



Supply Chain Inventory Manangment



From Previous Session

- Supply chain structures **vary** significantly depending on the type of business, organizational size, and operating environment.
- Geographic location plays a critical role in **shaping** supply chain strategy, influencing transportation, supplier access, and lead times.
- **Customization** of supply chain processes is essential to align with business goals, customer expectations, and market conditions.
- Inventory acts as a **buffer** between supply and demand, ensuring continuity in operations and customer service



What is Inventory

Inventory

- Represents one of the **most valuable** assets for any business, particularly within manufacturing & supply chain management.
- Inventory refers to all the **items and materials** a company holds, ranging from raw materials awaiting production to finished goods ready for sales and MRO.

Effective **inventory management** ensures a business can meet customer demand without accumulating excessive inventory, which ties up capital and increases storage costs.





Management Vs Control

Inventory Management

Broad, strategic focus

Inventory management is the overall process of overseeing and controlling the ordering, storage, and use of a company's inventory. It includes forecasting, replenishment, lead time analysis, stock planning, and demand analysis.

Key responsibilities:

- ☐ Determining how much inventory to order and when to order
- ☐ Setting reorder points and safety stock levels
- ☐ Managing supplier relationships
- ☐ Forecasting demand
- ☐ Analyzing inventory turnover and performance



Management Vs Control

Inventory Control

Narrower, operational focus

Inventory control refers to the day-to-day activities that ensure physical inventory is accurately tracked, stored, and managed. It's about ensuring the right quantity of products is in the right place at the right time.

Key responsibilities:

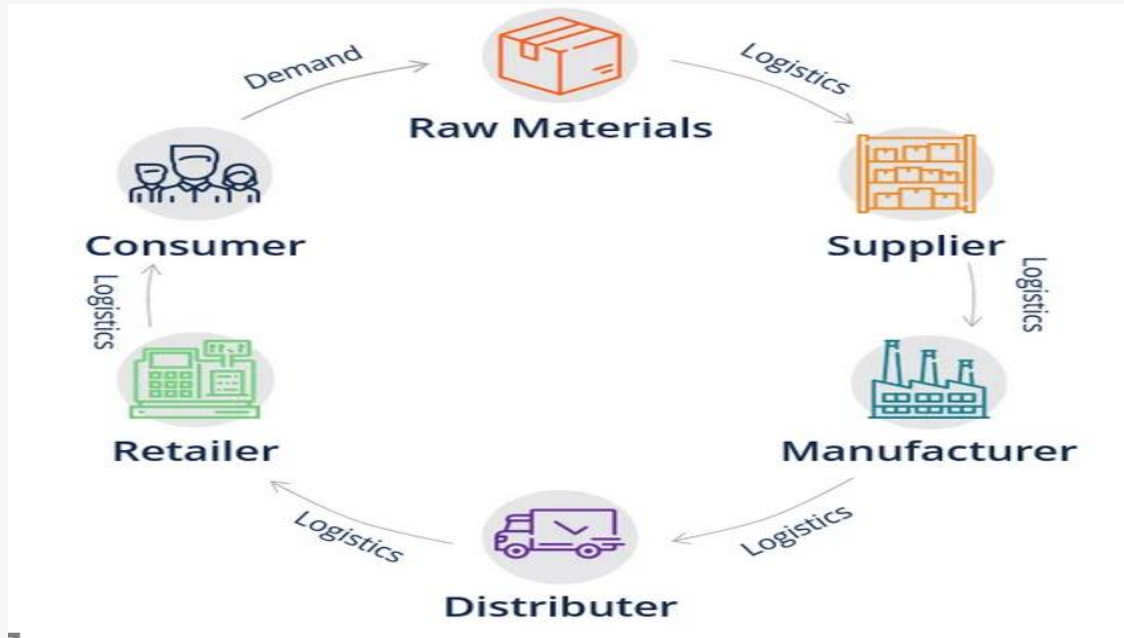
- ☐ Monitoring stock levels in real-time
- ☐ Managing stock locations (e.g., shelves, bins)
- ☐ Performing cycle counts and audits
- ☐ Preventing theft, damage, or spoilage
- ☐ Handling stock discrepancies
- ☐ Using tools like barcoding, RFID, or ERP systems



