production is increased by approximately double from the year 2065/66 to 2066/67 and similarly production is decreased by double in year 2067/68. It is also clear that the highest and sales and distribution are in 2066/67 and the lowest production and sales and distribution are in 2067/68

#### **4.3 Trend of Total Sales and Cost of Educational Materials**

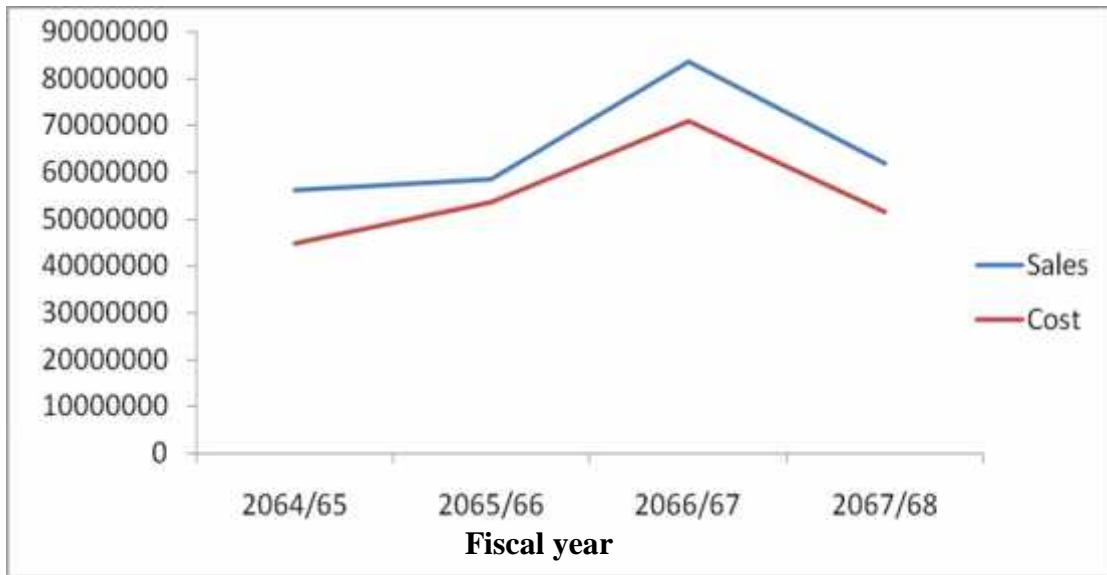
The structure of sales and cost of any product is helpful to know the overall position of the industry. Here the sales and cost price of the educational materials are depicted.

**Table 4.3**  
**Sales and Cost of Educational Materials**

Fiscal year	Sales			Cost		
	Rs.	Actual change %	Index	Rs.	Actual change %	Index
2064/65	562651062	-	100	448003528	-	100
2065/66	587118468	+4.35	104.35	534404284	+19.29	119.29
2066/67	835790493	+42.35	146.70	708198714	+32.52	151.81
2067/68	618997152	-24.94	121.76	514240214	-27.39	124.42

Source: Annual reports of JEMC.

**Figure 4.3**  
**Sales and Cost of Educational Materials**



The table above presents the sales and cost of the educational materials for the last four fiscal years from 2064/65 to 2067/68. For simplicity the sales and cost of materials is shown in total. In the fiscal year 2064/65, the sales of material were Rs. 562651062. The corresponding cost was Rs. 448003528. In the fiscal year 2065/66, sales value was Rs. 587118468. It is increased by 4.35%, in comparison to previous year. The corresponding cost was 534404284. The increment cost was 19.29%. In the fiscal year 2066/67, sales for the educational material or text books of school level is increased by 42.35%, in comparison to fiscal year 2065/66, whereas the cost for the same period was increased by 32.52%. In the fiscal year 2067/68, sales are decreased by 24.94%, in comparison to previous fiscal year, whereas the cost for same period was decreased by 27.39%. In the fiscal year sales was Rs. 618997152 and cost was Rs. 514240214.

The average sales and cost of four fiscal years is Rs. 651139294 and Rs. 551211685 respectively.

#### 4.4 Raw Material Purchase by JEMC

Without raw materials, the production of any product is impossible. The quantity and the quality of the production of any manufacturing organization highly depend on the quality and quantity of raw materials available therefore raw materials play a vital role for the efficient and successful operation of the industry. The main raw materials for publication industry like JEMC are paper, ink and other printing materials.

