UNIT 13 INTRODUCTION TO INVENTORY MANAGEMENT

Structure

13.0 OBJECTIVES

After completing this Unit, you will be able to:

- describe the concept and importance of inventory;
- discuss the need for inventories and the factors that affect inventories;
- explain inventory management;
- differentiate between centralized and decentralized purchase, inventory management and stores;
- discuss the concept and importance of purchase management;
- explain logistics management and demand system; and
- state the importance of procurement-vendor selection and negotiations.

13.1 INTRODUCTION

Inventory management is the art and science of planning, procuring, storing and providing the appropriate materials of right quality and right quantity, at the right place and at the right time.It is concerned with planning, organizing and controlling the flow of inventories/materials from their initial purchase through internal operations to the service point through distribution. This ensures maximization of the use of the firm's resources to provide the required level of customer service. Acquisition of raw materials or products includes more than just the purchase price from a supplier. It can also include transportation and freight costs and discounts. Manufacturing firms can include costs related to overhead and labor. Service organizations can include intangible inventories for work in process that has not yet been billed to the customer. From this Unit, we can understand how the inventory management encompasses various aspects essential for efficient operations. Inventory acquisition involves procuring necessary materials while accounting for costs like ordering, carrying, and storage. Purchase management highlights the scope, objectives, and importance of efficient procurement processes to optimize resources and reduce costs. Logistics management focuses on planning and managing material flow and demand to meet customer needs effectively, addressing different types of logistics and their objectives. Additionally, procurement involves selecting reliable vendors and negotiating terms to secure quality products and services at competitive rates.

13.2 INVENTORY: IMPORTANCE AND FUNCTIONS

13.2.1 Concept of Inventory

Inventory is needed for the definitive consumption/demand of materials and to manage the uncertainty involved in the usage or availability of the materials. The decoupling function of the inventory allows various dependent operational stages in any production/operation process can act independently of each other. The monetary value of inventories serves as a guide to indicate the size of investment required to achieve operational convenience. Inventories are physical stocks of items that a manufacturing or service organization holds in stock or for the efficient running of activities.Inventory can also be considered as an idle resource of any kind that holds economic value.

Definitions:

"Inventory is an idle stock of physical goods that holds economic value, and is held in various forms by an organization in its custody awaiting packing, processing, transformation, use or sale at a future point of time".

Any organization which is in the production, trading, sale and service of a product will necessarily hold stock of various physical resources to aid in future consumption and sale. While inventory is a necessary evil of any such business, it may be noted that the organizations hold inventories for various reasons, which include speculative purposes, functional purposes, physical necessities, etc.

"*In functional terms, inventory is defined as the sum of the value of raw materials, fuels, lubricants, spare parts, maintenance consumables; semi-processed materials and finished goods stock at any given point of time"*.

"*The operational definition of inventory would be the amount of raw materials, fuel and lubricants, spare parts and semi processed material to be stocked for the smooth running of the plant"*.

Inventories are maintained basically for operational smoothness by uncoupling successive stages of production.The monetary value of inventory serves as a guide to indicate the size of investments made to achieve operational convenience.

13.2.2 Reasons for Inventory

Let us understand the reasons for a firm maintains inventory that is often more than the quantity required for day-to-day operations.

Meet Demand: In order to stay in business, it must have the products that the customer wants available when the customer wants them. If the customer can get the goods from some other source, they would go to other sources. Hence, in many instances, if a good is not in inventory, a sale is lost forever.

Keep Operations Running: A manufacturer must have certain purchased items (raw materials, components, or subassemblies) in order to manufacture its product. Running out of even one item can prevent a manufacturer from completing the production of its finished goods. Inventory between successive dependent operations also serves to decouple the dependency of the operations. If a supply of work-in-process inventory is kept between each work center, then each machine can maintain its operations for a limited time, hopefully until operations resume the original center.

Lead Time: Lead time is the time that elapses between the placing of an order (either a purchase order or a production order issued to the shop or the factory floor) and actually receiving the goods ordered. If a supplier (an external firm or an internal department or plant) cannot supply the required goods on demand, then the client firm must keep an inventory of the needed goods. The longer the lead time, the larger the quantity of goods the firm must carry in inventory.

Hedge: Inventory can also be used as a hedge against price increases and inflation. Salesmen routinely call purchasing agents shortly before a price increase goes into effect. This gives the buyer a chance to purchase material, in excess of current needs, at a price that is lower than it would be if the buyer waited until after the price increase occurs.

Quantity Discount: Often, firms are given a price discount when purchasing large quantities of a good. This also frequently results in inventory in excess of what is currently needed to meet demand. However, if the discount is sufficient to offset the extra holding cost incurred as a result of the excess inventory, the decision to buy the large quantity is justified.

Smoothing Requirements: Sometimes, inventory is used to smooth demand requirements in a market where demand is somewhat erratic.

Check Your Progress 13.1

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1. What is Inventory?

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2. Indicate the different types of inventories.

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3. Give the reasons for maintaining inventories.

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13.2.3 Factors Influencing Inventory

There are various factors that influence inventory. These include:

a) Demand Related Factors:

- Size and frequency of orders;
- Uniformity or predictability of sales;
- Service requirements or allowed delays in filling orders;
- Physical and economic structure of the distribution network;
- Accuracy, frequency and detail of sales forecasts;
- Costs associated with failure to meet demand.

b) Process Related Factors:

- Form of production organization-Regular production, job shop, project;
- Number of process stages;
- Degree of specialization and differentiation at specific stages;
- Physically required process times, batch sizes and specific stages;
- Time required to respond to (lead time) changes in production plans;
- Production process capability and flexibility;
- Capacity of production and warehouse stages;
- Types of process-batch or continuous;
- Quality requirements, shelf life, obsolescence and risks.

c) Organizational Factors:

- Organization structure;
- Information system;
- Systems and procedures;
- Data processing capabilities-speed, volume and cost;
- Amount of capital available.

