

INVENTORY MANAGEMENT IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

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Meaning of Inventory:

Inventory means all the materials (may be raw or finished parts/components, in process or finished products, castings and consumable tools, electrodes etc.) recorded on the ledgers/books of the organization and kept in its stocks (in the store or warehouses) for some period of time.

Some definitions explaining the various aspects of inventory are as follows:

- (a) Inventories are referred to raw materials and finished goods lying in stores.
- (b) All items, parts/components, materials, in process or finished products recorded in the books of the organization and kept in the stores are called inventories.
- (c) Inventory is list of names, with complete specifications, quantities and/or money values of usable items.
- (d) Inventory is defined as a descriptive list or items/goods which gives quantity and money value of each item. Inventory includes raw materials, semi-finished products or work in process inventories, finished parts/components and finished final products etc. held in storage awaiting use or marketing.

Even though inventory of materials is an idle resource in the sense it is not meant for immediate use but for smooth functioning of the organization or enterprise, maintenance of some inventory is essential.

Functions or Characteristics of Inventory:

From the definition of inventory, it is clear that it is related to stock of raw materials, semi-finished and finished products/items maintained by the enterprise/business/organization.

The following points will explain the concept and functions of inventory:

(i) Inventories Serve as Cushions

Against shocks due to demand/supply fluctuations, it separates different manufacturing operations from one another and makes them independent so that each operation can be performed economically.

For example, an organization has to deal with several consumers and vendors and due to their unpredictable behaviour there are always fluctuations in demand or supply of goods which disturbs the schedule of the enterprise.

Inventories absorb these fluctuations and help in maintaining undisturbed production i.e., we decouple the manufacturing activities from the consumer and vendor successfully by cushions of stocks.

Furthermore purchasing/order of raw material can be carried out independently of the finished products distribution and both of these activities can be made low cost operations say by ordering raw material and distributing products in one big lot than in small batches. Thus it leads to better utilization men and machines besides economy.

(ii) Inventory, a Necessary Evil for Any Enterprise:

Inventories require valuable space, capital and other overheads for maintaining it. The invested capital remains idle till the stocks are not consumed. On the other hand, smooth working of the organization is not possible without inventory so it is a necessity. Further it has been observed that costs of not having inventory (stock out conditions) are usually greater than costs of having them. Thus inventory is a necessary evil.

(iii) Inventory Provides Production Economies:

Purchase in desired quantities nullifies the effects of change in prices or supply. Stocks bring economy so purchase of various inputs due to discounts on bulk purchase.

(iv) Maintenance of Smooth and Efficient Production Flow:

Maintains smooth and efficient production flow thus keeps a process continually operating.

(v) Creation of Motivational Effect in Decision Making:

Creates motivational effect in decision and policy making e.g. a person may be tempted to purchase more if inventories are displayed in bulk.

Importance of Inventory:

The following points give the importance of inventory to an organization:

- (i) Good consumer service can be provided and maintained in the organization.
- (ii) Enables smooth and efficient production flow of goods/items.
- (iii) Provides protection against uncertainties regarding demand and supply of materials and output.
- (iv) Various production activities can be independently and economically performed,
- (v) Ensure better utilization of men, machines and materials.
- (v) With bulk purchases quantity discounts can be availed.

Types of Inventory:

The term inventory includes all types of goods/items available in the stores however; it excludes the machinery, jigs and fixtures. Inventories can be classified in different ways depending on their function or convention. The classification of inventory is mentioned below.

1. Classification According to Function or Material Flow:

(i) Production inventory:

Items/goods going into final product such as raw materials, components finished parts/components subassemblies procured from market or outside source.

(ii) Work In Process Inventory:

Items in semi-finished stage or products required at different stages of manufacturing of the product.

(iii) Finished Goods Inventory:

These are finished goods or final products ready for dispatch to users or to distributors.

(iv) Operating and Maintenance Inventory:

These include the items which do not form the part of the final product but are either consumables used during the manufacturing process or items needed required for repair and maintenance functions.

(v) Miscellaneous Inventory:

The items/goods other than those mentioned above such as obsolete and un-saleable products or scrap arising from main production process, stationery items used in office, other items required by office, factory and sales department etc.

In-fact inventory is maintained for flow of operations only and as such remains in flow, like raw materials inventory maintained for smooth flow of production and finished goods inventory is maintained for smooth flow of goods under distribution.

2. Conventional Classification:

Inventory may be classified according to convention in the following way:

(i) Direct Inventories:

These include materials in any form and of any form after processing or finished components which becomes an integral part of the main/final product to be dispatched/delivered to distributor or consumer.

(ii) Indirect Inventories:

These include materials which are not processed and do not become an integral part of the final product but without which the completion of the final product is not possible. These may be cutting fluids, lubricants and other consumables items required during production.

(iii) Finished Products Inventories:

Products ready for dispatch to the distribution system or market i.e. final products.

(iv) Purchased Parts Inventories:

Semi-finished, finished parts purchased from the market for utilisation at the time of assembly of the final product.