Janak Education Materials Centre Limited purchase its raw material or required papers from local papers mills like Bhirkuti paper mills, Everest paper mills etc, But now the Bhirkuti paper mills is closed by the strike of employee, other materials ink and printing material purchase in the local market as well as foreign countries. The material which is not available in Nepal purchased from the other country through agent. Specially, all types of raw material are collected directly from suppliers.

#### 4.5 Inventory Stock of Finished Production of JEMC

It is also essential to discuss the inventory stock of the finished products (textbooks) in the JEMC for the last four fiscal year in values as well as in quantity here under.

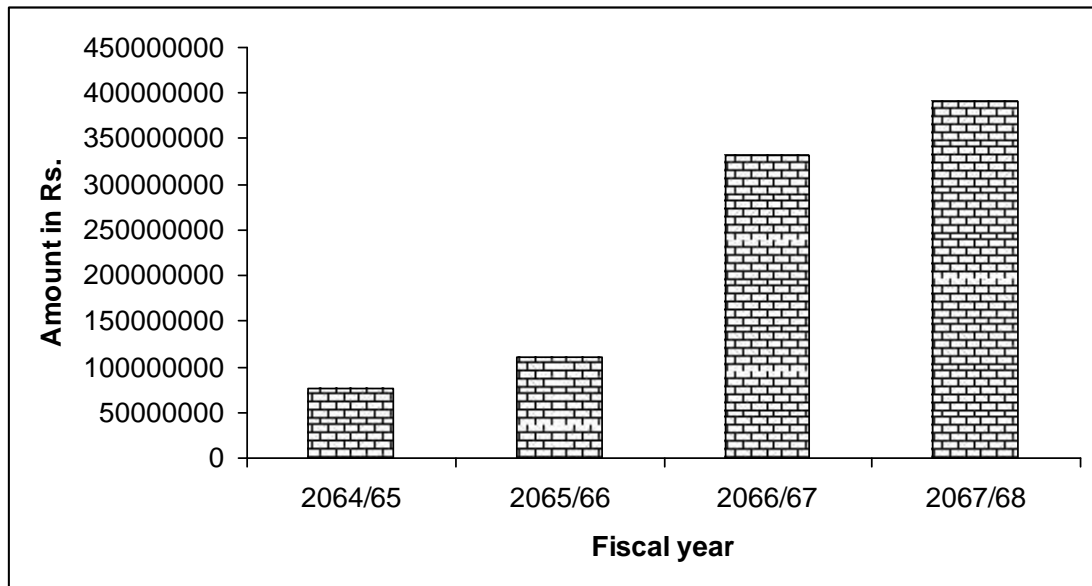
**Table No. 4.4**

##### **Inventory Stock of Finished Products**

Fiscal Year	Quantity	Annual Change %	Index	Amount (Rs.)
2064/65	2905262	-	100	76365060
2065/66	3243359	11.64	112	110051154
2066/67	10817885	233.54	346	331413306
2067/68	10558659	-2.40	344	390260366

Source: Annual reports of JEMC.

**Figure 4.4**  
**Inventory Stock and Finished Products**



Above table shows the value and quantity of inventory stocks of finished products in the JEMC for the last four fiscal years. In the fiscal year 2064/65 the finished product in inventory was 2905262 units, worth Rs. 76365060. During the fiscal year 2065/66 the inventory stocks of finished goods is increased by 11.64% in comparison to previous fiscal year. It was 3243359 units of finished goods worth Rs. 110051154. In the fiscal year 2066/67 the inventory stock of finished goods is increased by 233.54% in comparison to fiscal year 2065/66. It was 10817885 units whereas its value amounted to Rs. 331413306. Now during the fiscal year 2067/68, the stock of finished products was 10558659 units. It is decreased by 2.40% in comparison to the fiscal year 2066/67. The value of stock was Rs. 390260366.

From the above analysis, we know that the inventory of finished product is also fluctuating from year to year. Due to this fact, it can be concluded that the production and sales plan or target of the JEMC is not proper co-ordination between sales and production of the JEMC.