13.2.4 Functions of Inventory

The various functions of inventory are as follows:

- Maintaining a rate of flow through a process;
- Covers gaps in discontinuous process;
- Allowing purchase or production in economic lots;
- Allowing portions of a system or process to operate at different rates, at least temporarily;
- Meeting fluctuations in supply, process or consumption;
- Modifying and storing perishable commodities;
- Speculation against anticipated changes in costs or availability.

Check Your Progress 13.2

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1. What are the functions of inventory?

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2. Indicate the factors that influence the inventory system.

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13.3 INVENTORY MANAGEMENT

Inventory management is primarily about specifying the shape and percentage of stocked goods. In agricultural sector the inventory management is the need of the hour, as resources are limited and need to be utilized efficiently. It is required at different locations within a facility or within many locations of a supply network to support the regular and planned course of production and stock of materials. The scope of inventory management concerns the fine lines between replenishment lead time, carrying costs of inventory, inventory forecasting and related aspects. Balancing these competing requirements leads to optimal inventory levels, which is an ongoing process as the business needs shift and react to the wider environment.

There are Three Basic Reasons for Keeping an Inventory:

1. **Time :** The time lags present in the supply chain, from supplier to user at every stage, require that you maintain certain amounts of inventory to use in this "lead time." The **lead time** refers to the total time taken from the initiation of a process to its completion.
2. **Uncertainty :** Inventories are maintained as buffers to meet uncertainties in demand, supply and movements of goods.
3. **Economies of Scale :** Ideal condition of "one unit at a time at a place where a user needs it, when they need it" principle tends to incur high costs in terms of logistics. So, bulk buying, movement and storing brings in economies of scale, thus justifying inventory.

13.3.1 Inventory Acquisition

Acquisition of inventory usually involves a high volume of transactions and represents sizable expenditures for most businesses, whether retailers or manufacturers. For these businesses inventory is the most dynamic asset, and is usually a significant proportion of current assets. The cost of goods sold is typically the largest expense of these businesses. In agriculture, inventory acquisition involves procuring essential inputs like high-quality hybrid seeds from certified suppliers before the planting season. This ensures availability, accounts for lead time, and requires proper controls to verify quality, manage costs, and maintain records for optimal productivity. Given the significance of inventory and property, plant and equipment, internalcontrols over the acquisition of these assets are particularly important.

BOX 13.1: Internal Control Procedures for the Acquisition of Inventory Should Address the Following Points:

1. Are orders properly authorized?
2. Were all invoiced goods actually ordered by us?
3. Were all invoiced goods actually received (and of correct quantity and type and at the agreed price)?
4. Is payment made only if the above conditions are satisfactorily met?
5. Is the handling and storage of inventory secure?

There are five categories of procedures generally used to achieve control over acquisition of inventory:

1. Proper authorization
2. Segregation of duties
3. Documents and records
4. Access controls
5. Independent checks.

These procedures should be an integral part of the process for purchasing and paying for inventory and other goods and services. However, specific internal procedures are tailored to a business's needs. *For example*, a small business may not implement all of these procedures. Risk may be reduced for a small business if management is hands-on and directly involved in the day-to-day operations.

These procedures should be an integral part of the inventory purchasing function which involves the following six steps:

1. **Requisitioning Goods and Services:** A purchase requisition is an internal document requesting the purchasing department to buy goods or services. It usually originates from those departments directly involved with the control of inventory, *for example*, a retail department in a shop or the inventory warehouse.

2. **Preparation of Purchase Orders:** The purchasing department receives the purchase requisition from the operating department. A purchasing officer will raise a purchase order, which is the written offer sent to a supplier for the purchase of goods and/or services requested in the requisition. The purchasing officer has the authority to issue a purchase order only upon the receipt of a properly approved purchase requisition.

3. **Receiving of Goods:** There should be a central receiving section or department that is separate from the other functions (requisitioning, purchasing, storage and accounting). The goods receiving department receives one copy of the purchase order from the purchasing department. This order authorizes the receiving clerk to accept goods delivered by the supplier. The goods received should be compared with the description on the purchase order, the quantity should be checked and items inspected for damage.

4. **Storage of Goods:** The inventory warehouse receives goods together with a copy of the receiving report from the receiving department. Inventory should be stored in secure areas with restricted access. Employees responsible for custody of inventory should not be involved in the other purchasing functions. These procedures reduce the risk of unauthorized purchases, inefficient usage (wastage) and theft of goods.

5. **Verification and Approval for Payment:** The accounts payable department receives the supplier's invoice and matches it with the related copy of the purchase order and receiving report received from the other departments. The accounts payable clerk checks that the details on the supplier's invoice agree exactly with the purchase order and receiving report. This is a crucial procedure, as this check should confirm that:

   - Goods invoiced were in fact ordered by the business
   - Goods invoiced were actually received by the business.

The accounts payable clerk checks the supplier's invoice for mathematical accuracy. If all is in order, the supporting documents (purchase order, receiving report and supplier invoice) are attached to a pre-numbered payment voucher. This voucher is coded with the account or accounts to be debited (usually assets and expenses).

