Material management

The 5 M's of production are Men, Machines, Money , **Materials** and Methods
Material mgt. is the planning, directing, controlling and coordinating those activities which are concern with **materials** and **inventory management**.
Material Management ensures that the

- required material are brought in the required quantities,
- at the required time,
- of the required quality and
- at an acceptable price.

Advantage of MM are maximum co-ordination & Optimum expenditure on material.

Functions/aims of Material Management

1. Planning and control of material
2. Purchasing of material
3. Stock keeping (Inventory) of material
4. Distribution of material to various department
5. Allocation of material
6. Disposal of material

Inventory: Inventory is a **detailed list of all kinds of items(goods)** which are necessary to manufacture a product and to maintain the equipment and machinery in good working condition.
Inventory mgt. is a process of maintaining the optimum stock of each inventory item at minimum cost.

Inventory management takes care of

- Quantity of stock to be stored.
- When to order material?
- How much to order?
- What to order?

Inventory Control:
The aim of a sound inventory control system is to secure the best balance between ' **too much and too little**'

- ✓ Too much inventory (stock) - carries financial risks
- ✓ Too little inventory increases the risk of 'out of stock' condition which may hamper production activity. It may result in loss of order.

Classification of Inventories

1. **Raw material -** raw material on which operation will be performed to convert it into the desired(final) product.
   e.g steel, wood, rubber, tubes, plates etc.

2. **Semi-finished Material inventory:** It is also called as 'Work-In-process inventory'. The material which is processed partially and waiting for next process.
   eg. Half or partly parts which are required to assemble the final product

3. **Finished inventories-** they are the finished goods lying in stock rooms and are ready for dispatch to market.
   eg. Finished product like mobile phones, a.c, tv etc.

4. **Indirect inventories -** they include lubricants and other items (fro ex. Spare parts) need for proper operations.

Objective of Inventory Control

1. Procurement of inventory of right quantity and right quality.
2. Procurement of material at an economical rate.
3. Establishing safe, suitable storage location

Advantages of proper and efficient Inventory control

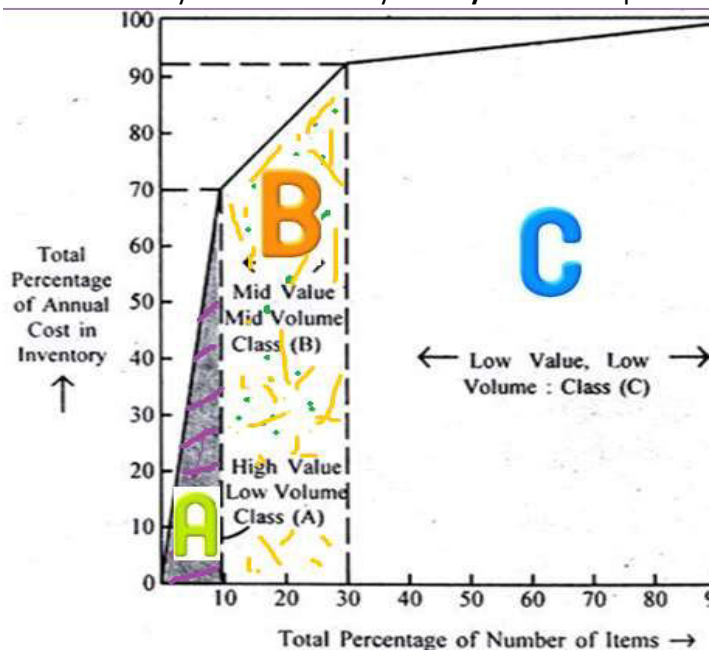
1. Supply of good quality material at right time
2. Reducing cost of production
3. No shortage and no excess of inventory.
4. Efficient utilization of storage space.

ABC analysis **(A**lways **B**etter **C**ontrol**)**

ABC analysis is one of imp. Technique which is based on **grading** the items according to the **importance of material.** In inventory control, this technique helps to analyze the distribution of any characteristic by **money value** of importance in order to determine its importance.

All the items of organization divided into **3 categories** on the basis of the money value of importance of material.

1. High value cost material – A (Less Consumption)
2. Medium value materials- B (Medium Consumption)
3. Low value materials- C (High Consumption)



Category	% of total number of items	% of total consumption cost
A	less than 10%	70 to 80 %
B	10 to 20%	15 to 25 %
C	70 to 80%	less than 10%

Economic Order Quantity (EOQ)

The Economic Order Quantity is the order quantity that minimizes total holding and ordering costs for the year.
Or
The EOQ is the amount of inventory ordered at one time for the purposes of minimizes annual inventory cost.
Or
The size of order that minimize the total inventory cost is called EOQ.

EOQ objectives is to

- ✓ Minimize the ordering cost
- ✓ Minimize carrying (holding) cost
- ✓ Minimize total cost of production.

Formula for EOQ is

$$EOQ = \sqrt{\frac{2 \times \text{Annual Consumption} \times \text{Ordering Cost}}{\text{Storage(holding)cost per unit}}}$$

Ordering cost = cost of placing single order
Holding cost = cost of hold one unit inventory in a year.