#### **4.6 Issuance of Purchasing Order and Stock Level Practice**

The production department of the JEMC issues the material requisition from to the store department when the raw materials are run out. The store department issues the raw materials to the publication department from its stock. If there is shortage of raw materials in store department, the storekeeper orders the materials to the procurement division. Then the procurement division of the JEMC orders materials with the permission of management on the board of directors to the suppliers. JEMC Ltd purchased raw material used for textbooks is paper. The JEMC purchase paper from Bhrikuti paper mills and Everest paper mills. Procurement of other materials such as ink and printing materials, lubricants are made in home market. The purchase orders for such materials are placed by the purchasing division with the permission of the management to the suppliers. Other materials which are needed in the JEMC are purchased local market as well as other countries. Such materials are purchased from the suppliers as per agreement between JEMC and them.

In the JEMC Economic Order Quantity (EOQ) model is not in practice. There is provision of safety stock. The provision of safety stock is kept in order to make smooth production operation and to supply the products smoothly to the market. Safety stock ensures against contingencies, such as sudden increases in the rate of the usage, failure to receive the ordered materials in time and receipt of defective materials that can't be used. A high safety stock is undesirable and lack of which may cause productions shut down. The time of production is not fluctuating due to the shortage of materials.

JEMC has made the provision of maximum, minimum and re-order level only in paper. In real life of the JEMC they are not arranged. In practice the center purchase majority of raw materials item through agents. The JEMC arranges the regular supply of its needed materials from the agents, national or international.

From the discussion above we come to the conclusion that the duty of issuing purchase order comes under procurement division. The JEMC regulates

its purchasing of materials by agreement for the most parties. It has an agreement of safety stock of raw materials. Whatever may be in reality? It has better understanding that stock should not be too much high or too much low than the optimum level.

#### 4.7 Ratio Analysis of JEMC Ltd

The efficient of the management can be measured by the ratio analysis. The inventory ratio analysis of any organization may help us to know the efficiency of management of finished goods stock. Inventory turnover ratio is known as stock turnover ratio or sales stock ratio. Inventory ratio is found out to know the rate of turnover of stock. This ratio measure turnover of stock in terms of time. Higher the turnover ratio, better the efficiency. There are two methods of measuring inventory turnover ratio. The inventory turnover is find out either by relating sales to closing inventory or by relating cost of goods sold to average inventory. Cost of goods sold is calculated by subtracting closing stock from the total of purchase and opening inventory. Formula to calculate inventory turnover ratio are as follows:

