

# Information Systems and Supply Chain Management

CHAPTER 10

# Questions

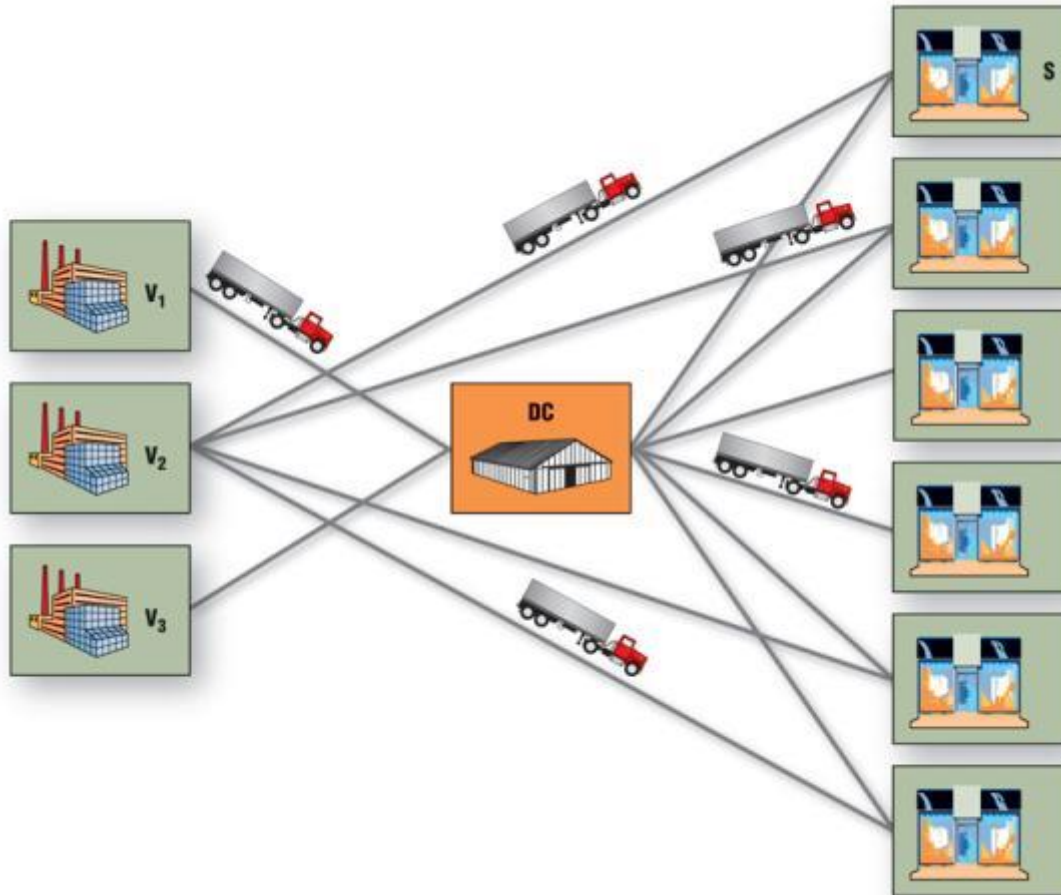
- How does merchandise and information flow from the vendor to the retailer to consumers?
- What activities are undertaken in a distribution center?
- What information technology (IT) developments are facilitating vendor-retailer communications?
- How do retailers and vendors collaborate to make sure the right merchandise is available when customers are ready to buy it?
- What are the benefits to vendors and retailers of collaboration on supply chain management?
- What is RFID, and how will it affect retailing?

# Supply chain management .....

- Efficient and effective integration of suppliers, manufacturers, warehouses, stores, and transportation intermediaries into a seamless value chain.
- Merchandise is produced and distributed in the right quantities; to the right locations; and at the right time.
- Minimization of system wide costs, while satisfying the service levels their customers require.



# Illustration of Supply Chain



# Strategic Importance of Supply Chain Management

- Opportunity to Increase Sales by Making the Right Merchandise is in the Right Place at the Right Time
  - Fewer Stock-outs
  - Greater Assortment with Less Inventory
- Opportunity to Reduce Costs
  - Transportation Costs
  - Inventory Holding Costs
- Improved ROI



# Strategic Advantage : ZARA

- Timely information from store managers with handheld devices to the corporate office
- Shorter cycle time from design to production to delivery to stores
- Shorter lead time – own production, small quantity production in close proximity, efficient logistics, premium transportation, frequent delivery
- No discounts necessary



# Strategic Advantage : Wal-Mart

- Wal-Mart's success is from its information and supply chain management systems
- Why are competitor's lagging behind?
  - Made a substantial investment in developing its systems and has the scale economies
  - Through experience and learning, changes are always made to improve the system
  - Coordinated effort of employees and functional areas throughout the company

