**Industrial Management : Unit-IV**

**Inventory Management**

In any business or organization, all functions are interlinked and connected to each other and are often overlapping. Some key aspects like supply chain management, logistics and inventory form the backbone of the business delivery function. Therefore these functions are extremely important to marketing managers as well as finance controllers.

**Inventory management is a very important function that determines the health of the supply chain as well as the impacts the financial health of the balance sheet**. Every organization constantly strives to maintain optimum inventory to be able to meet its requirements and avoid over or under inventory that can impact the financial figures.

Inventory is always dynamic. Inventory management requires constant and careful evaluation of external and internal factors and control through planning and review. Most of the organizations have a separate department or job function called inventory planners who continuously monitor, control and review inventory and interface with production, procurement and finance departments.

**Defining Inventory**

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

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

From the above definition the following points stand out with reference to inventory:

* All organizations engaged in production or sale of products hold inventory in one form or other.
* Inventory can be in complete state or incomplete state.
* Inventory is held to facilitate future consumption, sale or further processing/value addition.
* All inventoried resources have economic value and can be considered as assets of the organization.

## Raw Materials

This type of inventory includes any goods used in the manufacturing process, such as components used to assemble a finished product. Raw materials may also include partially finished goods or materials. For example, for an orange juice company, oranges, sugar and preservatives are raw materials; while for a computer manufacturer, chips, circuit boards and diodes are raw materials. Inventory items may be classified as raw materials if the organization has purchased them from an outside company, or if they are used to make components.

## Work-in-Process

Work-in-process inventory items are those materials and parts that are waiting to be made into something else. These may include partially assembled items that are waiting to be completed. Work-in-process inventory items may include finished goods that have not yet been packaged and inspected, as well as raw materials that have moved from storage to a preassembly area. For example, in an orange juice company, the oranges may come in to a storage area, where they are raw goods, but once they have been moved out of the storage area and onto the assembly line for juicing, they become work-in-process inventory. In a small company, work-in-process goods may be stored in the same area as raw materials and finished goods.

## Finished Goods

Finished goods are any products that are ready to be shipped out or sold directly to customers, including to wholesalers and retailers. Finished goods may be waiting in a storage area or on a shop floor. If the amount of inventory of finished goods increases faster that the amount of raw goods and work-in-process goods, then production may need to slow down until more finished goods are sold. In some businesses, goods are not included in the finished goods inventory until they are sold. For example- in companies where goods are made to order.

## Other Types of Inventory

Maintenance, repair and operating inventory are all the items an organization needs in order to operate, such as office equipment, packing boxes and tools to repair equipment. There are also other types of inventory that are classified based on the purpose they serve. These include transit inventory, which are products or components that are being moved from one location to another, such as from a warehouse to a factory; buffer inventory, which are excess inventory items that are kept on hand to protect against supply problems, such as poor quality or slow delivery of raw materials; and anticipation inventory, which are items that an organization stocks up on in case of excess demand -- such as in the build up to Christmas shopping.

**Models of Inventory control**

Different business owners and inventory managers will have varied approaches to inventory control. A business owners’ approach to inventory management will determine the company’s inventory levels, which can be make-or-break for any business selling goods.

Getting inventory to an optimum level so that demand is consistently met by supply – and vice versa – is key to the success of companies selling goods. Get the balance wrong, and you may risk running low on inventory and upsetting your customers. On the other end of the spectrum, if inventory levels aren’t ideal you may also risk holding excess or obsolete stock, resulting in inaccessible cash tied up in old stock.

For these reasons, it is essential that business owners determine the best model possible for nurturing inventory levels to get them ‘just right’. In this article, we look into two key models of inventory management: the deterministic model and the probabilistic model.

**Deterministic model**

Essentially, a deterministic model is one where inventory control is structured on the basis that all variables associated with inventory are known, predictable and can be predicted with a fair amount of certainty. Because of this, inventory is counted, tracked, stocked and ordered according to a stable set of assumptions that largely remain the same. So, with a deterministic model, it is presumed that factors such as lead time will remain stagnant.