Ex: Calculate the EOQ if annual demand of the product is 5000 unit. The ordering cost is Rs.30 per unit and holding cost is Rs.6 per unit per annual.
Sol: Annual Consumption = 5000 unit, Ordering cost=Rs.30 , Holding cost per unit=Rs.6 , **Ans: 224 units**

Purchasing (Purchase Management):can be defined as procurement of raw material, machinery, parts, goods needed for production and maintenance department**.**

Steps in purchasing

1. **Requisition or Order** (receiving purchase requirement by any department in need of material and send recognition letter to the inventory team.)
2. **Selection of supplier** (Tender/quotation from different vendors are invited and after comparing, finalized the best one by considering different parameters like cost, quality, reputation of vendor)
3. **Issue Purchase order** to vendor/Supplier: In PO the details about product specification, quality and date mentioned.
4. **Follow up with suppler** for updating the status of your order.
5. **Receiving Goods**: Once good received physically verified against the details provided in the PO.
6. **Inspection and testing**: overall dimensions, specification, material are tested.
7. **Storage and record keeping** (entering the goods by adding barcode and placed in warehouse)
8. **Payment** issued to supplier by cash or check.

Material Resource Planning (MRP)

MRP is a computer based **production planning** and **inventory control system.**

- *It provides the information about when to order and how much to order*
- **Inputs of MRP**
  - **Master Production Schedule**
  - **Bill of material**
  - **Inventory Records**

Output of MRP – when to Buy. How much to buy, purchase orders and reports**.**

ERP (Enterprise Resource Planning)

ERP is an integrated information system that serves all departments.

ERP is a theoretical Concept. It is computerized software or application available SAP, Oracle, JD Edward, PeopleSoft, TallyERP.

SAP ER product popular for material management.

Advantages of ERP:

1. Complete visibility into all process in the organization
2. Improves information access and mgt. throughout the enterprise.
3. ERP reduces paper cost and greater accuracy of information
4. Same software can be used in whole organization
5. Centralized data storage.

Unit No 5 Material management

The 5 M's of production are Men, Machines, Money , Materials and Methods Material mgt. is the planning, directing, controlling and coordinating those activities which are concern with materials and inventory management.
Material Management ensures that the
• Required material are brought in the required quantities,
• At the required time,
• Of the required quality and
• At an acceptable price.

Definition: A process encompassing acquisition, shipping, receiving, evaluation, warehousing and distribution of goods, supplies and equipment Each step is vital

Advantage of MM are maximum co-ordination & Optimum expenditure on material.

Functions/aims of Material Management

1. Planning and control of material
2. Purchasing of material
3. Stock keeping (Inventory) of material
4. Distribution of material to various department
5. Allocation of material
6. Disposal of material

5.1 Inventory Management

Inventory:
Inventory is a detailed list of all kinds of items (goods) which are necessary to manufacture a product and to maintain the equipment and machinery in good working condition.
Inventory mgt. is a process of maintaining the optimum stock of each inventory item at minimum cost.
• Stocks to ensure uninterrupted supplies
• The idle resources which have future economic value
• Cushion between estimated and actual demand of materials

A scientific system which indicates:
1. What to order
2. When to order
3. How much to order
4. How much to stock

Inventory Control:

The aim of a sound inventory control system is to secure the best balance between ' too much and too little'
✓ Too much inventory (stock) – carries financial risks

✓Too little inventory increases the risk of 'out of stock' condition which may hamper production activity. It may result in loss of order.

Classification of Inventories

Direct Inventories

The inventories which play a direct role in the manufacturing of a product and become an integral part of the finished product are called direct inventories

1. Raw material – raw material on which operation will be performed to convert it into the desired (final) product. e.g. steel, wood, rubber, tubes, plates etc.

2. Semi-finished Material inventory: It is also called as 'Work-In-process inventory'. The material which is processed partially and waiting for next process. eg. Half or partly parts which are required to assemble the final product

3. Finished inventories- they are the finished goods lying in stock rooms and are ready for dispatch to market. eg. Finished product like mobile phones, a.c, tv etc.

Indirect inventories

Comprise of stock items that are necessary for the manufacturing of goods but are not a direct component of such goods. They are ancillary goods, which mean we cannot assign them to specific units of the final goods. ... For example, petrol or lubricants used in production are **indirect inventories**.

Indirect materials are **materials** that are used in the production process but that are not directly traceable to the product. For **example**, glue, oil, tape, cleaning supplies, etc. are classified as **indirect materials**.

They include lubricants and other items (fro ex. Spare parts) need for proper operations.

Functions of Inventory management

1. **Improved Productivity and Efficiency:**
   Inventory management software enables us to increase productivity and efficiency by implementing automated daily manual tasks. This will assist you to maximize the growth of your business.
   The software saves uncountable hours and gives the opportunity to print shipping labels, process and dispatch orders, manage stock, create and update the listing on the system.
2. **Avoid Stock-outs and Over-stock:**
   When it comes to maintaining the balance sheet of inventories and its management, it is a difficult and challenging task to handle. Case of less stock leads to stock-out which not only disrupt customer relation but cause a possible loss whereas in case of over-stock its storage creates a problem.
   With inventory management software installed, you can set a limit for re-ordering so that stock when drops it gets automatically re-ordered.
3. **Quality Management:**
   The software has the ability to identify and track issues that can cause delayed shipment or broken packages. Through the already feed data provides guidance to quality management.