Management Vs Control

Aspect	Inventory Management	Inventory Control
Scope	Strategic / broad	Tactical / operational
Focus	Planning and Optimization	Monitoring and Accuracy
Goal	Ensure availability & reduce holding costs	Ensure inventory accuracy and reduce waste
Activities	Forecasting, Ordering, Supplier Mgmt	Counting, tracking, loss prevention
Tools used	ERP systems, demand planning tools	Barcode scanners, inventory control systems

Role of Inventory within Supply Chain Life Cycle



Inventory is an integral to the supply chain, bridging production and customer fulfillment. Proper inventory management ensures that materials work in progress and finished products flow efficiently from one stage to the next, aligning production schedules with market demand

Types of Inventory

1

Raw Materials

2

**Work in Progress
(WIP)**

3

Finished Goods

3

MRO

4

Packing Materials

Retailers

Pre-Packaged & ready for sale — the retailer doesn't assemble or modify them. Considered inventory until they are sold



Types of Inventory



1

Raw Materials

- Boeing (Aerospace Manufacturer)
Inventory Examples: Aluminum sheets, Wiring
- Nestlé (Food & Beverage)
Inventory Examples: Cocoa, sugar, milk powder, coffee beans

Types of Inventory



2

Work in Progress (WIP)

- Toyota (Automobile Manufacturer)
Inventory Examples: Partially assembled vehicles, unpainted car bodies
- Intel (Semiconductor Manufacturer)
Inventory Examples: In-process microchips or not yet fully fabricated

Types of Inventory

3



Finished Goods

- Apple (Consumer Electronics Retailer & Manufacturer)
Inventory Examples: iPhones, MacBooks, iPads ready for sale in stores
- Nike (Footwear and Apparel)
Inventory Examples: Sneakers,

Types of Inventory



3

MRO

- Amazon (Fulfillment Centers)
Inventory Examples: Packing tape, tools, cleaning supplies, scanners — all used to maintain operations
- Saudia Airlines
Inventory Examples: Aircraft maintenance tools, lubricants, safety equipment

Types of Inventory



- FedEx

Inventory Examples: Shipping boxes, bubble wrap, pallet wrap

4

Packing Materials

Types of Inventory



Clothing Retailer

Zara

Inventory Examples: Finished fashion items (dresses, shirts, jeans) in stores and warehouses

Electronics Retailer

Best Buy

Inventory Examples: TVs, laptops, phones, headphones — all held for resale

Grocery Retailer

Kroger / Tesco

Inventory Examples: Fresh produce, canned goods, dairy products, cleaning supplies

Retailers

Main Players

Major Players in the Retail Supply Chain



Main Players

Feature	Manufacturer	Distributor	Wholesaler	Retailer
Creates product	✓	✗	✗	✗
Buys in bulk	✗	✓	✓	✓
Sells to end customer	✗	✗	✗	✓
Adds branding/marketing	Sometimes	No	No	Yes
Stores inventory	Sometimes	Yes	Yes	Yes

Example

Role	Example	Function in Supply Chain
Manufacturer	Nike Inc. (factories in Vietnam, China, etc.)	Produces the shoes from raw materials.
Distributor	Ingram Micro , or Nike's regional distribution centers	Moves bulk products from Nike to wholesalers or retailers; may handle storage
Wholesaler	Footwear wholesalers like Zappos' warehouse (if selling B2B)	Buys in bulk from distributors/manufacturers, sells to retailers. Usually doesn't sell directly to consumers.
Retailer	Foot Locker, Nike Store, Amazon	Sells directly to the final customer. Often buys from wholesaler or distributor.