Major Objectives/Reasons for Holding Inventory:

Any comprehensive system of control covering all types of inventor)' is directly or indirectly aimed at accomplishing a great variety of purposes.

Most of them are as follows:

(i) Financial Objectives:

The major financial objective of holding the inventory is to keep the investment involved within the enterprise's cash position so that the working capital is not thrown seriously out of balance.

(ii) To Create a Buffer Stock Between the Input and Output:

So that, the outgoing flow of products is as little dependent on the input material characteristics as possible.

(iii) To Ensure Against Delay in Deliveries:

The delay in delivery of finished product to the buyer is avoided by holding inventory stock of finished goods.

(iv) To Allow for a Possible Increase in Output if so Required:

Market requirements may disturb the manufacturing programme of the enterprise. Depending upon the production requirements stocks are to be maintained and supplied.

(v) To Ensure Against Scarcity of Materials in the Market:

Sometimes input materials may become scarce and difficult to get when there are large fluctuations in output and demand for them. A reserve stock of raw materials is must for smooth manufacturing operations.

(vi) To Make Use of Quantity Discounts:

Input materials and components/parts may be cheaper when purchased in bulk quantities owing to quantity discounts and lower transportation costs/charges.

(vii) To Utilize to Advantage Price Fluctuations:

Price fluctuation may have a marked effect on the procurement policy of an enterprise or organization, if these fluctuations are to be utilized to advantage of the unit, materials have to be purchased in adequate quantities when prices are lowest.

All the above reasons or objectives involve cost. The inventory control is mainly concerned with making optimum decisions regarding above variables which are subject to control. Inventory is an idle resource which is usable to have value.

Understanding the Functions of Inventory

Inventory serves several essential functions within an organization:

1. Meeting Customer Demand:

One of the primary functions of inventory is to ensure that an organization can meet customer demand promptly. Having products readily available allows for timely order fulfillment, leading to customer satisfaction and repeat business.

2. Buffering Against Variability:

Inventory acts as a buffer to absorb fluctuations in both supply and demand. It helps mitigate the effects of unexpected changes in production, delivery delays, or spikes in customer orders.

3. Seasonal and Cyclical Demand:

Businesses often experience fluctuations in demand due to seasonality or cyclical trends. Inventory allows them to prepare for peak seasons and ensure a continuous supply of products.

4. Economies of Scale:

By maintaining inventory, organizations can take advantage of economies of scale in production. Ordering materials and goods in larger quantities often leads to cost savings.

5. Emergency and Contingency Planning:

Inventory provides a safety net for unforeseen events or emergencies, such as supply chain disruptions, natural disasters, or unexpected surges in demand.

6. Facilitating Production and Operations:

Raw materials, work-in-progress, and finished goods inventory support the production process. Having these items on hand ensures that operations can continue smoothly.

7. Supplier Relationships:

Maintaining inventory levels allows for better negotiation with suppliers, as businesses can provide more accurate order forecasts and secure favorable terms.

Inventory functionality

A major portion of the investment of the company is in inventory. Hence, the company must assure itself of at least a minimum amount of return on this investment. As the same time, experts in the field of accounts have found it difficult to exactly quantify the trade-off between the amounts invested in the inventory and the service levels, and operating efficiencies. In other words, it cannot be exactly quantified as to the amount of 'loss' suffered with regard to service offered to client, or how much other operating efficiencies have gone down, because of the money invested in inventory. Due to this, many enterprises carry an average amount of inventory that can exceed their basic requirement. This can be understood better by studying four prime functions underlying inventory commitments.

● **Geographical Specialization**

Because of the requirements of factors of production such as power, materials, water and labor, the economical location for manufacturing is often at a considerable distance from the major market. one function

For example: for an automobile industry, components such as tyres, batteries, transmission, and springs are essential components but a tyre industry prefers to be located at a place when materials for tyre manufacturing are easily available because this minimizes transportation cost for that industry. Same is the case regarding the manufacturer of other components. This geographical separation of the components manufacturing units will reduce the cost of the components produced. But, for the final assembly, these components have to be transported to the main' assembly plant of the automobile company.

Geographical separation also requires manufactured goods from various locations to be collected at a stage warehouse. These are then combined as a mixed product shipment and sent to the required destination.

For example: Procter and Gamble uses its distribution centers to combine products from its laundry, food, and health care divisions to offer the customer a single integrated shipment. For an enterprise geographical separation, permits economic specialization between the manufacturing and distribution unit. Let us once again consider the case of automobile factory. Because of the proximity of the availability of power, water, materials and labor the tyre plant, the spring manufacturing plant will be located at different geographical points. Each geographical location of course will require its basic inventory. The economies gained through

geographical specialization are expected to more than offset increased inventory and transportation cost, in case the company had decided to manufacture all the required components at its main assembly plant.