$$\text{a) Inventory turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

OR

$$\frac{\text{Sales}}{\text{Closing inventory}}$$

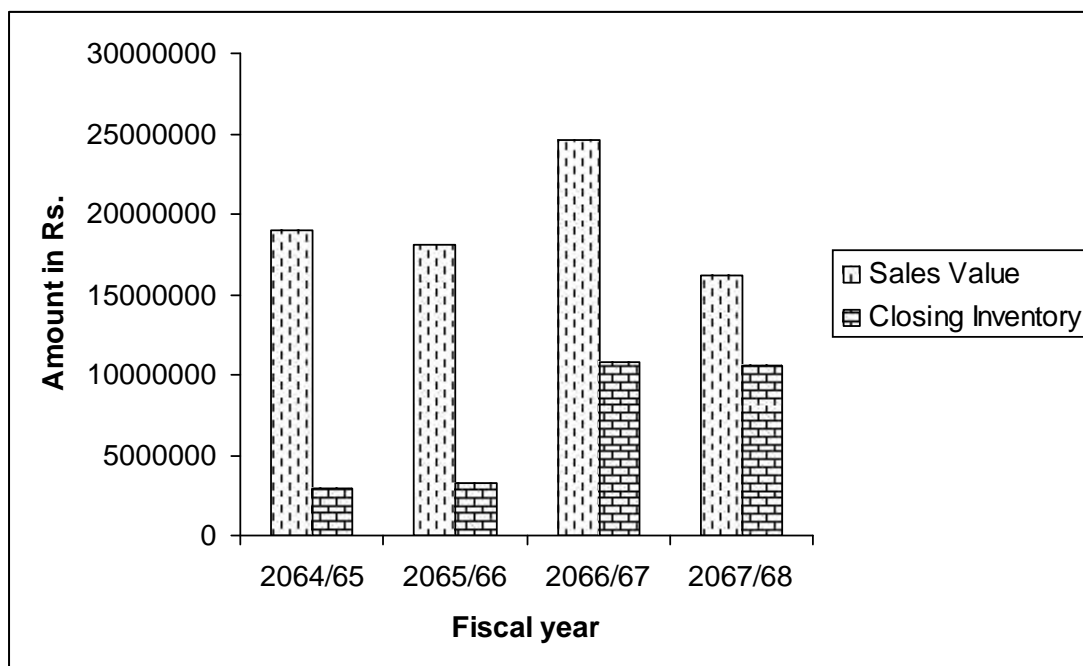
**Table 4.5**

#### **Inventory Turnover Ratio Analysis of JEMC**

Fiscal Year	Sales Value	Closing Inventory	Inventory turnover ratio	Annual change
2064/65	19043810	2905262	6.56	-
2065/66	18094690	3243359	5.58	-14.94
2066/67	24592609	10817885	2.27	-59.32
2067/68	16188150	10558659	1.53	-32.60

Source: Annual reports of JEMC.

**Figure 4.5**  
**Inventory Turnover Position**



The above table shows the calculation of inventory turnover ratio of the JEMC for the last four fiscal years. In the fiscal year 2064/65 the turnover ratio is 6.56 times. In the fiscal year 2065/66 the turnover ratio is 5.58 times. It is decreased by 14.94% in comparison to the previous fiscal year. During the fiscal year 2066/67 the turnover ratio is 2.27 times. It is decreased by 59.32% in comparison to the fiscal year 2065/66. And the inventory turnover ratio is 1.53 times for the fiscal year 2067/68. It is also decreased by 32.60% in comparison to the fiscal year 2066/67.

From the above analysis it is found that the inventory turnover ratio is decreasing year to year. The highest turnover ratio is in the fiscal year 2064/65 and the lowest turnover ratio is in the fiscal year 2067/68.

Here it can be concluded that the inventory turnover ratio or sale stock ratio of JEMC is found at bad condition or unsatisfactory.

#### **4.8 Trend of Profit & loss and Production of JEMC**

The production and profit & loss of the JEMC is analyzed below:

**Table No. 4.6**  
**Profit & loss and production of JEMC**

Fiscal year	Profit & loss		Production	
	Rs.	Actual change %	Quantity	Actual change %
2064/65	(30179772)	-	18126861	-
2065/66	(83693800)	177.32%	18763149	3.51%
2066/67	(132731434)	58.59%	32189361	71.56%
2067/68	(50263504)	-62.13%	15806422	-50.90%

Source: Annual reports of JEMC.

The table above shows the profit & loss and production of Janak Education Material Center Limited for the last four fiscal years. Production of the JEMC is presented in quantity and profit & loss is in value. All fiscal years shows that the JEMC is in loss. In the fiscal year 2064/65, JEMC is in loss by Rs. 30179772. The production of this year is 18126861 units. During the fiscal year 2065/66 loss and production are increased by 177.82% and 3.51% respectively in comparison to the fiscal year 2064/65. In the fiscal year 2066/67, JEMC is in loss by Rs. 132731434. The production during the year was 32189361 units. In the comparison to previous year, loss and production of JEMC is increase by 58.59% and 71.56% respectively. In the fiscal year 2067/68, JEMC lost Rs. 50263504. The production during the year was 15806422 units. During this year the loss is decreased by 62.13% and production was also decreased by 50.90% in comparison to the fiscal year 2066/67.

As per the above table for the last four fiscal years, JEMC is in loss every year. It doesn't get profit. JEMC running in loss during these years due to the loose management system, overstaffing, corruption, political instability and strike also.

#### **4.9 Major Findings of the Study**

From the above analysis, following findings are extracted about the inventory management system of Janak Educational Material Center Limited.

- 1) Sales and production of JEMC are increasing from year to year, except fiscal year 2067/68.
- 2) Janak Education Material Center Limited is earning loss due to its over-staffing and corruption problem as well as political instability and strike problem of nation.
- 3) JEMC is investing huge amount in inventory. Stock of inventory is increasing due to its seasonal sales pattern.
- 4) There is not proper target and plan for material purchases and there is variation in the purchasing value and quantity of materials.
- 5) JEMC purchases its raw materials in the local market as well as foreign.
- 6) An inventory stock of finished goods is fluctuating from year to year. There is not proper co-ordination between sales and production or publication department.
- 7) The inventory turnover ratio of the JEMC is not satisfactory.
- 8) Inventory stock is valued at cost price.
- 9) JEMC is not following the Economic Order Quantity (EOQ) model in its buying decision.
- 10) JEMC has maintained the provision of stock, minimum and maximum stock in materials. It has better understanding that stock should not be too much high or too much low than the optimum level but in the reality they are not in practice.