In practice, a deterministic approach to inventory may see business owners or inventory managers blindly ordering inventory without considering variables that are subject to change. This may lead to, for example, over ordering a certain item in inventory on the basis that it has been popular over the past few months, without considering whether the trend may have passed (or may be about to pass).

In this situation, the company may end up with inventory gathering dust on shelves which is nearly impossible to sell, resulting in reduced profitability.

### Probabilistic model

On the other end of the spectrum is the probabilistic model, which says that there is generally some degree of uncertainty associated with inventory variables, the demand pattern in particular. With this model, everything inventory control related is predicated on the assumption that demand may fluctuate and may not always be predictable.

In practice, a probabilistic approach would be informed by the assumption that not everything is certain, especially relating to inventory. A probabilistic approach allows for fluctuations in demand and considers this when it comes to managing inventory.

Because of this, a probabilistic model may be the preferred approach for many business owners and inventory managers. By identifying changes in demand, inventory can be managed appropriately so that supply is neither excessive nor inadequate. When it comes to ordering inventory, historic sales trends won’t be the only factor taken into account but will be one of the various factors that will influence the final order.

By using a probabilistic model, inventory will be more adaptable, and therefore easier to mould along-side external changes.

# Material Requirements Planning (MRP)

Materials requirements planning (MRP) system is a software-based solution that works backwards from customer orders to determine when materials will be needed for production and then initiates their purchase to have delivery coincide with upcoming manufacturing runs and scheduled product delivery dates. It plans production, schedules raw material purchase and delivery, and manages completed inventory levels.

Since customers want and expect products to be delivered in a timely manner, manufacturers work to ensure they have enough inventory on hand to meet that demand, without going overboard.

## A Balancing Act

An MRP system is designed to do three main things:

1. Make sure raw materials and component parts are always on-hand for production, to keep the production schedule running smoothly
2. Support just-in-time (JIT) production by enabling the lowest levels of materials and inventory to be available and still keep production on track
3. Plan production schedules to meet customer demand for products in a timely manner.

## Controlling Costs

By managing materials and inventory levels, MRP systems help prevent revenue loss, which can happen when:

* Insufficient raw materials on-hand prevents scheduled production and customer delivery deadlines to be missed, causing contracts to be cancelled
* Overbuying raw materials causes cash to be tied up and unavailable for use in other areas of the company, such as hiring, marketing, or shipping
* Excess inventory risks product obsolescence and ties up cash that could be used elsewhere in the business

By connecting raw material delivery to production schedules and customer purchases, MRP systems keep production running smoothly.

# Just in Time (JIT)

The just-in-time (JIT) inventory system is a management strategy that aligns raw-material orders from suppliers directly with production schedules. Companies employ this inventory strategy to increase efficiency and decrease waste by receiving goods only as they need them for the production process, which reduces inventory costs. This method requires producers to forecast demand accurately.

The JIT inventory system contrasts with just-in-case strategies, wherein producers hold sufficient inventories to have enough product to absorb maximum market demand.

## How Just-in-Time (JIT) Works

One example of a JIT inventory system is a car manufacturer that operates with low inventory levels but heavily relies on its supply chain to deliver the parts it requires to build cars, on an as-needed basis. Consequently, the manufacturer orders the parts required to assemble the cars, only after an order is received.

For JIT manufacturing to succeed, companies must have steady production, high-quality workmanship, glitch-free plant machinery, and reliable suppliers.

JIT production systems cut inventory costs because manufacturers do not have to pay storage costs. Manufacturers are also not left with unwanted inventory if an order is canceled or not fulfilled.