Decoupling

A second inventory function, decoupling provides maximum operating efficiency within a single manufacturing facility by stockpiling work-in-progress between production operations. Decoupling processes permit each product to be manufactured and distributed in economic lot sizes that are greater than market demands. For example, let us consider a Tyre-manufacturing unit. This unit once the production operation begins will continue to produce a certain type of tyre till an economic lot size is produced. There may not be a market demand for the entire lot of production. But the production of the lot was carried out keeping in mind the future demand as well as the economies of production. Customer can be sent large shipments with full-load capacity of trucks at minimum freight cost. In a way, therefore, decoupling tends to “buffer” or “cushion” the operations of an enterprise from uncertainty. Decoupling, therefore, enables increased operating efficiency at a single location. In contrast, geographical specialization looks at the operating efficiency at multiple locations because from these multiple locations, goods have to be dispatched to the main manufacturing unit.

Balancing supply and demand

A third inventory function, balancing, is concerned with the elapsed time between consumption and manufacturing. Balancing inventory means the availability of supply is attempted to reconcile or match with the demand for the product. The most notable example is seasonal production and year-round consumption. In the West, Orange juice is consumed to a great extent throughout the year. But the production (i.e., reaping or harvesting) of oranges is basically seasonal. So the seasonal availability of oranges has to be reconciled to the year-round demand for orange juice. Balancing of inventories, therefore, attempts to link the economies of manufacturing with the variations of consumption. When the demand for a product is concentrated in a very short selling season, manufacturers, wholesalers, and retailers are forced to plan about stocking of goods in advance of the point of selling period. In our country we can take the example of a particular festival season, say Diwali. Every retailer, wholesaler and manufacturer expects a boom for gift articles, sweet and new clothes. But these enterprises have to plan out the amount of goods and products that are required to be manufactured, and stockpiled. There should be a proper balance between the expected demand and the availability of supply. This is to minimize the risk of carryover into the next selling season. If such situation arises then the quality of goods and its marketability will be the problems for its sale.

Buffer uncertainties

The safety stock or buffer stock function concerns short range variation in either demand or replenishment. The safety stock requirement results from uncertainty concerning future sales. Safety stocks protect against two types of uncertainties :

- Demand can be in excess of the forecast, during the performance cycle
- Delays in the length of the performance cycle itself.

In the first type of uncertainty the customer may demand more than what he had actually planned. It can also happen that the demands from the customer may also fall, which can also upset inventory. In the second type of uncertainty, there can be delay in order-receipt from the customer, or delay in processing of the order, or delay in transportation of required material. This brings about an uncertainty in the length of the performance cycle.

Managing inventory under uncertainty requires businesses to strike a balance between having enough inventory to meet customer demand and minimizing the costs associated with excess stock.

Service level

The service level is the target specified by the management. It defines the performance objectives, which the inventory function must be capable of achieving. The service level can be defined in terms of an order cycle time, case fill rate, line fill rate, order fill rate, or any combination of these. • The order cycle time (performance cycle) is the elapsed time between the release of a purchase order by a customer and the receipt of the corresponding shipment.

Inventory Expectations

Inventory forecasting is the process of calculating the inventory needed to fulfill future customer orders based on how much product you predict you will sell over a specific period of time. These estimates take historic sales data, planned promotions, and external forces into account to be as accurate as possible.

1.Planning Inventory:

is the process of determining the optimal quantity and timing of inventory for the purpose of aligning it with sales and production capacity. Inventory planning affects a company's cash flow and profits while contributing to an efficient supply chain. According to NetSuite, ultimately "Inventory planning helps lower the costs of keeping items in stock and helps make sure there is enough stock for making and selling items."

What are some ways to improve your inventory planning?

There are three main strategies to improve inventory planning: Preventing stock outs, minimizing overstocking and improving processing.

What are some best practices for effective inventory planning?

A company's best strategy for improving and maintaining an effective inventory planning method depends on where improvement is needed most. Companies should assess their inventory management process to determine weaknesses (ex. maintaining too much stock in warehouses). Some common methods to improve inventory planning are:

- Utilizing a demand forecasting formula
- Performing regular stock counts
- Implementing software to automate manual processes
- Proper training and accountability

EOQ / ROQ

Economic order quantity (EOQ) is a calculation companies perform that represents their ideal order size, allowing them to meet demand without overspending. Inventory managers calculate EOQ to minimize holding costs and excess inventory.

It doesn't matter if your business sells jelly beans, appliances, furniture or airplanes. Finding the economic order quantity for every product you purchase is almost certain to impact the bottom line. Every business that manages inventory can benefit from measuring and following the EOQ.

- Quantity ordered whenever material to be purchased

-by setting this quantity the buyer is saved the task of re calculating the how much he should buy each time

It is the quantity most economic to order. EOQ is the quantity is the size of the order which gives maximum economy in purchasing any material and ultimately contributes towards maintaining the material at optimum level at the minimum cost

Benefits of Economic Order Quantity (EOQ)

The main benefit of using EOQ is improved profitability. Here's a list of benefits that all add up to savings and improvements for your business:

- **Improved Order Fulfillment:** When you need a certain item or something for a customer order, optimal EOQ ensures the product is on hand, allowing you to get the order out on time and keep the customer happy. This should improve the customer experience and may lead to increased sales.
- **Less Over ordering:** An accurate forecast of what you need and when will help you avoid over ordering and tying up too much cash in inventory.
- **Less Waste:** More optimized order schedules should cut down on obsolete inventory, particularly for businesses that hold perishable inventories that can result in dead stock.
- **Lower Storage Costs:** When your ordering matches your demand, you should have less products to store. This can lower real estate, utility, security, insurance and other related costs.
- **Quantity Discounts:** Planning and timing your orders well allows you to take advantage of the best bulk order or quantity discounts offered by your vendors.