- 11) JEMC has not sufficient working capital due to its excess inventory stocks.  
JEMC has to maintain a huge level of inventory of finished products for a period as long as ten months or more in a year.
- 12) It seems totally in loss.
- 13) The relationship between sales and closing stock value of educational materials of JEMC is significant.

## **CHAPTER – V**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Summary**

Education is the most important requirement for all in contemporary time. But it is not possible in the absence of textbooks and other educational materials. To fulfill the requirements of people and add bricks in the development of the nation, Janak Educational Materials Center (JEMC) Limited was established in 2035 B.S. under company act 2021. It is helping in the development of nation by the way of publishing school level textbooks and other educational materials. JEMC is responsible and dutiful to fulfill the objective of “Education for all” by means of efficient production, sales and distribution of textbooks and educational materials throughout the country. It is also a kind of industry, such industry on the one hand promotes the other industries like paper and pulp and on the other hand it employs local resources such as labour and material within the nation. Besides, such industry generates revenue to the government funds and finally makes the trade balance profitable.

There are various problems faced by JEMC but inventory management is the major problems which is practicing in the organization without proper inventory management techniques (EOQ model, ABC analysis, Stock level practice etc). This study is tried to examine the inventory management system of the JEMC. To analyze and present the prevailing condition of inventory management system of JEMC, suitable research methodology is applied in this study.

For analyzing the collected data percentage and ratio analysis statistical tools are applied. Especially, this study presents the production, sales and distribution, profit and stock position of JEMC Limited in the appropriate table and graph and analysis with the help of statistical tools to reach the findings

and conclusions. And finally, it is concluded that management of inventory is not satisfactory.

## **5.2. Conclusions**

As per objectives and analysis of the study, following conclusions have been drawn:

- ) Value of inventory stock is varying from year to year. It is increasing except the fiscal year 2064/065. Stock is growing up due to the non-selling of production.
- ) Sales and cost of education materials both are increasing every year except year 2066/067.
- ) JEMC purchase the raw materials from local market as well as foreign countries.
- ) The store department issues the raw materials to the publication depart from its stock. If there is shortage of raw material in store department, the storekeeper orders the material to the procurement division.
- ) The inventory turnover ratio is decreasing year to years, which shows that the JEMC running at bad condition or unsatisfactory.

## **5.3 Recommendations**

JEMC is one of the most important public priority enterprises. It has its own separate management system even in inventory management. But there is no realistic raw materials purchasing planning. This is because the increasing volume of production of each year. JEMC is also suffering from over stocking problem but it has no any realistic and comprehensive plan to improve in its inventory management system. Due to shortage of time and other limitations, the researcher could not be able to provide the overall position of the

organization, however, the following recommendation are listed for the further improvement.

- 1) The production of the JEMC is increasing from year to year except fiscal year 2067/68. This is due to the increased demand of public, not its modernized production system. JEMC must prepare proper production plan on the basis of realistic market studies. The JEMC is also advised to modernize its production paying proper attention to consumer group by demographical, geographical locality and income. It is also advised for arrangement of production time schedule.
- 2) JEMC is at loss in every year due to the corruption and over-staffing, so it must control of corruption and control in recruitment of employ.
- 3) The financial dimension of inventory management is ignored by JEMC. Therefore, it must follow the budgetary and financial analysis techniques in inventory management system.
- 4) There is not proper method of inventory management and controlling techniques applied by JEMC. So, it must apply the modern techniques in inventory management like ABC analysis, stock level fixing, material requirement planning, just-in-time etc. Similarly, optimum level of inventory also should be fixed, if so it helps to improve the profitability of the organization.
- 5) JEMC seems to be ignoring the Re-order Level system, so it bearing the problem at stock of inventory. It means JEMC has to apply the Re-order Level system to manage the inventory.
- 6) Every organization public enterprises should be allowed to function according to its own internal mechanism. The undue involvement and direct instructions from ministers and top leveled officers offset to achieve the organizational goals. These kinds of involvement should strictly be avoided.