4. **Easy Inventory Management:**
   The software makes the process of inventory management a lot easier which saves money and time both. It assists to automate the business processes and guides to make smarter decisions.
5. **Improved Profitability:**
   The software helps to reach the maximum amount for business investment. It uses marketing and production to increase profits. With the software's ability to automatically operate the business in terms of management of inventory possibility of fulfilling tasks efficiently and accurately, increases.
   It can be in any terms from managing stocks to updating lists on all channels. Then the processing orders will turn to reduce expenses and maximize profitability.
6. **Planned Management:**
   You can identify the possibilities of opening multiple stock storehouses located near the customers' location. This will increase efficiency and improve service levels.
7. **Balanced Supply and Demand:**
   When it comes to delivery, time is the focus point. Delivery should be given at the exact time that also with the least pay amount and excess of features.
8. **Inventory Reports:**
   The software is meant to generate automated reports. You can get any report such as a low stock report, inventory validation report, inventory forecast report.
9. **Inventory Tracking:**
   Inventory tracking is the most beneficial function and feature of inventory management software. The software keeps the track of unlimited serial numbers from when the inventory is received until the time it is issued.

Objective of Inventory Control

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Advantages of proper and efficient Inventory control

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5.2ABC analysis (Always Better Control)

ABC Analysis also referred to as ABC Classification**,** is an integral part of material management. It is an inventory categorization method, which classifies the inventory primarily into three distinct categories based on the revenue generation. ABC inventory helps business entrepreneurs and stock owners identify the essential products in the stock and prioritize their management based on the value. The inventory analysis is based on the Pareto Principle.

The Pareto Principle is a popular economic theory, discovered by renowned Italian economist Vilfredo Pareto. Pareto believed that optimum economic growth occurs only due to a small part of the economy. It means that the relation between the input and output is always unequal.

Pareto Principle states that 80% of the sales volume gets generated from the top 20% of the items. It says that in any group, there are significant few and insignificant many. It is also known as the 80/20 rule.

ABC analysis is one of imp. Technique which is based on **grading** the items according to the **importance of material.** In inventory control, this technique helps to analyze the distribution of any characteristic by **money value** of importance in order to determine its importance.

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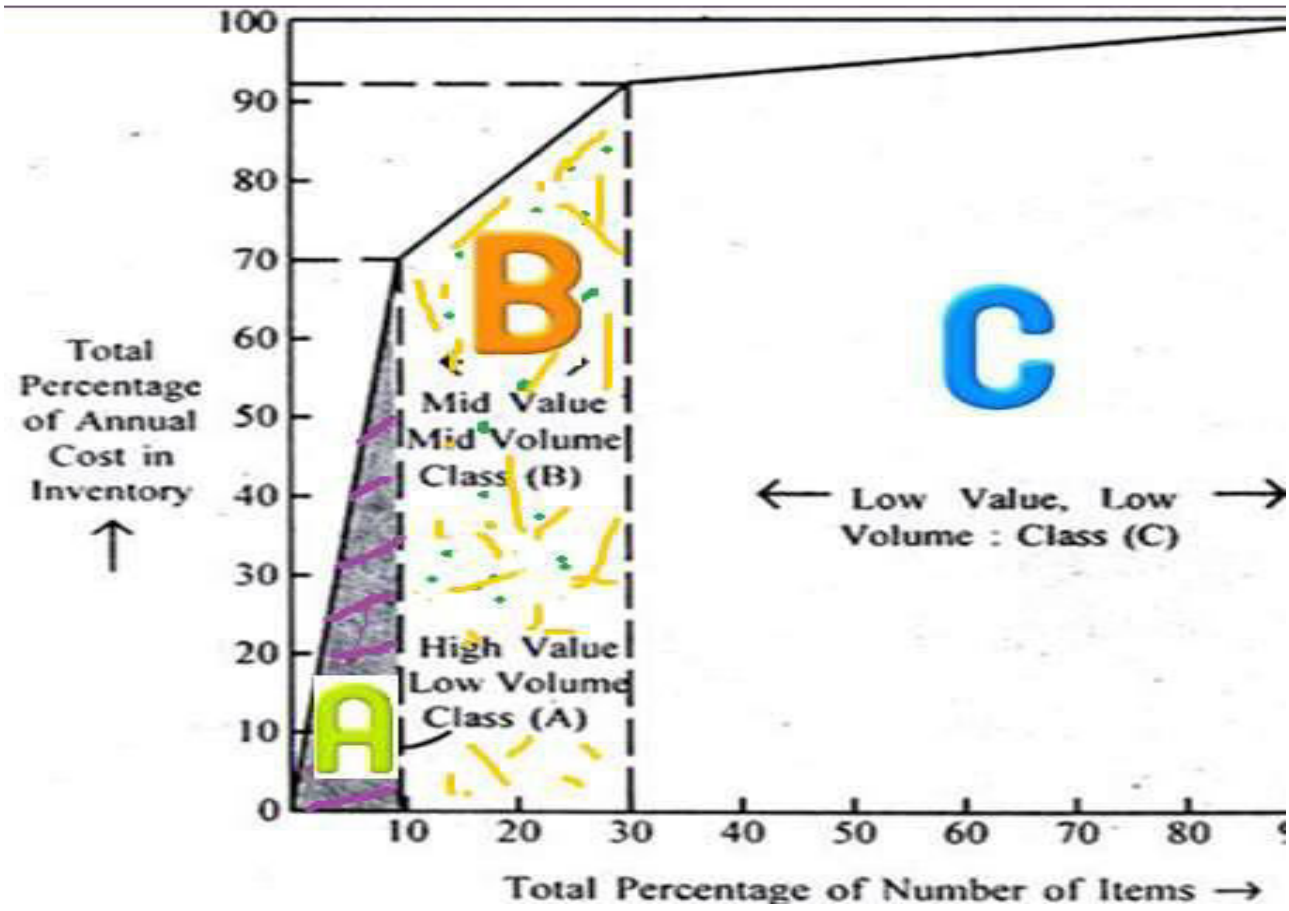


Major Applications of ABC Analysis The Manufacturing SectorABC Inventory Analysis helps manufacturers to improve the inventory replenishment schedule. It allows managers to categorize stock items based on the total annual cost. Also, ABC Analysis becomes mandatory if the organization plans to integrate the Kabana to manage the workflows.