Challenges of Economic Order Quantity (EOQ)

While many businesses want to use EOQ to determine order sizes, it isn't always easy to achieve. When determining EOQ, you may run into these challenges:

- **Poor Data:** One of the biggest challenges of determining EOQ is access to accurate and reliable data. Manual or spreadsheet-driven systems may provide low-quality or outdated information, which can lead to inaccurate calculations.
- **Outdated Systems:** Old and outdated systems may have incomplete data and lead to missing out on potential savings. An inventory management system or cloud-based ERP can solve this problem.

- **Business Growth:** The EOQ formula is ideal for businesses with consistent inventory needs. With a fast-growing business, relying on EOQ can lead to inventory shortages.
- **Inventory Shortages:** If you're just starting to use this method, it often generates smaller orders. If you are too conservative with your calculations, you could wind up under-ordering.
- **Seasonal Needs:** Seasonality can make EOQ more challenging, but not impossible. This is because there could be major changes in customer demand throughout the year.

Key Challenges in Inventory Management Under Uncertainty

1. Fluctuating Demand

Demand for products can vary unexpectedly due to changes in consumer behavior, market trends, or external factors. Businesses must be prepared to adjust their inventory levels to meet shifting demand patterns.

2. Supply Chain Disruptions

Supply chain disruptions, such as transportation delays, supplier issues, or geopolitical events, can disrupt the flow of inventory. This uncertainty requires businesses to have contingency plans in place and diversify their supplier base when possible.

3. Lead Time Variability

Variability in supplier lead times can complicate inventory management. Longer lead times or unpredictable delivery schedules may necessitate higher safety stock levels to avoid stockouts.

4. Economic Fluctuations

Economic downturns, inflation, or currency fluctuations can affect procurement costs and inventory valuations. Businesses must be agile in adjusting pricing and inventory strategies in response to economic uncertainties.

Strategies for Effective Inventory Management Under Uncertainty

To manage inventory effectively under uncertainty, businesses can adopt the following strategies:

1. Safety Stock

Maintain **safety stock** to provide a buffer against unexpected fluctuations in demand or lead times. Calculating safety stock levels should consider factors like demand variability, supplier reliability, and desired service levels.

2. Demand Forecasting

Invest in robust demand forecasting tools and techniques to predict demand patterns more accurately. Regularly update forecasts based on real-time data and market trends.

3. Supplier Collaboration

Build strong relationships with suppliers and collaborate closely with them to improve communication and visibility into supply chain dynamics. This can help in obtaining early warnings of potential disruptions.

4. Risk Assessment

Conduct risk assessments to identify vulnerabilities in the supply chain and inventory management processes. Develop contingency plans to mitigate potential risks and ensure business continuity.

5. Inventory Optimization Models

Implement advanced inventory optimization models that factor in uncertainty. These models can help determine optimal reorder points, order quantities, and safety stock levels based on various scenarios.

6. Technology Adoption

Leverage inventory management software and technology solutions that offer real-time visibility into inventory levels, demand, and supply chain information. These tools can enhance decision-making under uncertain conditions

7. Agile Procurement

Adopt agile procurement practices that allow for flexibility in sourcing and supplier selection. Diversify suppliers when feasible to reduce reliance on a single source.

8. Continuous Monitoring

Regularly monitor key performance indicators (KPIs) related to inventory, such as stockout rates, inventory turnover, and holding costs. Use this data to make informed adjustments to inventory strategies.

9. Scenario Planning

Develop scenarios and contingency plans for various uncertainty scenarios. This proactive approach can help businesses respond swiftly to unexpected events.

10. Cross-Functional Collaboration

Foster collaboration between different departments, including sales, marketing, and operations, to ensure that inventory management strategies align with changing market conditions and business goals.

❖ Fill rate Estimations

Fill rate is the percentage of orders a brand can fulfill without running out of stock. The item fill rate is a good indicator of order management, fulfillment efficiency and a brand's ability to meet customer demand with their inventory levels. When a company has a higher fill rate, it is able to minimize lead time and prevent lost sales to items on back order.

❖ Types of Fill Rate

The most common type of fill rate used by brands is order full rate. Still, various kinds of fill rates can give the retailer valuable insights into how efficient their supply chain and order fulfillment operations are.

❖ Order Fill Rate

Order fill rate measures the percentage of total orders that have been filled. This metric gives brands insight into operational efficiency, product demand, and supplier relationships. A brand can also use the order fill rate to find areas for improvement in unloading stock, packing time, and product buying decisions.