6. **Recording the Liability:** The accounting department receives the purchases journal or voucher register from accounts payable and uses this for posting the specified accounts in the general ledger. An accountant should check the appropriateness of account classifications prior to posting.

13.3.2 Inventory Acquisition Costs

Inventory acquisition costs refer to those costs that are necessary to bring the inventory to a condition that is ready for sale. A manufacturing firm incurs the freight and shipping costs that the merchandising firm also deals with, as well as the other costs referred to above. However, the inventory cost reported by the manufacturing firm includes the cost of converting the raw materials to finished goods. The cost of goods sold for a manufacturing firm includes all the costs of a merchandising firm, plus the conversion costs of goods sold during the period. The manufacturing firm indicates the extent to which its inventory costs are progressing through three inventory accounts: raw materials, work-in-process and finished goods.

There are Four Basic Issues Concerning Inventory are:

1. The costs included in the acquisition cost
2. The valuation basis used for items in inventory
3. The frequency with which inventory computations occur, perpetual or periodic.
4. The cost flow assumption used to trace the movement of costs into and out of inventory, which doesn't necessarily represent physical flow of inventory.

Inventory Costs:

- Costs associated with ordering too much (represented by carrying costs);
- Costs associated with ordering too little (represented by ordering costs);
- These costs are opposing costs, i.e., as one increases the other decreases.

This cost behaviour is the basis for answering the first fundamental question: How much to order? It is known as the Economic Order Quantity (EOQ).

Balancing Ordering cost and Inventory carrying cost is shown in Fig.13.1

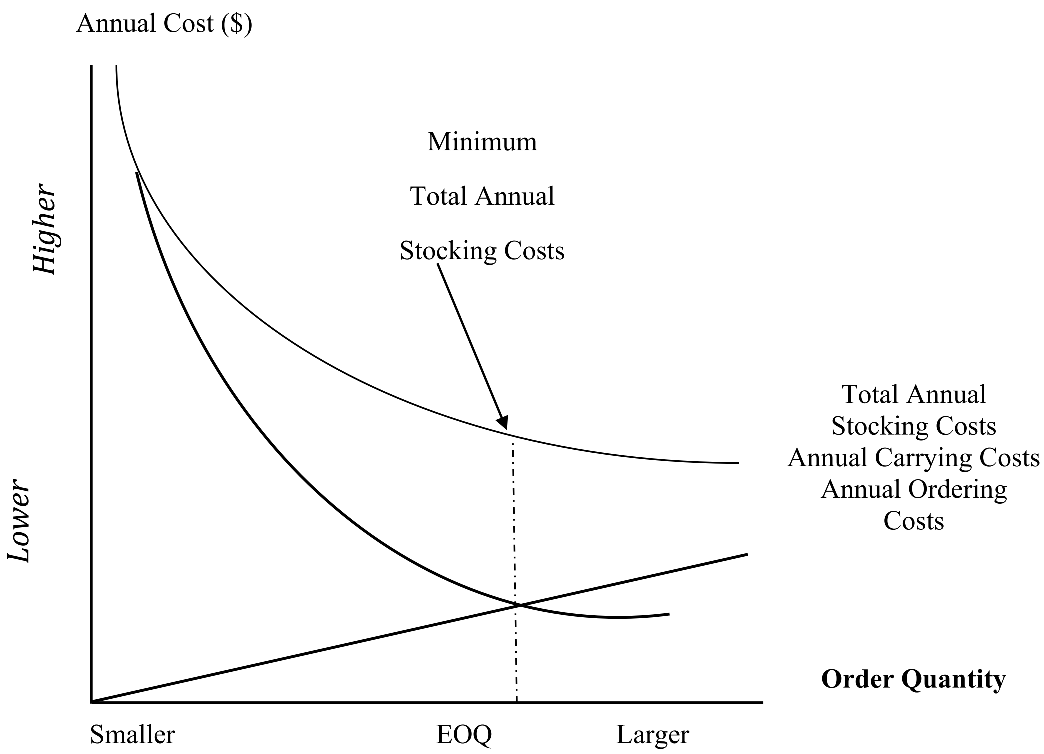

Fig.13.1: Balancing Carrying and Ordering Costs

Fixed Order Quantity Systems Consists:

- Behaviour of Economic Order Quantity (EOQ) Systems
- Determining Order Quantities
- Determining Order Points

Behaviour of EOQ Systems: As demand for the inventoried item occurs, the inventory level drops.When the inventory level reaches a critical point (the order point), the ordering process is triggered. The amount ordered each time an order is placed is fixed or constant.

Economic Order Quantity (EOQ): Annual Demand (D), Carrying Cost (C) and Ordering Cost (S) can be estimated by,

Average Inventory Level = Fixed Order Quantity (Q) / 2.

Annual Carrying Cost = (average inventory level) × (carrying cost) = (Q/2)C

Annual Ordering Cost = (average number of orders per year) × (ordering cost) = (D/Q)S

Total Annual Stocking Cost (TSC) = Annual Carrying Cost + Annual Ordering Cost = (Q/2)C + (D/Q)S

The order quantity where the TSC is at a minimum (EOQ) can be found using calculus (take the first derivative, set it equal to zero and solve for Q)

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

Economic Order Periodic System: As demand for the inventoried item occurs, the inventory level drops. When a prescribed period of time (EOP) has elapsed, the ordering process is triggered, i.e., the time between orders is fixed or constant. At that time, the order quantity is determined using the formula:

Order Quantity = Upper Inventory Target − inventory level + EDDLT (Expected Demand During Lead Time).

After the lead time elapses, the ordered quantity is received, and the inventory level increases. The upper inventory level may be determined by the amount of space allocated to an item. This system is used where it is desirable to physically count inventory each time an order is placed.