Supply Chain and Warehouse

The supply chain and warehouses use ABC Inventory Classification mainly for the stock count cycles. For instance, items placed in category A have to be counted quarterly. B class items need a bi-annual counting. On the other hand, C category products get the most liberty. They are calculated on an annual basis, once in a year.

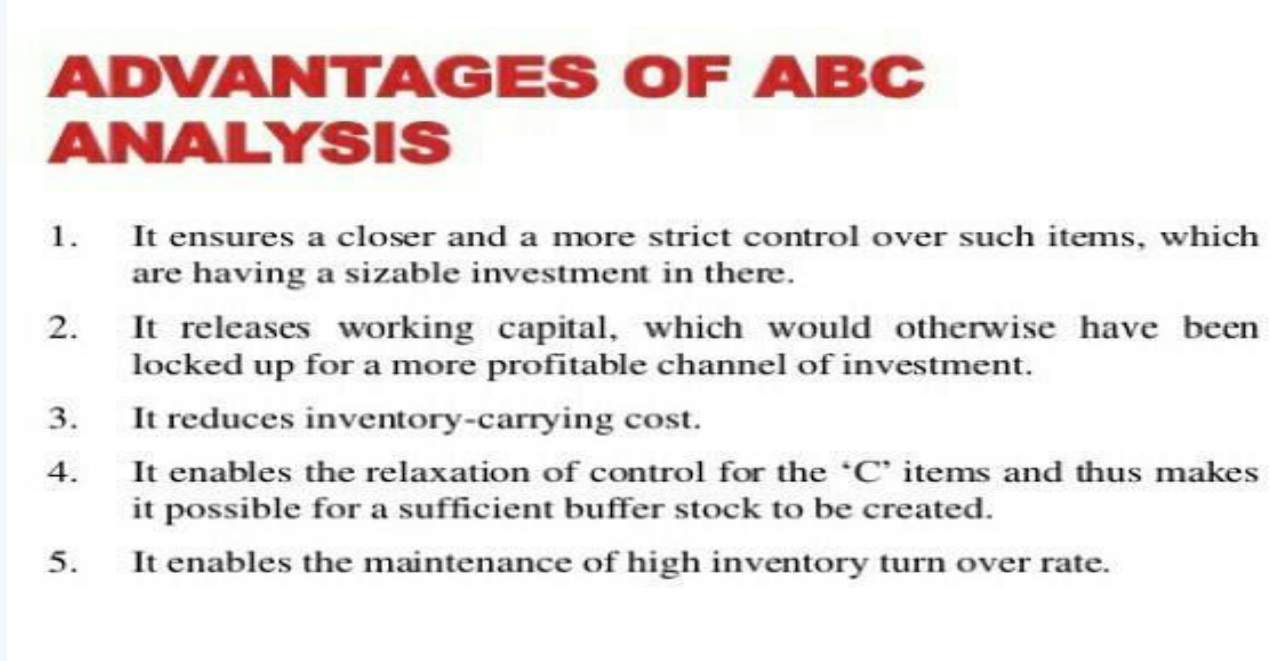
Retail and E-commerce

The retail and the e-commerce industry usually choose ABC Management for customer segmentation. It helps retailers and e-commerce owners to pinpoint their most valuable customers. ABC Analysis is performed using key metrics such as sales revenue, buying

potential, and contribution margin. The retailers can create a chart based on the metrics and then rank their customers in A, B, and C categories accordingly.

Logistics Industry

The logistics industry is also reaping the benefits of ABC Analysis. Here ABC management plays a pivotal role in controlling the inventory. The products are classified according to their importance based on different criteria such as sales ratio, profit margin, and cost of transportation, etc.



5.3Economic Order Quantity (EOQ)

The Economic Order Quantity is the order quantity that minimizes total holding and ordering costs for the year.

Or

The EOQ is the amount of inventory ordered at one time for the purposes of minimizes annual inventory cost.

Or

The size of order that minimize the total inventory cost is called EOQ.

Economic order quantity (EOQ) is the ideal order quantity a company should purchase to minimize inventory costs such as holding costs, shortage costs, and order costs. This production-scheduling model was developed in 1913 by Ford W. Harris and has been refined over time.

EOQ objectives is to

✓Minimize the ordering cost

✓Minimize carrying (holding) cost

✓Minimize total cost of production.

$$EOQ = \sqrt{\frac{2 \times \text{Annual Consumption} \times \text{Ordering Cost}}{\text{Storage(holding)cost per unit}}}$$

Ordering cost = cost of placing single order
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Ex: Calculate the EOQ if annual demand of the product is 5000 unit. The ordering cost is Rs.30 per unit and holding cost is Rs.6 per unit per annual.
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Example of Economic Order Quantity (EOQ)

EOQ considers the timing of reordering, the cost incurred to place an order, and the costs to store merchandise. If a company is constantly placing small orders to maintain a specific inventory level, the ordering costs are higher, along with the need for additional storage space.