❖ Line Fill Rate

Brands generally list individual items as lines on an order, so the line fill rate refers to the percentage of order lines completely filled out of the total number of order lines. For example, a brand could have five orders with 10 total order lines.

❖ Case Fill Rate

This particular fill rate metric is used mostly by wholesalers and distributors. It's the percentage of product cases that were shipped compared to the total number of product cases that were originally ordered. For example, if a brand sold 10 cases but shipped nine cases, the case fill rate would be 90%.

❖ **Warehouse Fill Rate**

The warehouse fill rate measures the percentage of orders that a warehouse ships compared to all of the orders received. This metric is similar to the order fill rate but from the perspective of warehouse operations. The warehouse fill rate gives brands insights into the efficiency of their warehouse operations.

❖ **Vendor Fill Rate**

Vendor fill rate measures the percentage of vendors who have completed order shipments out of the total number of vendors. This metric allows brands to assess vendor performance.

❖ **Why Is Fill Rate Important?**

The fill rate is a relatively simple metric that allows brands to see how productively, efficiently and quickly they can process orders and ship them out. When brands understand their fill rate, they can improve it, which has many benefits for a growing e-commerce company.

When a brand consistently fills orders—without stock outs—customers notice the good fill rate. A consistently high fill rate can establish a reputation among first-time customers and breed loyalty among return customers.

But fill rate is not just important for customers; it is also crucial for internal management. Tracking warehouse, case, and vendor fill rates can help brands determine how effectively the supply chain is operating and identify areas for improvement.

Fill Rate Formula

To calculate order fill rate, use this formula:

$$\text{Fill rate} = (\text{total completed orders} / \text{total orders}) \times 100$$

Inventory Management Policies:

Inventory Management Policies

While there are a number of inventory management policies, here are some of the most common policies:

1. Order Quantity Policy:

The policy defines the number of items in order to optimize order size and minimize costs. It ensures adequate stock levels to meet demand without excessive expenses.

2. Reorder Point Policy:

This policy indicates when to reorder to prevent stockouts or excessive holding costs. It ensures consistent product availability for customers.

3. Safety Stock Policy:

It outlines extra inventory kept as a buffer against demand or supply variations. This policy ensures uninterrupted service and enhances customer satisfaction.

4. Demand Forecasting Policy:

This approach uses predictive techniques for estimating future demand and informing inventory decisions. It prevents overstocking and ensures product availability.

5. ABC Classification Policy:

6. Policy:

Inventory is categorized into classes (A, B, C) based on importance. This prioritization ensures resources focus on high-value or fast-moving items.

6. Cycle Counting Policy:

Regular partial inventory counts ensure accuracy and eliminate comprehensive counts. This fosters efficient operations and informed decision-making.

7. Stock Review Policy:

This policy details how often and by which methods stock levels are reviewed. It supports informed replenishment decisions and consistent product availability.

Steps to Create an Inventory Policy

Use our 10 Step process to develop an effective inventory policy. Simply follow the steps below:

Step 1. Define Objectives

Identify the specific needs and objectives that the inventory policy should address, such as reducing holding costs, improving order fulfillment, or increasing turnover rate. Determine the key metrics to track the policy's performance.

Example: The objective is to reduce inventory carrying costs by 15% and improve order fulfillment speed by 25%. Key Performance Indicators include inventory turnover rate and order fulfillment time.

Step 2. Data Collection and Analysis

Gather historical and current data to understand sales trends, demand, and inventory levels. Analyze this data to predict future demand and optimize stock levels.

Example: Data shows that 500 units of "Widget A" are sold monthly, but current stock levels are at 800 units. Analysis reveals an opportunity to reduce excess inventory and optimize reordering processes.

Step 3. Determine Inventory Types and Levels

Identify different categories of inventory and establish optimal stock levels for each. Consider factors like demand variability and lead time in setting these levels.

Example: Raw materials, including 200kg of steel, are classified separately from the 150 finished "Bike Model X" in stock. Safety stock is determined based on historical sales data and supplier lead times.

Step 4. Choose an Inventory Management Method

Select an appropriate inventory management technique to maintain optimal stock levels. This method should align with the business's operational needs and objectives.

Example: ABC analysis is employed, classifying "Gadget Y" as an 'A' item due to its high sales volume. The focus is on maintaining optimal stock levels to avoid stockouts and overstocking.

Step 5. Develop Ordering Policies

Create procedures for ordering inventory, focusing on efficiency and accuracy. Establish relationships with suppliers to ensure timely and cost-effective procurement.

Example: An automated ordering system is set up to purchase 100 units of "Tool Z" when stock levels reach 50 units. Negotiations with suppliers ensure a lead time of just 5 days.

Step 6. Implement Inventory Control System

Introduce a system or software for real-time tracking and managing inventory. Ensure that staff is adequately trained to use this system effectively.

Example: An inventory management software is implemented to track the 300 "Electro Widgets" in real-time. Staff receives training on utilizing the software to monitor and manage inventory levels efficiently.

Step 7. Monitor and Optimize

Regularly review key metrics to assess the inventory policy's performance. Make necessary adjustments to enhance efficiency and cost-effectiveness.