**JIT : pros and cons**

**With the right approach, utilizing a JIT inventory management strategy has a number of potential benefits for businesses:**

* **Lower**[**inventory holding costs**](https://www.tradegecko.com/blog/7-ways-to-save-on-holding-costs?hsLang=en-us) – with inventory purchased or produced at short notice there’s no need to have unsold inventory taking up valuable warehouse space.
* **Improved**[**cash flow**](https://www.tradegecko.com/blog/what-is-the-difference-between-cash-flow-and-profit?hsLang=en-us) – without the need to store large volumes of inventory at all times, capital expenditure is reduced, and cash can be invested elsewhere.
* **Less**[**dead stock**](https://www.tradegecko.com/learning-center/what-is-dead-stock?hsLang=en-us) – because inventory levels rely on customer demand, there’s less risk of unwanted stock left sitting in your warehouse.

**On the flipside, though, Just in Time inventory management isn’t without its potential disadvantages:**

* **Problems with order fulfillment** – if a customer orders a product and you don’t yet have it in stock, you run the risk of not being able to fulfill the order in a timely fashion.
* **Little room for error**– doing JIT right means having accurate [demand forecasts](https://www.tradegecko.com/blog/what-is-demand-forecasting-and-how-can-it-help-your-business?hsLang=en-us) and insights into customers’ buying habits at all times. Any miscalculation could have a significant negative impact on business operations.
* **Price shocks**– with a Just in Time system, you don’t have the luxury of waiting around for the best prices on goods. When prices go up, profit margins go down.

# ****ERP inventory management****

ERP inventory management, short for enterprise resource planning inventory management, refers to an integrated approach to business planning and operations, in which businesses can manage all their finances, logistics, operations, and inventory in one place.

## ****Benefits of ERP inventory management****

The potential advantages of ERP inventory management are far-reaching:

### ****Increased efficiency****

There are huge time-saving implications of using an ERP inventory management system. Managing operations using a centralized system not only cuts down on double-handling but also allows for automation of daily tasks. This translates to increase production and more accurate output in less time.

### ****Cost savings****

Every business owner knows that efficiency equals cost savings. Rather than paying for segmented resources or systems to handle different parts of the business, ERP inventory management systems handle many working parts simultaneously, reducing overall workload and minimizing expenses.

### ****Supply chain transparency****

A growing number of businesses are using [shipping providers](https://www.tradegecko.com/blog/choose-the-best-shipping-provider?hsLang=en-us) or [3PLs](https://www.tradegecko.com/blog/3pl-everything-you-need-to-know-about-third-party-logistics?hsLang=en-us) to outsource their shipping and logistics requirements. An ERP inventory management system enables you to integrate with external partners to ensure all systems communicate with each other. Stock, order and shipping information is therefore synced across the entire supply chain.

### ****Accurate data collection and reporting****

With key updates on stock, orders, and customers in a single location, ERP inventory management enables quality data collection. Most systems will also allow you to create and save custom inventory and [sales reports](https://www.tradegecko.com/inventory-management-reports?hsLang=en-us) to track business performance and plan for growth.

### ****Enables business expansion****

ERP inventory management systems are designed to reduce manual labor, by automating and streamlining processes – all of which goes hand-in-hand with growing a business. If scaling up locally or expanding internationally is on your radar, an ERP inventory management system can provide the space and freedom you need to grow.

## ****Typical features of an ERP inventory management system****

As you might expect, ERP inventory management systems are designed to empower businesses to manage not just inventory, but all business operations from a single location. Some of the standard features of an [ERP inventory management system](https://www.tradegecko.com/tradegecko-pro?hsLang=en-us) include:

* Stock tracking and management
* Sales and purchase order management
* Multi-channel order fulfillment
* Warehouse management and stock transfers
* B2B e-Commerce functionality
* Payment gateway functionality
* Integrations with e-Commerce, accounting, shipping and other operational tools
* Intelligence reports and analytics

And that’s just scratching the surface! No two ERP systems are exactly the same, but their shared purpose is to centralize and streamline all facets of a business’ operations.