For example, consider a retail clothing shop that carries a line of men's shirts. The shop sells 1,000 shirts each year. It costs the company $5 per year to hold a single shirt in inventory, and the fixed cost to place an order is $2.

Disadvantages of Using Economic Order Quantity (EOQ)

The basis for the EOQ formula assumes that consumer demand is constant. The calculation also assumes that both ordering and holding costs remain constant. These assumptions make it difficult, if not impossible; to account for unpredictable business events, such as changing consumer demand, seasonal changes in inventory costs, lost sales revenue due to inventory shortages, or purchase discounts a company might get for buying inventory in larger quantities.

Buffer Stocks

Buffer stock is an additionally stored volume of goods which is kept to meet any sudden future demand or supply fluctuations. It is a backup stock, which retains some kind of buffer to protect in case of uncertain future. Buffer stock is kept as an extra backup to prepare for any uncertain business situations.

Buffer stock is also known as strategic stock or safety stock or buffer inventory. It is an important

Importance of Buffer Stock

Buffer stock may be found at all stages of the supply chain, and is intended to reduce the occurrence or severity of stock-out situations and thus provide better line continuity and/ or customer service. Buffer stock is used in production or other inventory situations to ensure that exceptional or unpredictable shortages or demands can be met with some degree of certainty. Safety stock is generally held when there is uncertainty in the demand level or lead time for the product. The amount of buffer stock a business chooses to maintain regularly can dramatically affect their operations. Too much stock can result in high inventory carrying costs. Too less stock can cause repeated occurrences of stock-outs. Hence, businesses need to maintain a fine balance and decide on the amount of buffer inventory to be held.

Definition of Buffer Stock Scheme

A buffer stock scheme is a government plan to stabilise prices in volatile markets. This requires intervention in buying and selling.

Prices for agricultural products are often volatile because:

- Supply can vary due to the weather.
- Demand is inelastic
- Supply is fixed in the short term
- Buffer stock schemes aim to:
- Stabilize prices
- Ensure the supply of food
- Prevent farmers/producers going out of business because of a drop in prices.

Advantages of buffer stocks

1. Stable prices help maintain farmers incomes. A rapid drop in prices can make farmers go out of business, which leads to structural unemployment.
2. Price stability encourages more investment in agriculture.
3. Farming can have positive externalities e.g. helps rural communities. A drop in price could cause a negative multiplier effect within rural areas.
4. Target prices help prevent excess prices for consumers and help reduce food inflation. This might be important for households living in poverty, who may struggle to pay high prices during years of shortage.

5. It helps to maintain food supplies and avoid shortages.
6. It is possible the government could make a profit from a buffer stock scheme. If it buys during a glut and sells during a shortage, it can make a profit.

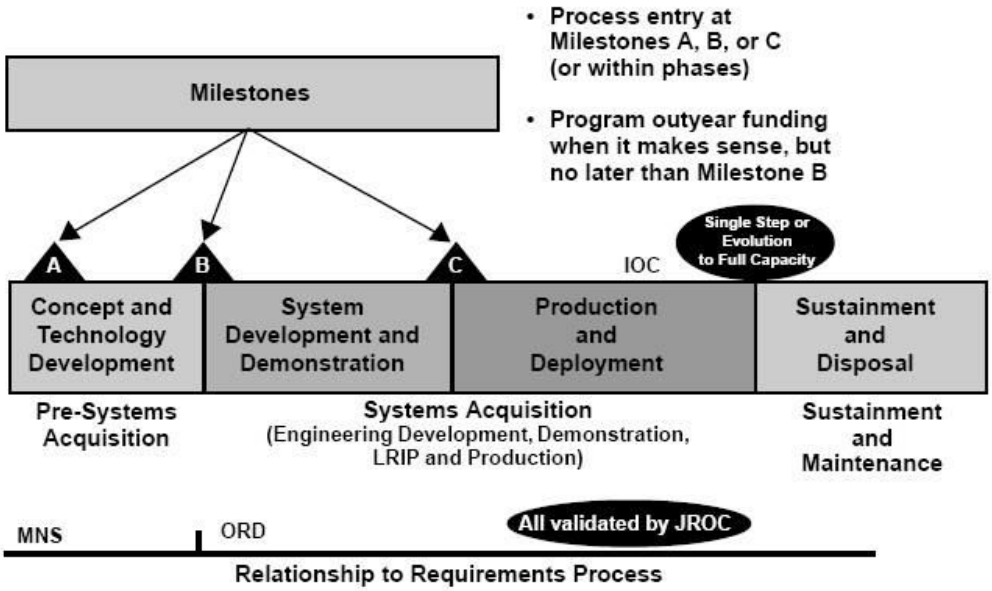
Disadvantages of Buffer Stock

1. In case of shorter shelf life, the products can get damaged and be rendered useless.

2. Additional overhead costs in purchasing and storing this stock.

5.4 Purchasing (Purchase Management):

can be defined as procurement of raw material, machinery, parts, goods needed for production and maintenance department**.**