Example: After reviewing KPIs, it's noted that the carrying costs for "Gadget Y" have decreased by 10%. Further analysis and optimizations aim to reach the 15% reduction target.

Step 8. Risk Management

Identify potential risks associated with inventory management and develop plans to mitigate them. Consider supply chain disruptions, demand fluctuations, and other uncertainties.

Example: A contingency plan is developed to source "Material Q" from an alternative supplier in case of disruptions. This ensures continuous production of "Product R," to maintain a stock level of at least 200 units.

Step 9. Documentation and Compliance

Document all processes, responsibilities, and protocols associated with the inventory policy. Ensure alignment with legal and regulatory requirements.

Example: The inventory policy for handling and storing 500 units of "Chemical S" is documented with detailed safety and compliance protocols. Regular audits ensure adherence to legal requirements and safety standards.

Step 10. Review and Improvement

Periodically evaluate the inventory policy and make improvements based on data, feedback, and emerging trends. Focus on continuous enhancement of efficiency and effectiveness.

Example: Annual reviews of the policy indicate a consistent surplus of "Item T." Adjustments are made to the ordering process, reducing orders from 400 units to 300 units to align with actual sales data.

Methods of Inventory Control

ABC Analysis

ABC Analysis is a pivotal inventory control method that categorizes inventory into three different classes based on their importance. Often referred to as the Pareto Principle, this method identifies that 80% of a company's profits typically come from 20% of its products. The ABC Analysis method recognizes this disproportion and applies it to inventory management to optimize resource allocation.

The ABC classification system is a strategic approach to inventory management.

The "A" category contains high-priority items that often account for 15-20% of the inventory but generate 70-80% of revenue.

The "B" category represents a balance, typically accounting for 30% of the inventory and 15-20% of the revenue.

The "C" category, although making up 50-60% of the inventory, only contributes around 5-10% to revenue.

Last In, First Out (LIFO) & First In, First Out (FIFO)

LIFO (Last In, First Out) and FIFO (First In, First Out) are two essential inventory valuation methods businesses use to manage and evaluate inventory. These methods dictate the order in which inventory is sold and consequently affect the cost of goods sold and the value of remaining inventory.

LIFO (Last In, First Out): Under LIFO, the most recently acquired items are sold first. The inventory cost is based on the cost of items that were acquired last, while the older inventory remains on hand.

FIFO (First In, First Out): In contrast, FIFO considers that the oldest items in inventory are sold first. It assumes that the items acquired first are the first to be sold, mirroring a more natural flow of inventory.

Batch Tracking

Batch Tracking, also known as lot tracking, is a vital inventory control method that allows businesses to **track products through different stages of the production and distribution process**. This method involves grouping items with shared characteristics or features into batches or lots and tracking them together as a single unit.

In industries where quality control, compliance, and traceability are paramount, batch tracking becomes essential. It ensures that if an issue arises with a specific batch, the entire set can be easily identified and isolated, preventing potential problems from escalating. This practice also facilitates recalling products if necessary and helps in adherence to regulations and standards.

Safety Stock

Safety Stock, often referred to as “buffer stock,” is a term that finds its roots in inventory management. It refers to the extra inventory held by a business to mitigate the risk of stockouts due to unpredictable fluctuations in demand, supply delays, or other unforeseen disruptions in the supply chain management.

Calculating the correct level of safety stock is vital. Too little may lead to stockouts, while too much can tie up capital and lead to obsolescence. Here’s a general formula used to calculate safety stock:

Safety Stock = (Maximum Lead Time – Average Lead Time) * (Maximum Usage – Average Usage)

What is collaborative inventory replenishment?

Collaborative inventory replenishment is the method of finding the balance between reordering inventory and maintaining optimal stock levels. This method seeks the most cost-effective method of inventory management by determining the frequency of reordering inventory items to aid the order management process.

Collaborative inventory replenishment enables higher shipping frequencies and reduced transport costs by sharing transport and logistical resources between suppliers. Collaborative inventory replenishment works to optimize deliveries to common distributors.

Features to look for when choosing inventory replenishment software

When your business is seeking inventory replenishment optimization software, the key factor is making the software features work for you to effectively streamline your inventory processes.

Features to look for when choosing inventory replenishment software include:

- Forecasting methods
- Optimized accuracy
- Intuitive analytics

Forecasting methods need to work for both seasonal and non-seasonal products. And the system needs to be able to cope with ever-evolving customer demand shifts as well as market fluctuations for optimized accuracy.

Multiple supplier capability

Chances are your business deals with multiple suppliers. In your quest for the perfect inventory replenishment software, check that your provider can handle multiple supplier capabilities and avoid lost sales.

A seamless approach to inventory management is data integration from numerous suppliers with the ability to:

- Track inventory
- Order inventory
- Replenish inventory

Use automatic inventory replenishment software to set vendor conditions, such as minimum order quantities and case sizes, to create smooth purchase orders.