- 7) Inventory information will be valuable to the decision makers. Therefore, JEMC should keep its inventory record up-to-date and unnecessary and old spare parts should be auctioned to save the inventory carrying costs.
- 8) JEMC must be control of capturing of political parties.
- 9) In Nepalese public enterprises, top management do not pay enough attention to planning and managing, their time is spent on doing routine works and less importance is given to financial matters such as management of working capital, preparations of financial plans, capital budgeting etc. From the study it is found that there is not proper and timely improvement in inventory management in JEMC. So the top management should pay due attention to the overall management, purchasing, production and financial aspects of inventory.

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## APPENDIX-I

### **Janak Education Material Center Limited: A Brief Profile**

Name	: Janak Education Material Center Limited, Sanothimi, Bhaktapur.
Year of Establishment	: 2035/06/08 B.S.
Organization Structure	: Centre office, 3 directorates, 9 departments, 5 regional offices, 1 monitoring office.
Authorized Capital	: Rs 500 million
Staff	: Permanent-616, Contractual-43, Labour-96, Folder-96.
Production Capacity	: Production of 13.2 million copies of text books annually.
Utilization of Capital	: 100%
Economic Position	: Self reliant.
Yearly Transaction	: Rs 550 million annually
Loss in F/Y 065/66	: Rs 132731434/33
Purpose	: Production, sales and distribution of school level education materials including text books throughout the kingdom.

### **Historical Background and Importance of JEMC**

After the successful democratic revolution in 2007 B.S., the skeletal format of what JEMC is today was established with the motive of publication of effective teacher's training materials. The press was operated as Bureau of publication under college of education since 2013 B.S. with integration of Bureau of publication with Educational Materials Center (Estd. 2018 B.S.) paying tribute to the historic national personality, king Janak of Mithila, the center was given the name Janak Education Materials Center and was inaugurated by the Late King Mahendra later on 2028 B.S., with inclusion of New Education Policy, the center was given the responsibility of publication

and distribution of all school level books and educational materials. In 2035 B.S., the center was registered as limited under Company Act 2021 B.S. and till date the center is continuously contributing effectively in publication and distribution of school level books throughout the country.

JEMC is a non profit oriented organization, the books published and the educational material produced are prices reasonably so that maximum numbers of students and other customers are benefited. JEMC have derived some objectives so that the center could be operated and expanded effectively. The future plan of the center is to convert it into the security press of the country and save time and money of the country going abroad in purpose of printing of confidential matters.

From the different ways JEMC is serving the students, teachers, and guardians and in turn the whole nation. It was established as a small printing press, now owns number of modern printing machines and is capable of publishing more than 170,00,000 books per year. Since the number of students depending of JEMC for textbooks is increasing every year, the center will have to increase its publication rate every year. The center is desperate to fulfill the objectives of “Education for all” by means of efficient distribution of textbooks and educational materials throughout the country.

### **Organization Structure and Management System of JEMC**

Business is the partnership of various personal, social and institutional entities. The success of business depends upon the satisfaction of the partners such as shareholders, employees, consumers, community and government. Each of the above partners have different expectation of one member of the business partners may differ from one another. Today the challenges before a head to organization are to overlap and balance the interest and expectation of various partners to the business and to ensure the productive utilization of various resources.

Every modern organization, whatever the manufacturing, trading or service rendering must have their organization structure and management

system. The structure of organization depends upon the nature of products, volume of production, number of man power engaged, and nature of technology applied either in the production process or trading and service rendering procedures. The prevailing law of the country also affects the organization structure and management system of business. JEMC has set up an organization structure under the provision of company Act 2021. the organization structure and the working procedures of JEMC are similar to that of other company established under the company Act 2021. The organization structure of Janak Educational Materials Center Limited.

### **Production System of Janak Education Material Center Limited**

The production system can be expressed as the mechanism of converting of raw materials into desired finished products through the mutual interaction of different components in any productive organization. The component of the production system can be made break down input, process and output. Inputs are the basic needs or resources of system. They are converted into desired output. The inputs or resources include raw materials, parts, supplies or finished products form another system, labors, capital, management, information, goals and environment. The process is the converting inputs into output. It consists of the machines, equipment, technology and processing steps. Nature of the transformation process differs depending upon the types of organization, organizational policy, nature of output, types of production size of production etc. when input enters into process the desired goods and services come as the output. Therefore output is the desired result of the system; it may be goods or services. Nature of outputs differs depending on the nature of organization. Generally they are produced to fulfill need and demand of customers. Thus, each and every manufacturing organization has its own type of production system. The production system of any industry depends upon the nature of products and technology applied.