The process allows for a given system to enter the process at any of the development phases. For example, a system using unproven technology would enter at the beginning stages of the process and would proceed through a lengthy period of technology maturation, while a system based on mature and proven technologies might enter directly into engineering development or, conceivably, even production. The process itself includes four phases of development:[1]

- Concept and Technology Development: is intended to explore alternative concepts based on assessments of operational needs, technology readiness, risk, and affordability.
- Concept and Technology Development phase begins with concept exploration. During this stage, concept studies are undertaken to define alternative concepts and to provide information about capability and risk that would permit an objective comparison of competing concepts.
- System Development and Demonstration phase. This phase could be entered directly as a result of a technological opportunity and urgent user need, as well as having come through concept and technology development.
- The last, and longest, phase is the Sustainment and Disposal phase of the program. During this phase all necessary activities are accomplished to maintain and sustain the system in the field in the most cost-effective manner possible.

Importance of Purchasing

The purchasing process is of importance because it is used to identify user requirements, effectively and efficiently and evaluate the need ,identify suppliers, ensure the payment occur promptly and drive continuous improvement. Buying of inventory is usually driven by the purchasing department

The key objectives of purchasing department are:

1. Support operational requirements - It includes the basic requirements like buy products at right price, from the right source, at right quantity and quality.

2. Supply base management- One of the most important objectives of purchasing function is the selection development maintenance of supply, a process commonly known as Supply base management.

3. Develop strong Relationship with other functional groups

4. Support organization goals and objectives that comply with purchasing management

Responsibilities of Purchasing Department

Some of the key responsibilities & duties are:

1. Evaluate and select suppliers: The most important duty of purchasing is to evaluate and right suppliers. It is important to avoid "maverick buying and selling -a situation that occurs when sellers contact and attempt to sell directly to end users

2. Review specifications: The right to question allows purchasing to review specifications where required. The right to question material specifications also helps avoid developing material specifications that only a users favorite supplier can satisfy.

3. Act as the primary contact with suppliers: Purchasing must act as the primary contact with suppliers, but that other function should be able to interact directly with suppliers as needed. involving multiple people enables the communication process between internal customers, purchasing, sale and suppliers internal functions to be more efficient and accurate

Steps in purchasing

1. **Requisition or Order** (receiving purchase requirement by any department in need of material and send recognition letter to the inventory team.)
2. Selection of supplier (Tender/quotation from different vendors are invited and after comparing, finalized the best one by considering different parameters like cost, quality, reputation of vendor)
3. Issue Purchase order to vendor/Supplier: In PO the details about product specification, quality and date mentioned.
4. Follow up with suppler for updating the status of your order.
5. Receiving Goods: Once good received physically verified against the details provided in the PO.
6. Inspection and testing: overall dimensions, specification, material are tested.
7. Storage and record keeping (entering the goods by adding barcode and placed inwarehouse)
8. Payment issued to supplier by cash or check.

5.5 Smart Manufacturing:

Brief introduction
The smart manufacturing the latest new generation manufacturing machine used in different industries for manufacturing purposes. Smart manufacturing is implement in different industrial sectors for the increased output of the industry. With the help of smart manufacturing, different tasks of the industry are done automatically. The automation of a factory as per the new technologies can be also termed as the smart manufacturing technique. Computers are mostly use in smart manufacturing procedures to control the automatic operations of a factory or a unit of a factory. Smart manufacturing is also refer to as computer-integrated manufacturing which results in rapid design change, high-level adaptability, flexible workforce training, and digital information technology.
By implementing smart manufacturing in the industrial sector several benefits can be accomplish such as supply chain optimization, fast changes for the demanded production level, efficient recyclability and efficient production.
According to the smart manufacturing industry, a smart industry should have a multi-scale simulation, multi-scale dynamic modeling, interoperable system, good cyber security, networked sensors, and intelligent automation. An industry comprising of all the above-mentioned parameters can be consider as a smart industry possessing smart manufacturing capability.

Industry 4.0

In this next phase of the industrial revolution, measurement technology plays a crucial role for quality-conscious organizations on the road to Industry 4.0. With the fusion of production technology and the Internet of Things (IoT), measurement technology requires strong

connectivity and the capability to capture quality data faster, better and more flexibly and transfer it to networked devices and systems. It is truly the framework for increasing process efficiency and realizing bottom-line benefits in the smart factory. And, it not only pertains to on-line measurements but also includes the integration of at-line and off-line gauging technologies.

Connectivity, Communication and Control

To be Industry 4.0 ready means that production technology must be interoperable with other systems that speak the same industry protocols over a common Ethernet infrastructure. Smart factories require the utilization of advance-prediction tools, so that data can be systematically processed into information that allows operators to make the right decisions. Smart gauges or sensors provide industry-standard connectivity via common communication protocols, and built-in web server support provides mobile connectivity for smart diagnostics and smart service.

Material Resource Planning (MRP)

MRP is a computer based **production planning** and **inventory control system.**

- *It provides the information about when to order and how much to order*
- **Inputs of MRP**
- **Master Production Schedule**
- **Bill of material**
- **Inventory Records**

Output of MRP – when to Buy. How much to buy, purchase orders and reports.

Materials Requirement Planning (MRP) is a technique for determining the quantity and timing for the acquisition of dependent demand items needed to satisfy master production schedule requirements."