Optional Replenishment Model: This model is similar to the Fixed Order Period model, except that if the inventory has not dropped below a prescribed level when the order period has elapsed, no order is placed.This approach avoids placing very small orders. It is especially attractive when review and ordering costs are high.

Base Stock Model: Start with a certain inventory level and whenever a withdrawal is made, an order of equal size is placed which ensures that inventory maintained at an approximately constant level and appropriate for very expensive items with small ordering costs.

Single Period Inventory Model: The order quantity decision covers only one period. This model is appropriate for perishable items, e.g., fashion goods, certain foods, magazines. Payoff tables may be used to analyze the decision under uncertainty.

Dynamics of Inventory Planning includes:

- Continual review of ordering practices and decisions;
- Modifications to fit the firm's demand and supply patterns;
- Constraints, such as storage capacity and available funds, can impact inventory planning;
- Production planning and control systems are changing to support lean inventory strategies;
- Computers and information technology are extensively used in inventory planning.

Cost of Inventory: However, inventory values should also include any incidental costs incurred to bring inventory to the sales location and into a saleable condition including:

- Freight-in, storage and insurance costs
- Costs to prepare, condition and assemble inventory for sale.

Many firms rely on both the materiality and the cost-benefit concepts to argue that the incidental inventory acquisition costs of freight, storage, insurance, etc. are not material and that the cost of appropriately assigning these costs to items of inventory outweigh any benefits received. As a result, many firms justify recording inventory costs using invoice prices only.

Methods Used to Determine which Cost to Expense Include:

- Specific Identification
- Weighted Average
- Last in First Out (LIFO)
- First in First Out (FIFO)

Specific Identification expenses as Cost of Goods Sold the actual costs incurred to purchase the exact inventory item sold.

This may be impractical when inventory includes a large number of items that are difficult to match to the actual cost paid without considerable effort.

If identifying the specific cost paid for an item of inventory is excessive, these methods may be used:

- LIFO – Last in First Out
- FIFO – First in First Out
- Weighted Average

LIFO method expenses the most recent inventory costs first

FIFO method expenses the oldest inventory costs first

Weighted average method expenses the average of all inventory costs incurred for the category.

Check Your Progress 13.3

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1. Fill the following blanks:

   a) In centralization, reservation of decision-making power is at ....

   b) Centralized purchasing will cause ....

   c) Three reasons for keeping inventory are ...., ... and ....

   d) Purchase order is a step of ....

   e) Economic Ordering Quantity (EOQ) balances .... and .... costs.

2. Mark the following statements as True or False:

   a) In decentralization system delegation of authority is to the lowest levels. ( )

   b) In centralized stores, cost of internal transport is high. ( )

   c) Inventory acquisition steps involve verification but not approval for payment. ( )

   d) Acquisition cost of inventory include freight and shipping costs. ( )

   e) When to place a purchase order is not a part of inventory acquisition. ( )

13.4 CENTRALIZATION VS DECENTRALIZATION

Centralization refers to the process in which decision-making power is concentrated in a few hands, typically at the top levels of management. In a centralized organization, all important decisions and actions at lower levels require approval from top management. According to Allen, “Centralization is the systematic and consistent reservation of authority at central points in the organization.”

Key Implications of Centralization:

1. Decision-making power is reserved at the top level
2. Operating authority is retained by middle-level managers
3. Operational actions are carried out at the lower level, under the direction of top management.

Under centralization, the important and key decisions are taken by the top management and the other levels are involved in implementations as per the directions of top-level management.

On the other hand, decentralization is a systematic delegation of authority at all levels of management and throughout the organization. In a decentralization concern, authority is retained by the top management for taking major decisions and framing policies concerning the whole concern. The rest of the authority may be delegated to the middle level and lower level of management.The degree of centralization and decentralization depends upon the amount of authority delegated to the lowest level.

13.4.1 Centralized vs Decentralized Purchasing

Whether purchasing should be centralized or decentralized, is a question to be decided with reference to a particular situation prevailing in an organization. If, in the case of a concern, the function of buying direct materials, indirect materials and capital nature, is entrusted to a single person or at a single place like head office, buying is said to be ‘centralized’. However, if this function is performed by the other managers of the same or different managerial hierarchy besides the purchase manager, and if a factory has a number of divisions or branches, and in each division, there is a purchase manager, the purchasing function is said to be ‘decentralized’.

Advantages of Centralized Purchasing:

1. Employing skilled professionals ensures efficient material purchasing.
2. Bulk buying enables favourable terms, such as trade discounts and transport savings.
3. Records are centrally maintained, streamlining management and access.
4. Vendors benefit from dealing with a single purchase officer, reducing complexity.
5. Centralized control minimizes reckless buying.

Disadvantages of Centralized Purchasing:

1. Miscommunication between branches and the purchasing department can lead to incorrect orders.
2. Delays may occur as branches relay requirements to the purchasing department for processing.
3. Branches miss out on localized purchasing benefits.
4. Establishing a central purchasing department involves high initial costs.

Decentralized Management of Inventory Purchases:

There are various advantages and disadvantages of inventory purchases such as:

Advantages of Decentralized Purchasing

Local inventory control ensures awareness of local factors, special promotions, and customer plans. It also fosters a sense of ownership and control among local managers.

Disadvantages of Decentralized Purchasing

Local managers may lack inventory management skills, overreact to transient events, and favor highly visible inventory, ignoring stock in transit or central warehouses.