Example

Role	Example in Saudi Arabia	Function in Supply Chain
Manufacturer	Nova Water (Health Water Bottling Co. Ltd.)	Produces the bottled water at its factory (e.g., in Al Kharj).
Distributor	Tamimi Logistics or Nova's own distribution fleet	Distributes bottled water across the Kingdom to wholesalers and large retailers.
Wholesaler	BinDawood Group Warehouse, local food & beverage wholesalers in Riyadh/Jeddah	Buys large quantities and sells to small shops, restaurants, etc.
Retailer	Panda, Tamimi Markets, Baqala (local grocery), or online grocery apps like Nana	Sells directly to end consumers. Offers convenience and packaging for retail purchase.

What is Inventory Costs

Inventory costs represent the total expenses associated with acquiring, storing, and managing inventory throughout its lifecycle.



Ordering Costs

**Holding
(Carrying)
Costs**



**Stockout
(Shortage)
Costs**

Purchase Costs



What is Inventory Costs



Ordering Costs

What:

Costs incurred every time an order is placed to replenish inventory. This includes costs for order processing, shipping, receiving, and inspection.

Amazon places millions of orders with suppliers worldwide. Each order requires **administrative work**, **shipping fees**, and **logistics coordination**. Even if an order is small, these costs remain, so Amazon tries to balance order size and frequency to minimize ordering costs.

Impact:

Placing many small orders increases ordering costs; placing fewer large orders reduces ordering costs but may increase holding costs.

Formula: Total Ordering Cost = Number of Orders per Period × Cost per Order

What is Inventory Costs



Holding (Carrying) Costs

What:

Costs associated with storing unsold inventory. This includes warehousing rent, utilities, insurance, security, depreciation, and obsolescence risk

Apple produces large quantities of iPhones and other devices. Holding excess inventory ties up capital and risks obsolescence (older models becoming outdated quickly). Apple's holding costs include storage in warehouses, insurance, and potential markdowns for unsold stock.

Impact:

Higher inventory levels increase holding costs, so companies like Apple strive to keep inventory lean but sufficient to meet demand.

Formula: Holding Cost = Average Inventory Level × Holding Cost per Unit

What is Inventory Costs



Stockout (Shortage) Costs

What:

Costs when inventory runs out, leading to lost sales, delayed orders, or customer dissatisfaction

Imagine **Nike** runs out of popular sneaker sizes during a major sale. The company loses potential sales, damages customer loyalty, and may lose customers to competitors.

Impact:

Stockouts can result in lost revenue and damage brand reputation, pushing companies to maintain safety stock or better forecast demand.

Formula: $\text{Stockout Cost} = \text{Number of Stockouts} \times \text{Cost per Stockout}$

What is Inventory Costs



Purchase Costs

What:

The actual cost of buying the inventory items, which might vary based on order size, supplier negotiations, and bulk discounts.

Walmart uses its massive buying power to negotiate lower purchase costs from suppliers. By purchasing in bulk, Walmart reduces its per-unit cost, allowing competitive pricing.

Impact:

Lower purchase costs improve profit margins but may lead to higher holding costs if inventory levels grow too large.

Summary

Inventory Cost Type	Description	Business Impact
Ordering Cost	Cost per order placed	More orders → higher cost, fewer orders → risk stockouts
Holding Cost	Storage, insurance, depreciation	Higher inventory → higher cost, risk of outdated products
Stockout Cost	Lost sales, customer dissatisfaction	Stockouts → lost revenue & damaged reputation
Purchase Cost	Cost to buy goods	Bulk buying → lower cost but possibly higher holding costs

What is Inventory Costs

Formula: Shrinkage Cost = (Recorded Inventory - Actual Inventory) × Cost per Unit



Shrinkage Costs

Losses due to theft,
damage, or
inaccuracies in
inventory records