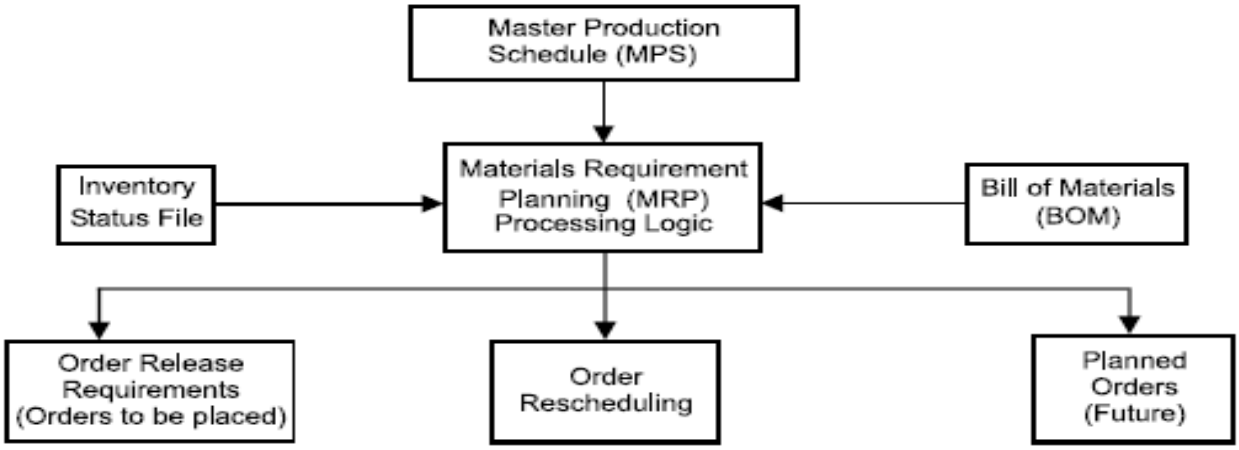
Objectives of MRP

1. **Inventory reduction:** MRP determines how many components are required when they are required in order to meet the master schedule. It helps to procure the materials/ components as and when needed and thus avoid excessive build up of inventory.
2. **Reduction in the manufacturing and delivery lead times***:* MRP identifies materials and component quantities, timings when they are needed, availabilities and procurements and actions required to meet delivery deadlines. MRP helps to avoid delays in production and priorities production activities by putting due dates on customer job order.

3. **Realistic delivery commitments*:*** By using MRP, production can give marketing timely information about likely delivery times to prospective customers.
4. **Increased efficiency:**
   MRP provides a close coordination among various work centers and hence help to achieve uninterrupted flow of materials through the production line. This increases the efficiency of production system.

MRP System

The inputs to the MRP system are: (1) A master production schedule, (2) An inventory status file and (3) Bill of materials (BOM). Using these three information sources, the MRP processing logic (computer programme) provides three kinds of information (output) for each product component: order release requirements, order rescheduling and planned orders.



1. **MASTER PRODUCTION SCHEDULE (MPS)**
   MPS is a series of time phased quantities for each item that a company produces, indicating how many are to be produced and when. MPS is initially developed from firm customer orders or from forecasts of demand before MRP system begins to operate. The MRP system whatever the master schedule demands and translates MPS end items into specific component requirements. Many systems make a simulated trial run to determine whether the proposed master can be satisfied.
2. **INVENTORY STATUS FILE**
   Every inventory item being planned must have an inventory status file which gives complete and up to date information on the on-hand quantities, gross requirements, scheduled receipts and planned order releases for an item. It also includes planning information such as lot sizes, lead times, safety stock levels and scrap allowances.
3. **BILL OF MATERIALS (BOM)**
   BOM identifies how each end product is manufactured, specifying all subcomponents items, their sequence of build up, their quantity in each finished unit and the work centers performing the build up sequence. This information is obtained from product design documents, workflow analysis and other standard manufacturing information.

Advantages of materials requirements planning (MRP)

- Aids with maintaining minimum inventory levels

- If you have minimum inventory levels, materials planning will also reduce associated costs
- Material tracking becomes much easier and ensures that economic order quantity is achieved for all lot orders
- Material planning smooths out capacity utilization and allocates correct time to products as per demand forecast

Disadvantages of materials requirements planning (MRP)

- Material planning is entirely dependent on inputs it receives from other system departments. If input information is not correct than output for material planning will also be incorrect
- Material planning requires maintenance of robust database with all information pertaining inventory records, production schedule, etc, without which output again would be incorrect
- Material planning system requires proper training for end users, as to get maximum out of the system
- Material resource planning system requires substantial investment out of time and capital

ERP (Enterprise Resource Planning)

ERP is a kind of software system that helps you run your entire business, including processes in finance, manufacturing, supply chain, services, procurement, and more.
Enterprise resource planning (ERP) is defined as the ability to deliver an integrated suite of business applications. ERP tools share a common process and data model, covering broad and deep operational end-to-end processes, such as those found in finance, HR, distribution, manufacturing, service and the supply chain.
ERP applications automate and support a range of administrative and operational business processes across multiple industries, including line of business, customer-facing, administrative and the asset management aspects of an enterprise. ERP deployments are complex and expensive endeavors, and some organizations struggle to define the business benefits.
Look for business benefits in four areas: a catalyst for business innovation, a platform for business process efficiency, a vehicle for process standardization, and IT cost savings. Most enterprises focus on the last two areas, because they are the easiest to quantify; however, the first two areas often have the most significant impact on the enterprise.
ERP is an integrated information system that serves all departments.
ERP is a theoretical Concept. It is computerized software or application available SAP, Oracle, JD Edward, PeopleSoft, Taller.
SAP ER product popular for material management.