13.4.2 Centralized vs Decentralized Stores

In business, about 80-90% of capital may be invested on the materials. So, severe losses may have to be suffered by the industries, unless the stores are efficiently managed. The main objectives that must be fulfilled while managing the stores efficiently are mentioned below:

1. Smoothly receiving and issuing materials;
2. To maintain stocks at desired levels; and
3. To protect stock from pilferage, theft, evaporation, deterioration, sublimation, etc.

Depending on the type of industry, size of the business, location and policy of the management, stores may be of three types:

a) Centralized stores *i.e.*, materials are supplied to all departments by one store.

b) Decentralized stores *i.e.*, for each department there is a separate store.

c) Centralized stores with sub-stores, *i.e.*, there is one central store which holds the stocks in general stock, with separate sub-stores for each department which get supplies from the central stores.

From the receiving department, the materials are received by the stores and then materials are supplied to the production and service departments. So near the receiving department should be the location of the store and at the same time, it should also be near the departments which requires supply from it. For the location and layout of stores the factors to be considered are: (i) highest efficiency, (ii) lowest cost of internal transport and (iii) easy accessibility to all departments which require materials.

Merits and Demerits of Centralized Store

Merits:

1. Better control.
2. High technical skill and better supervision,
3. Less storage space is needed because stocks should be kept as low as possible.
4. Replenishment is quicker.
5. As record maintenance of the same material is not required in different departments, less clerical work, stationery and other costs are involved.
6. Better facility for store audits.
7. Stock taking is easier.
8. Insurance cost is lower.

Demerits:

1. Cost of internal transport is higher.
2. In the flow of materials to production, possibility of bottle-neck is there.
3. Risk of obsolescence is greater.
4. Any disturbance affects all production departments.

Merits &Demerits of Decentralized Store

Merits:

1. Cost of internal transport are avoided.
2. Production is not affected by disturbance in the central store.
3. Delays in receiving materials can be avoided.
4. The chance of obsolescence is lower.

Demerits:

1. Organizational and space costs increase due to separate stores for each department.
2. Departmental heads, in addition to their regular duties, must maintain the store.
3. The availability of technical skill is lower.

Centralized Store with Sub-Stores

In this case, a central store is located near the receiving department and each department has a sub-store with it. Materials are received by the sub-store from the central store using the imprest system and issues to the department are made accordingly.

When the central store is located far from work sites, this system becomes essential. It helps avoid bottlenecks in the supply of materials for production. However, this system is more expensive than a purely centralized store.

13.5 PURCHASE MANAGEMENT

The process of 'purchasing'– which is the acquisition of a desired object or commodity in exchange for something else accepted as being of equal value is certainly not a "modernphenomenon".A widely accepted definition of the modern purchasing function for organizations and which is often referred to as 'organizational purchasing' is as follows:

"The function responsible for procuring (obtaining) by purchase, lease or other legally acceptable means, those products - materials, supplies, services and equipment which are required by an organization for use in 'production' to ensure its smooth functioning and its continuous and uninterrupted operations, and to achieve the purposes for which it was established."

The ability of any particular product to satisfy wants is called its 'utility'. Utility expresses the relationship between a possible purchaser and a product.

If a product has utility, then we understand that the purchaser needs that product in order to satisfy a want or a need.

Purchasing management directs the flow of goods and services in a company and handles all data relating to contact with suppliers. Effective purchasing management requires knowledge of the supply chain, business and tax laws, invoice and inventory procedures, and transportation and logistics issues. Sourcing reliable suppliers is a crucial part of purchasing management. Purchasing professionals meet with potential suppliers in their plants whenever possible.

13.5.1 Scope and Objectives of Purchasing Function

The fundamental objective is "To purchase the right quality of materials, at the right times,in the right quantities, from the right sources, at the right prices."

We can consider the scope and objectives of the "modern" purchasing function as set out in the following sections.

- **Continuity of Supply**

  The purchasing function must ensure that there is "continuity of supply"; interruptions in the smooth "inwards" flow of materials can result in loss of production, in loss of sales, in loss of customers – and in loss of profits.Forecasting the probable future purchasing requirements of the organization is also very important.

- **Economy**

  It is incumbent on the purchasing function to buy efficiently and wisely, and to obtain by ethical means the "best value" for all monies which are spent on procurements on behalf of the organization. However, quality and reliability must not be sacrificed in the quest to cut costs; a "balance" between quality/reliability and cost must be maintained.

- **Stock and Inventory Control**

  The purchasing function whether it is under the control of the stores/ inventory function, or whether it controls the stores/inventory function - must act to ensure, as far as is practicable, that the quantity of each required material "held in stock" at any one time is neither too low nor too high.

  Too low stock or inventory of an item can result in 'shortages' or even worse to 'stock-outs' leading to interruptions in and loss of production, to loss of sales, to loss of customers - and to loss of profits. On the other hand, excess (too high) stock or inventory of items results in money being tied up unnecessarily; when that money might be required to purchase other needed goods and/ or materials, or for other purposes. Excess stock/inventory can also lead to problems, especially as storage of materials, particularly as "storage space" - in storehouses and/or stock yards - is generally limited.

- **Cooperation and Coordination**

  An organization's purchasing function cannot operate in isolation; its purpose is to provide an efficient service to other sections/departments of the organization. In order to be able to provide that service, the purchasing function must receive information from other sections/departments based on their needs. It clearly follows that those who are responsible for the purchasing function must maintain regular and cooperative relationships with the executives and staff of other sections/departments of the organization, to assist in the effective coordination of the efforts of the organization as a whole towards achieving its goals.

