Chapter 5: Inventory Management

Defining Inventory

- Defined as stock and materials held by a firm which are used to facilitate production
- Raw Materials are stored while awaiting utilisation/consumption in process of making finished products
- Work-in-progress items are stored while waiting to be worked on during the next sequential task
- Parts/Equipment are stored in readiness for utilisation in maintenance/repair/operations tasks
- Finished Items that are kept in stock in order to satisfy customers' demands when they arise

Types of Inventory

1. *Cycle Stock*
   Portion of inventory that is carried specifically for the purpose of satisfying regular orders

2. *Safety Stock*
   Refers to portion of inventory items held as a buffer to enable the organisation to cushion the effects of uncertainties in demand or supply chain

3. *Anticipation Stock*
   Carries because of likelihood of occurrence of a future event which justifies stocking quantities of the item above

4. *Seasonal Stock*
   Items that are carried in store simply because of the levels of demand peculiar to particular periods of the year can be categorised as seasonal stock. Tied to period rather than event.

5. *Promotional Stock*
   Stock carried so that high levels of demand due to a promotion campaign can be satisfied. Encourage customers

6. *Dead Stock*

Organisation keeps this stock but cannot utilise as was intended. Keeping stock for too long

7. *Non-conformance stock*
   Categories of inventory items is similar to the dead stock category . no longer usable by the organisation

Purpose of holding stock

- Creating a cushion for uncertainties: some form of insurance
- 3 major kinds of uncertainties

1: Uncertainty in demand this implies that information related to whether customer is indeterminate
2: Uncertainty in supply will they deliver quality?
3: Uncertainty in yield this indicates exactly how much needs to be produced for infinite stock of materials unknown

Holding Bath Stock
This stock occurs because firms usually cannot buy/produce products in the quantity needed due to physical or financial restrictions

Providing for seasonal stock or anticipation stock
Make ample provision for expected increases in demand

Providing for strategic stock
Support firm's quest to achieve objectives

Enabling smooth production process
Work in progress cost kept on floor and supports uninterrupted production process

Compliance with legal/contract requirements
Carrying stock such as parts/components kept for a number of years for a warranty

Overcoming supply disappointments
Deliveries not happening when expected = labour strikes or transportation issues
If order items in stock = overcome late delivery

Compensating for a shutdown in production
Shutdown could be unplanned where no production takes place. Becomes very imperative to carry inventory

Inventory holding costs

Keeping inventory inevitably incurs costs.
Warehouse needs to be looked after and have administration

Capital Costs

Capital costs include the funds spent to purchase inventory as they could be invested in something else.
Use return on investment to determine capital costs

Cost of obsolescence

This component is very much product related
Products with shorter life cycle have a higher risk of obsolescence

Handling of storage costs

This component generally includes the mortgage on or rent of a warehouse/salaries for warehouse.
These costs arise after when keeping a certain amount of inventory

Demand and inventory

The central aim of carrying inventory is to enable the organisation to satisfy demand when it arises.
Demand can be considered the quantity of an item that customers will request at a given price.

1. Independent demand and dependent demand

Independent demand items are usually finished goods whose demand levels are directly linked to existing customer requirements.
Inventory items can also be dependent in nature. This implies that the level of demand for the item dependent on the level of demand of another item.
Forecasting used to estimate demand levels
Recorder level = safety stock + demand during lead time.

Forecasting

Forecasts are frequently employed in supply management.
Forecasts are used to determine the future demand levels of independent demand items and referred as estimate of the level of future demand of an item.
Using qualitive or quantitative techniques

Quantitative forecasts: utilise numerical data and mathematical techniques for predicting future demand levels.

Qualitative Forecasting

Common formal techniques utilised for forecasting using different methods.

1. Panel Consensus Method
    - First phase: large number of participants develop demand forecasts
    - Second phase: involves screening forecasts
    - Third phase: entails use of panels to critically analyse forecasts dependent of one another
    - Fourth phase: knowledgeable supply chain practitioners evaluate the outputs of the panels and further reduce the forecasts of most reasonable options.
    - Fifth phase: involves decision phase and selection of best forecast by top management team.

2. The Delphi Technique
    - An interactive forecasting process involving a panel of experts
    - Estimated forecasts and demands used by the firm

3. Quantitative Forecasting
    - Often utilise simple averages, weighted averages, moving averages
    - Simple Average: entails the sum of the forecast + actual demand figures from the previous month (A1+f1/2)
    - Year to date average: entails sum of actual demand figures from previous months and determination of their mean (a1+at-1+At-2…./n)
    - Moving Average: entails the sum of the actual demand figures from only a predetermined number of previous months and determination of their mean (a1+at-1+at-2…./n)
    - Weighted Average: entails the application of weight to be forecasted (xA6+yF7)

VALUE OF INVENTORY ITEMS

STEP 1: Determine the quantities of inventory items utilised in a period usually annually
STEP 2: Calculate the expenditure on each item by multiplying the quantity usage by the items unit cost (regarded as item value)
STEP 3: Rearrange the inventory items being analysed in descending order using the item values from step 2
STEP 4: Undertake the ABC categorisation of items

ECONOMIC ORDER QUANTITY

ORDERING COSTS= cost of placing order X number of orders
HOLDING COSTS = value of items to be held X holding percentage
VALUE OF ITEMS HELD = average inventory X price of item

FORMULA – DIFFERENT FROM TEXTBOOK!!!!!

$$EOQ = \sqrt{\frac{2 \times annual\ demand \times OC}{HC}}$$