In addition to handling multiple suppliers, your inventory replenishment software should integrate with multiple sales channels to seamlessly sync product and sales data. For example, if your business runs the majority of sales through Amazon, this integration is essential.

User-friendly and streamlined navigation

The reasons for investing in inventory replenishment software include making life easier. Therefore, seek a solution that's easy to use and implement into your existing systems. You must be able to place orders quickly and easily without complicated navigation.

Implementing a user-friendly inventory management system means that all your staff members can quickly get to grips with the new software, and your business can benefit from the new technology's features immediately.

Inventory optimization

Inventory optimization is the practice of determining inventory levels to:

- Meet customer demand
- Control logistics costs
- Avoid stockouts and overstocking

The best inventory replenishment software takes care of reordering stock and optimizing stock levels. This ensures that your business carries the right amount without overstocking or understocking.

The main elements of inventory optimization are:

- Current inventory levels
- Storage capabilities
- Supplier lead times
- Seasonal trends

To optimize your inventory, use demand forecasting analytics to estimate future demand for your products that predict the total sales for a pre-set time period.

Optimizing your inventory:

- Saves your business money and warehouse space
- Reduces carrying costs

- Increases your business's efficiency and profitability
- Improves cash flow
- Promotes customer satisfaction

What is MRP?

Material Requirements Planning (MRP) refers to the process that translates master schedule requirements for finished goods into time-phased requirements for raw materials, components, parts, and sub-assemblies. The overall goal of MRP is to determine what materials are needed, how much is needed, and when these materials are needed.

While the master schedule designates the quantity and need dates of the end items, material requirements planning generates a production plan that indicates the timing and quantities of all materials required to produce those end items.

In manufacturing, MRP allows manufacturers to maintain a steady flow of materials through the supply chain by keeping their production planning, inventory control, and purchasing departments aligned.

MRP is also about being a step ahead of production to prepare for swift demand changes. Some manufacturers choose to use demand forecasting to anticipate the materials they will need to start production within a given time-frame. Using such a strategy requires your production facility to use accurate historical sales and inventory data to ensure that you are ordering the right amount of materials while preventing waste.

What is DRP?

Distribution requirements planning (DRP) is the process used for planning orders in a supply chain. DRP is an extension of Materials Requirements Planning which allows manufacturers to compute time-phased requirements.

The output of Distribution Requirements Planning is the distribution plan which ensures that goods are delivered in the most efficient manner. This includes considering the aspects of establishing the quantity and direct location that an item is required to arrive at in a given time frame.

Distribution Requirements Planning will benefit manufacturing operations as a whole by increasing the efficiency of distribution while decreasing costs. This allows production facilities to focus their time and attention elsewhere in the manufacturing process to further improve their operation.

There are two methods of distributing goods through the supply chain: push or pull. The 'push' method is guided by the supplying facilities that produce goods and 'push' them to the downstream facilities. In contrast, the 'pull' method is guided by the inventory management and planning activities of the downstream facilities. They tell the supplying facilities the quantity and need date of each item or part that is required. DRP is most beneficial to manage goods that have a long manufacturing lead time.

MRP and DRP Correlation

While MRP focuses more on a single location, DRP focuses more on the control of the materials among the various locations. These two systems operate together and evaluate the supply chain in a variety of ways:

- Modification of Orders
- Receipt Schedules
- Inventory Balances
- Transportation Times

These evaluations promote insight within the supply chain and allow for enhanced distribution and efficient ordering of materials that aid production facilities through

Just-in-time, or JIT

Just-in-time, or JIT, is an inventory management method in which goods are received from suppliers only as they are needed. The main objective of this method is to reduce inventory holding costs and increase inventory turnover.

Importance of just-in-time

- **Reduces inventory waste**

A just-in-time strategy eliminates overproduction, which happens when the supply of an item in the market exceeds the demand and leads to an accumulation of unsalable inventories. These unsalable products turn into inventory dead stock, which increases waste and consumes inventory space. In a just-in-time system you order only what you need, so there's no risk of accumulating unusable inventory.

- **Decreases warehouse holding cost**

Warehousing is expensive, and excess inventory can double your holding costs. In a just-in-time system, the warehouse holding costs are kept to a minimum. Because you order only when your customer places an order, your item is already sold before it reaches you, so there is no need to store your items for long. Companies that follow the just-in-time inventory model will be able to reduce the number of items in their warehouses or eliminate warehouses altogether.

- **Gives the manufacturer more control**

In a JIT model, the manufacturer has complete control over the manufacturing process, which works on a demand-pull basis. They can respond to customers' needs by quickly increasing the production for an in-demand product and reducing the production for slow-moving items. This makes the JIT model flexible and able to cater to ever-changing market needs. For example, Toyota doesn't purchase raw materials until an order is received. This has allowed the company to keep minimal inventory, thereby reducing its costs and enabling it to quickly adapt to changes in demand without having to worry existing inventory.

- **Local sourcing**

Since just-in-time requires you to start manufacturing only when an order is placed, you need to source your raw materials locally as it will be delivered to your unit much earlier. Also, local sourcing reduces the transportation time and cost which is involved. This in turn provides the need for many complementary businesses to run in parallel thereby improving the employment rates in that particular demographic.