- **Structure**

  To achieve its objectives, a suitable structure for the purchasing function needs to be developed. It must be staffed with trained and efficient personnel, and suitable policies and procedures must be established. Depending on the size and activities of an organization, its purchasing function might be an independent section or department. In some organizations the purchasing function might be part of the production department. In some organizations the purchasing department might encompass the stores/inventory control function, or alternatively it might be a section within the stores/inventory department.

13.5.2 Importance of Purchase Management

The importance of purchase management is that it is a fundamental function in an industrial establishment:

1. **Core Function in Industrial Enterprises**: Facilitates the conversion of raw materials into finished products by ensuring the timely and adequate supply of materials.
2. **Major Cost Component**: Materials account for over 50% of total costs, and efficient purchasing can significantly impact profitability, with a 1% saving equating to a 10% increase in turnover.
3. **Optimization of Working Capital**: Purchasing ties up a significant portion of earnings and working capital in inventories, making efficient procurement crucial for financial stability.
4. **Reliance on Specialized Suppliers**: Advanced manufacturing depends on automatic machines and outsourced components, increasing interdependence among manufacturers.
5. **Support for Import Substitution**: By exploring alternatives to imports, purchasing helps save foreign exchange and foster innovation, leveraging executives' broad industry knowledge.
6. **Critical to Project Success**: Mismanagement in purchasing can lead to costly delays and interruptions in industrial projects, causing significant economic and social repercussions.

13.5.3 Purchase Process

Purchasing is the formal process of buying goods and services. The purchasing process can vary from one organization to another, but there are some common key elements.

The process usually starts with a demand or requirement - this could be for a physical part (inventory) or a service. A requisition is generated, which details the requirements (in some cases providing a requirements specification) and prompts the procurement department to take action. A request for proposal (RFP) or request for quotation (RFQ) is then raised. Suppliers send their quotations in response to the RFQ, and a review is undertaken where the best offer (typically based on price, availability and quality) is given the purchase order.

Purchase orders (PO) can be of various types, including:

- Standard - a one-time buy;
- Planned - an agreement on a specific item at an approximate date; and
- Blanket - an agreement on specific terms and conditions; date, quantity and amount are not specified.

Purchase orders are normally accompanied by terms and conditions which form the contractual agreement of the transaction. The supplier then delivers the products or service and the customer records the delivery (in some cases, this includes a goods inspection process). An invoice is sent by the supplier which is cross-checked with the purchase order and documents specifying which goods have been received. The payment is then made and transferred to the supplier.

Eight-Step Purchase Process:

The purchasing process for companies breaks down into eight clear steps are as follows;

1. Identify Need;
2. Select Specific Product;
3. Appoint Purchase Team;
4. Specify Technical Specifications
5. Budget for Purchase;
6. Research Potential Suppliers
7. Solicit Bids; and
8. Execute/Award Contract.

Check Your Progress 13.4

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1. Fill the following blanks :

   a) Purchase management professionals must be good ....

   b) Purchase must ensure .... of supply

   c) RFQ means ...., ..., ...

2. Mark the following statements as True or False:
   a) Sourcing suppliers is crucial part of purchase management. ( )
   b) Purchasing is not concerned with import substitution. ( )
   c) Lead Time for procurement is important in purchase. ( )

Activity 13.2:

Visit a nearby manufacturing plant and discuss the objectives with the operations manager. Try to relate their goals and practices to the concepts discussed above. Make a brief note on your understanding.

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13.6 LOGISTICS MANAGEMENT AND DEMAND SYSTEM

Logistics is the management of the flow of resources between the point of origin and the point of consumption in order to meet certain requirements, *for example*, of customers or corporations.Logistics involves the integration ofinformation, *transportation*, inventory, *warehousing*, *material handling* and *packaging*, and often *security*. It is a part of the *supply chain* which adds the value of time and place utility.

13.6.1 Definition and Objectives of Logistics

"Logistics/Supply Chain is a collection of functional activities (transportation, inventory control, etc.) which are repeated many times throughout the channel through which raw materials are converted into finished products and moved to consumer".

"Supply Chain Management (SCM) is the management of an inter-connected or interlinked network of businesses, channels and nodes involved in the provision of product and service packages required by the end customers in a supply chain. SCM spans the movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption."

The objectives of logistics can be divided into performance-related and cost-related categories. These objectives include high due-date reliability, short delivery times, low inventory level and high-capacity utilization. However, when decisions need to be made, there is always a trade-off between these targets. This is what makes being a logistician both challenging and interesting.

13.6.2 Types of Logistics

Based on the services performed by logistics, one can distinguish the main fields as follows:

- Procurement Logistics
- Production Logistics
- Distribution Logistics
- Disposal Logistics

1. Procurement Logistics consists of activities such as market research, requirements planning, make or buy decisions, supplier management, ordering, and order controlling. The targets in procurement logistics might be contradictory to maximize the efficiency by concentrating on core competences, outsourcing while maintaining the autonomy of the company, and minimization of procurement costs while maximizing the security within the supply process.
2. Production Logistics connects procurement to distribution logistics. The main function of production logistics is to use the available production capacities to produce the products needed in distribution logistics. Production logistics activities are related to organizational structure, layout planning, production planning and control.
3. Distribution Logistics has, as main tasks, the delivery of the finished products to the customer. It consists of order processing, warehousing, and transportation. Distribution logistics is necessary because the time, place and quantity of production differs from the time, place and quantity of consumption.
4. Disposal Logistics' main function is to reduce logistics costs, enhance services and conserve natural resources. Supply Chain Management (SCM) approaches are being extensively used in planning logistics to meet the customer's requirements in terms of time, cost and quality.