Advantages of ERP:

1. Complete visibility into all process in the organization
2. Improves information access and mgt. throughout the enterprise.
3. ERP reduces paper cost and greater accuracy of information
4. Same software can be used in whole organization
5. Centralized data storage.

Internet of Things (IOT)

what is the Internet of Things?

"The **Internet of Things** (**IoT**) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction."

The Internet of Things, or IoT, refers to the billions of physical devices around the world that are now connected to the internet, all collecting and sharing data. Thanks to the arrival of super-cheap computer chips and the ubiquity of wireless networks, it's possible to turn anything, from something as small as a pill to something as big as an aeroplane, into a part of the IoT. Connecting up all these different objects and adding sensors to them adds a level of digital intelligence to devices that would be otherwise dumb, enabling them to communicate real-time data without involving a human being. The Internet of Things is making the fabric of the world around us more smarter and more responsive, merging the digital and physical universes.

What are the types of IoT

1. LPWANs. **Low** Power Wide Area Networks (LPWANs) are the new phenomenon in IoT. ...
2. Cellular (3G/4G/5G) ...
3. **Zigbee** and Other Mesh Protocols. ...
4. **Bluetooth** and BLE. ...
5. **Wi-Fi**. ...

IoT Benefits
Several benefits are offered by the IoT to an organisation.

- Help in monitoring the overall business processes.

- Help in improving the experience of the customer.

- Save time and money.

- Productivity of the employee will increase.

- Adapt and integrate business models.

- Business decisions can be made better by IoT.

- Revenue generation can also be increased.

- IoT encourages companies to rethink the ways they approach their business, industries, markets and can also improve their strategies.

Disadvantage of IoT
- As several in formations will be shared by different devices so, the potential of hacker to hack data or to steal confidential information will increase.

- Enterprisers have to deal with millions of IoT devices and so collecting and managing data will be difficult task.

- If there is any virus in the system then all the connected devices will also become corrupted.

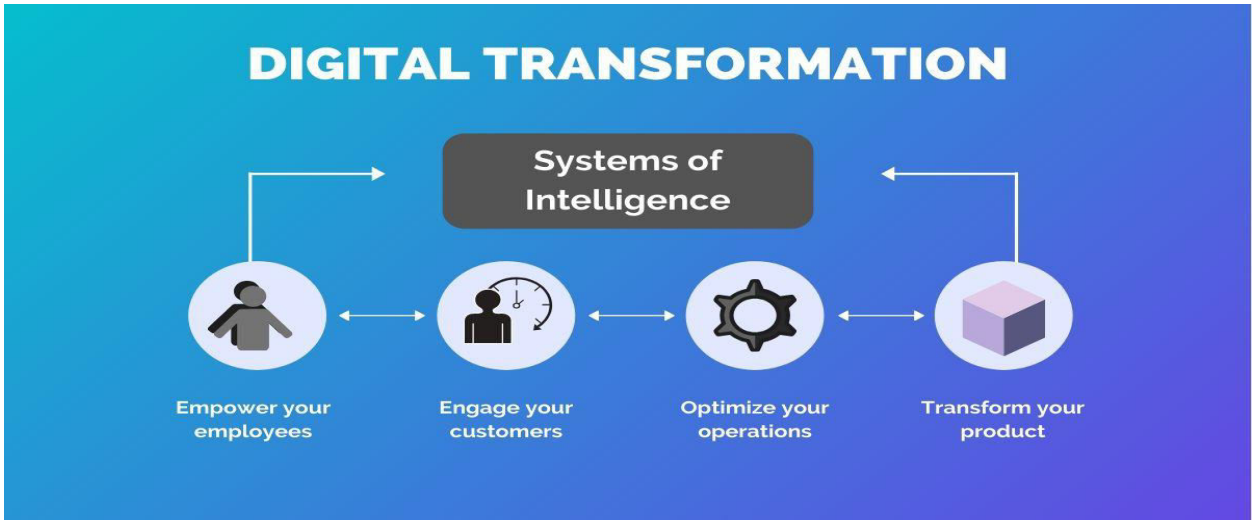
What is Digital Transformation?

In layman terms, digital transformation (DT or DX) means using technology to create differentiating ways of doing business to drive growth in new and existing markets.

The definition of digital transformation can be different for every organization because every business is unique. So, we have collected a spread of definitions to help you find one that applies best to your needs.

What are the Benefits of Digital Transformation?

With the digitization of society, you'd feel the increasing importance of digital transformation. As an entrepreneur, you may take on digital transformation for several reasons.



1. Transforming Customer Experience

At the heart of digital is customer experience. Many companies are increasingly aware of this, with 92% of leaders developing sophisticated digital transformation strategies to enhance the consumer experience.

2. More Data-based Insights

When you go digital, you can track metrics and analyze the data that you capture during your digital marketing efforts.

Using data-driven insights can help to understand customers better, and also rethink business strategies, assisting with better decision-making, paving ways to a higher ROI.

3. Greater Collaboration Across Departments

DT offers an excellent opportunity for unity throughout the organization as leaders build it on digital congruence.

When you find everyone aligned to a common purpose, you'll find a smooth and seamless transition.