- **Smaller investments**

In a JIT model, only essential stocks are obtained and therefore less working capital is needed for finance procurement. Therefore, because of the less amount of stock held in the inventory, the organization's return on investment would be high. The Just-in-time models uses the "right

first time” concept whose meaning is to carry out the activities right the first time when it’s done, thereby reducing inspection and rework costs. This requires less amount of investment for the company, less money reinvested for rectifying errors and more profit generated out of selling an item.

JIT-II

JIT II is a purchasing-related application of the JIT philosophy with implications for marketers. Lance Dixon, purchasing executive for the BOSE Corporation, developed the JIT II approach to minimize purchasing costs as sales increased (Greenblatt, 1993; Dixon, 1992).

What Is Kanban?

Kanban is an inventory control system used in just-in-time (JIT) manufacturing. It was developed by Taiichi Ohno, an industrial engineer at Toyota, and takes its name from the colored cards that track production and order new shipments of parts or materials as they run out. Kanban is a Japanese word that directly translates to "visual card," so the kanban system simply means to use visual cues to prompt the action needed to keep a process flowing.

Kanban Board is a visual tool that helps agile teams manage the project workflow by visualizing the various tasks, issues, bugs, or activities. With Kanban Board, they can easily create the issues or tasks for the project and order them according to their priority using the drag-and-drop interface. However, it is not limited to these features. It has various features, each covering the core agile principles.

Features of Kanban Board

1. Pull-System Approach

They provide a Pull-System based management which means that we have to resolve the various issues and risks as they occur in the system. This prevents us from the unnecessary activities without any requirement.

2. Supports the backlog for issues

Backlog is the visual workflow where the Agile teams can create the tasks or issues before they are pulled into the Kanban Board. This feature of JIRA Kanban boards helps us to create and prioritize issues. Also, we can move our issues between Backlog and Board to prioritize the tasks.

3. Swim lanes for categorizing the issues

Using the Kanban Board in JIRA, we can easily bifurcate the tasks, issues or bugs according to the assignees, priority, or issue types. Thus, users can easily visualize the issues in the Project workflows in a categorical manner.

4. Grouping and Filtering

If you want the Kanban Board to highlight only the right things to your team, you can use the grouping and filtering feature in the Kanban Board. It has an assignee filter using which the issues containing a search term are visible to particular members. Additionally, it has the Group By filter using which we can list the issues according to the categories.

5. Can be used for Team as well as Company Managed Projects

JIRA allows us to create the Kanban Board for both the team as well company-managed projects. The Team-managed projects can be managed by anyone on the team. Thus, it is suitable for autonomous teams. On the other hand, Company-managed Projects are managed by the JIRA admins to enable the shared workflow across multiple projects.

6. Supports WIP

The Work-In-Progress limits (WIP) help us to prevent work overload. It keeps the limit on the number of tasks for each column so that a particular workflow does not have too much pressure in terms of project tasks.

7. Creating Reports

Agile teams can create reports in the Kanban Board to track the Cycle Time of the Project Workflow. Also, it provides various charts such as Cumulative Flow Diagram and Control Chart to analyze the performance of the project workflow.

8. Automating the Workflow

The Kanban Boards in JIRA have a feature of Automation using which we can make our workflow as a set of automatically executed tasks. The Automation feature helps in creating rule-based automation, triggers or action events for the state transition.

Benefits of Kanban Board

1. Continuous Delivery

The changes or updates are continuously reflected in the Kanban Boards throughout the lifecycle. Hence, it supports continuous workflow management, which helps us to maintain a consistent pace during the project initiation and execution phases.

2. Re-use Workflow

You do not need to modify the existing setup to implement the Kanban Boards. You can easily maintain the existing roles and assign them the tasks highlighted in the Kanban Cards.

3. Faster Workflow

The visual approach of the Kanban Board helps in faster updates about the project's progress. Also, the continuous improvement and integration feature helps us to achieve early delivery of the project.

4. Time-Saving

The stand-up meetings and sessions are optional in Kanban so that we can use that time in managing some other tasks in the workflow. Along with this, we can also integrate other development tools with the Kanban Board, without managing the separate task log for other tasks.

5. Reduces the Pressure of Timeline

It has a flexible timeline as it does not focus on strict timelines or constraints for execution activities. In addition to this, the standup meetings or sessions are optional in Kanban which makes the execution faster.

6. Availability of Current Status of Issues

Kanban Board in JIRA provides the 'insights' feature which tells us the status and priority of the current issues. In this way, various Agile Principles for managing the project are covered in it.

7. Interactive Timelines

In JIRA Kanban Board, the timelines can be managed by creating the epics which are large tasks to be broken down into smaller tasks. These epics can be mapped with the work items, dependencies and releases. Thus, timeline management is user-friendly.

8. Built-in Template

We do not need to create the Kanban Board from scratch. JIRA provides various templates for creating the Kanban Board that can be customized as per our Agile requirements.