13.6.3 Logistic Management and Demand

Logistics is the part of the supply chain process that plans, implements and controls the efficient, effective flow and storage of raw materials, in-process inventory, finished goods, services and related information from point of origin to point of consumption (including inbound, outbound, internal and external movements) for the purpose of conforming to customer requirements. (Coyle *et. al*.)

Demand Management

Companies must match the supply of their products with the demand for their products. On average, a company may succeed and deliver the right amount at the right time to the right place, but frequently something goes wrong: wrong quantity, wrong time, wrong place. The economic consequences for a company may range from lost customers to bankruptcy. The root cause is often that demand varies, but supply does not. Logistics and supply chain management helps companies to overcome this challenge by finding ways to best match their supply with demand.

Demand management is the supply chain management process that balances the customers' requirements with the capabilities of the supply chain. With the right process in place, management can proactively match supply with demand proactively and execute the plan with minimal disruptions. The process is not limited to forecasting. It includes synchronizing supply and demand, increasing flexibility, and reducing variability.

Characteristics of Demand Management

- Smooths production after master production schedules have already been released to internal production and external suppliers.
- Functions as a process (versus a bounded business function) that requires the utmost in coordination and communication between the responsible parties.
- Includes contingency plans developed with supply chain members to allow modification of short-term schedules when necessary.
- Balances total costs of not meeting demand against the total costs of adding additional resources required to meet demand.
- Failure to accurately estimate demand and share information among supply chain entities can result in bloated inventory levels due to the cumulative effect of poor information cascading up through the supply chain.

The SCM Triangle covering supply management, demand management, logistics management provides the foundation for effective SCM.

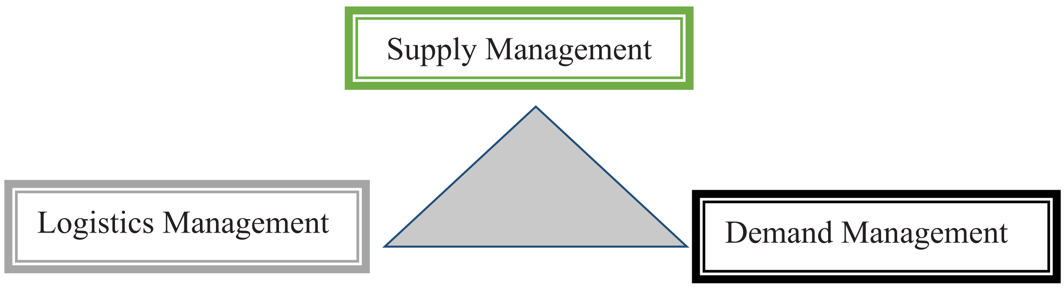

Fig. 13.2: Supply Chain Management Triangle

Demand management typically fits within either supply management or SCM organizationally.

Supply professionals manage the relationships in the supply chain; therefore, they are in a critical position to facilitate the high levels of communication and trust that are required in Strategic Demand Management.

13.7 PROCUREMENT-VENDOR SELECTION AND NEGOTIATIONS

Procurement involves the strategic process of acquiring goods and services, where vendor selection and negotiations play a critical role. Identifying the right vendor and negotiating effectively ensures value for money, quality, and long-term partnership benefits.

13.7.1 Vendor Selection

- One of the most important processes performed in organizations today is the evaluation, selection and continuous measurement of suppliers.
- Selecting a vendor is now as important a process as developing new products.

Importance of Supplier Selection Includes:

- Supplier selection is a multi-criteria problem, which includes both qualitative and quantitative factors.
- Purchasing commands a significant position in most organizations since purchased parts, components, and supplies typically represent 40 to 60 percent of the sales of their end products.
- Thus relatively small cost reductions gained in the acquisition of materials can have a greater impact on profits.
- Suppliers have a large and direct impact on the cost, quality, technology and time-to-market of new products.
- An organization's ability to produce a quality product at a reasonable cost and in a timely manner is heavily influenced by its suppliers'capabilities.
- Supplier selection is one of the key issues of SCM because the cost of raw materials and component parts constitutes the main cost of a product management.
- A sound supplier selection decision today canreduce or prevent a host of problems tomorrow.

Steps in Supplier Selection Process:

– Evaluating Needs and Defining Objectives;

– Gathering a Limited Pool of Vendors;

– Interviewing Vendors; and

– Selecting and Applying the Method;

The Supplier Should Have:

- Sound business sense and attitude;
- A good track record in supplying the market in which the buyer operates (or similar);
- A sound financial base;
- A suitable technical capability with modern facilities;
- A total quality orientation;
- Cost-effective management;
- Effective purchasing, acquisition and control;
- Good morale among the workforce;
- Effective logistical arrangements; and
- A customer service mentality.

Vendor Rating

The vendors also like to be given priority by the purchaser if they constantly improves its selling performance, which from a purchaser's point of view is mainly its offered price, quality and punctuality in delivery.

For the purchaser, there shall always be a need to continuously monitor and update their registered vendor base so that the organization continues to have the most competent and competitive vendors in its list of vendors. For this purpose, the efforts are made to monitor supply performance of the vendors and rate them objectively.

The major factors usually considered for such vendor rating are the competitiveness of vendor are price, quality of supply and delivery adherence.

Vendor rating may also be used for removing a vendor from registered vendor list and also in the selection of vendors.

13.7.2 Negotiations

Negotiation is a dialogue between two or more people or parties, intended to reach a common understanding, resolve points of difference, or gain advantage. It is a problem-solving process in which two or more people voluntarily discuss their differences and attempt to reach a joint decision on their common concerns. Negotiation requires participants to identify issues about which they differ, educate each other about their needs and interests, generate possible settlement options and bargain over the terms of the final agreement. Successful negotiations generally result in some kind of exchange or promise being made by the negotiators to each other. The exchange may be tangible (such as money, a commitment of time or a particular behaviour) or intangible (such as an agreement to change an attitude or expectation, or to make an apology).

Negotiations in Procurement/Purchase Function:

Negotiation in the purchasing process covers the period from when the first communication is made between the purchaser and the supplier through to the final signing of the contract. Negotiation can be as simple as trying to obtain a discount on a case of safety gloves, or as complex as major capital purchases. A purchasing professional must aim to be successful in their negotiations with suppliers to obtain the best price with the best conditions for every item that is purchased.

The negotiation process has become a more important sector in the supply chain process as companies look to reduce their expenditure whilst increasing their purchasing power. This means that purchasing professionals have to negotiate increasingly better rates with suppliers whilst maintaining or increasing quality and service. This offers companies the ability to negotiate significantly lower prices for items that they were purchasing from a number of separate vendors.

Negotiation Objectives

Purchasing staff must enter negotiations with clear, flexible objectives to avoid conceding on price, quality, or service. Negotiators should stay focused on their objectives and avoid discussing areas where objectives are undefined, such as quality, unless they are prepared. Negotiation is a vital skill for purchasing professionals and proper training enhances their effectiveness.

Vendors as Partners

Negotiation now emphasizes building partnerships with fewer vendors to secure the best price, quality, and service rather than focusing solely on the lowest price. Long-term contracts foster collaborative relationships, encouraging vendors to improve quality and service for continued business, benefiting both parties.

Check Your Progress 13.5

Note: a) Use the spaces given and fill your answers.

b) Check your answers with those given at the end of the unit.

1. Fill in the blanks:

   a) Logistics is the management of the flow of goods between the ______ and the _______ in order to meet the requirements.

   b) The main targets of logistics can be divided into______ and _____ related.

   c) Supply Chain Management approaches are used in logistics to meet the customers’ requirement of _______ and _______

   d) Negotiation is a _______ between two or more parties.

   e) Objective of negotiation is to provide _______

2. Mark the following statements as True or False:

   a) Production logistics connect procurement to distribution logistics. ( )

   b) In demand management companies pay attention only to supply. ( )

   c) Evaluation criteria are fundamental to the choice of a supplier. ( )

   d) Negotiation is not concerned with problem solving. ( )

   e) Vendors today are considered as partners in business. ( )

Activity13.3 :

Visit a nearby manufacturing plant and discuss with operations manager about their objectives. Try to assimilate the concepts discussed above. Make a brief note on your understanding.

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13.8 LET US SUM UP

Inventory management is concerned with planning, organizing and controlling the flow of materials from their initial purchase through internal operations to the service point through distribution.Inventory acquisition deals with a wide range of activities covering procurement, inventory control, costs, purchase, logistics and demand management. It is a critical function that ensures the efficient flow of materials through planning, procurement, storage, and distribution. It encompasses inventory acquisition, cost-management and balancing ordering and carrying costs. Centralized and decentralized systems have their unique advantages and challenges in managing purchasing and inventory. Effective logistics management, purchase processes, and vendor selection contribute to achieving organizational goals while optimizing resources and costs.

13.9 KEY WORDS

Perpetual	:	Continues, everlasting, unending.
Transaction	:	Deal, business, contract.
Expenditure	:	Spending, expenses, cost.
Inventory	:	List, record, stock.
Centralization	:	A process where the concentration of decision-making is in a few hands.
Decentralization	:	Devolution, delegation, transference.
Acquisition	:	Gaining, achievement, attainment.
Segregation	:	Separation, isolation.
Depreciation	:	Reduction, decrease, decline.
Fixtures	:	Fittings, equipment.
Logistic	:	The detailed organization of large and complex operations.
Procurement	:	The act of obtaining or acquiring goods and services.

13.10 SUGGESTED FURTHER READINGS/ REFERENCES

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13.11 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 13.1

1. Inventories are physical stocks of items that a manufacturing or service organization holds in stock for the efficient running of activities.

   Inventory is an idle stock of physical goods that contain economic value and are held in various forms by an organization in its custody awaiting packing, processing, transformation, use or sale at a future point of time.

2. Meeting demand, keeping operations running, lead time, hedging, quantity discounts and smoothing requirements.

Check Your Progress 13.2

1. Functions of inventory:

   Maintaining a rate of flow through a process, covering gaps in discontinuous process, allowing purchase or production in economic lotsallowing parts of a system or process to operate at different rates, at least temporarily meeting fluctuations in supply, process, or consumption,modifying and storing perishable commodities and speculating against anticipated changes in costs or availability.

2. Factors affecting inventory cover demand-related factors, process-related factors and organizational factors.

Check Your Progress 13.3

Q1	a	b	c	d	e
	top level	delay	time, uncertainty, economies of scale cost of internal failure	inventory acquisition	ordering, inventory carrying
Q2	a	b	c	d	e
	F	T	F	T	F

Check Your Progress 13.4

Q1	a	b	c
	good negotiators	continuity	request, for quotation
Q2	a	b	c
	T	F	T

Check Your Progress 13.5

Q1	a	b	c	d	e
	point of origin, point of use	Performance, cost	time, cost	dialogue	clarity
Q2	a	b	c	d	e
	T	F	T	F	T