# Improved Product Availability

- Benefits of Efficient Supply Chain Management to Customers:
  - Reduced stockouts – merchandise will be available when the customer wants them
  - Tailoring assortments – the right merchandise is available at the right store

These benefits translate into greater sales, lower costs, higher inventory turnover, and lower markdowns for retailers



# Higher Return on Investment

**Return on assets = Net profit margin x Asset turnover**

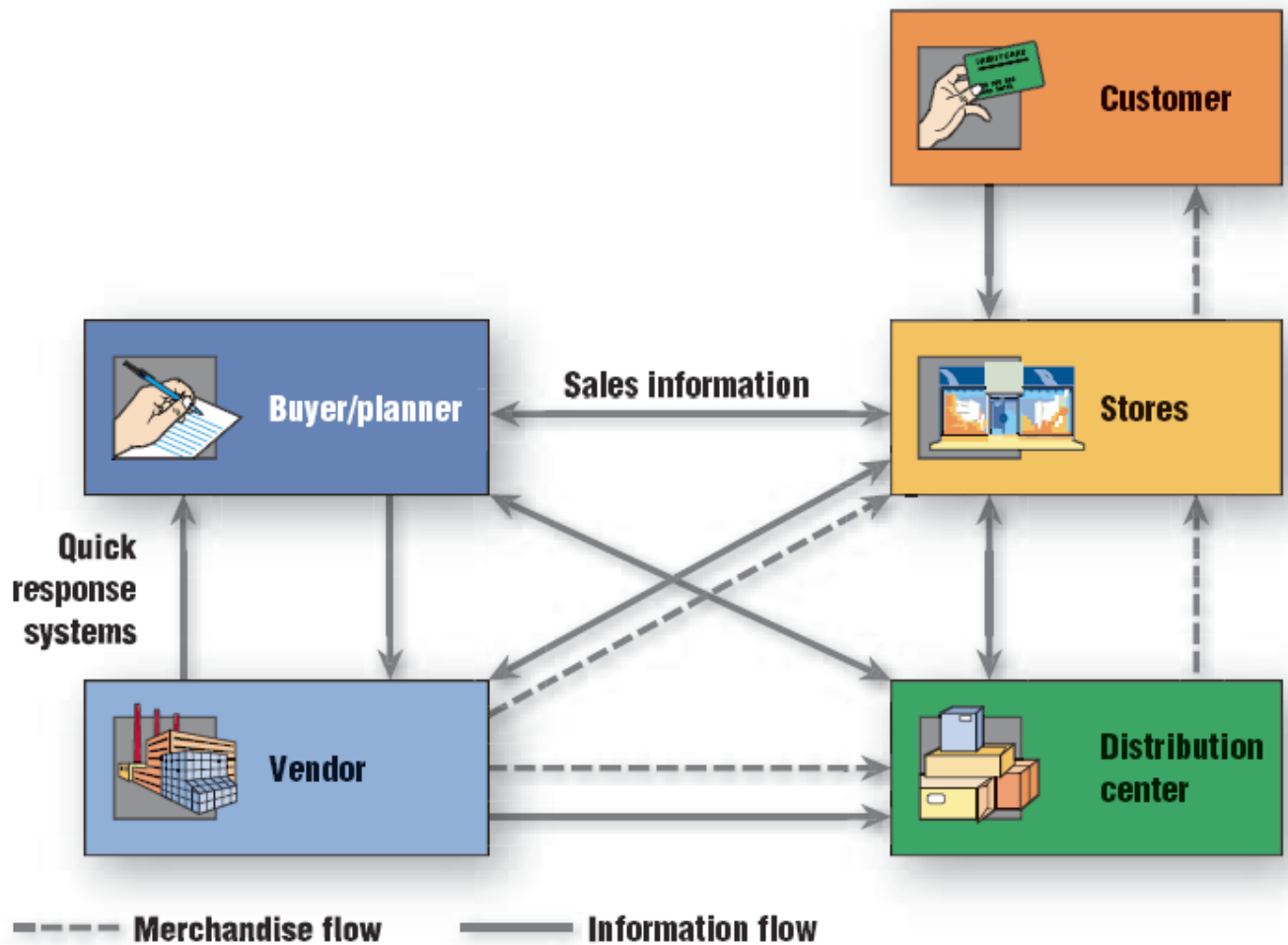
$$\frac{\text{Net profit}}{\text{Total assets}} = \frac{\text{Net profit}}{\text{Net sales}} \times \frac{\text{Net sales}}{\text{Total assets}}$$

Efficient Supply Chain Management leads to →

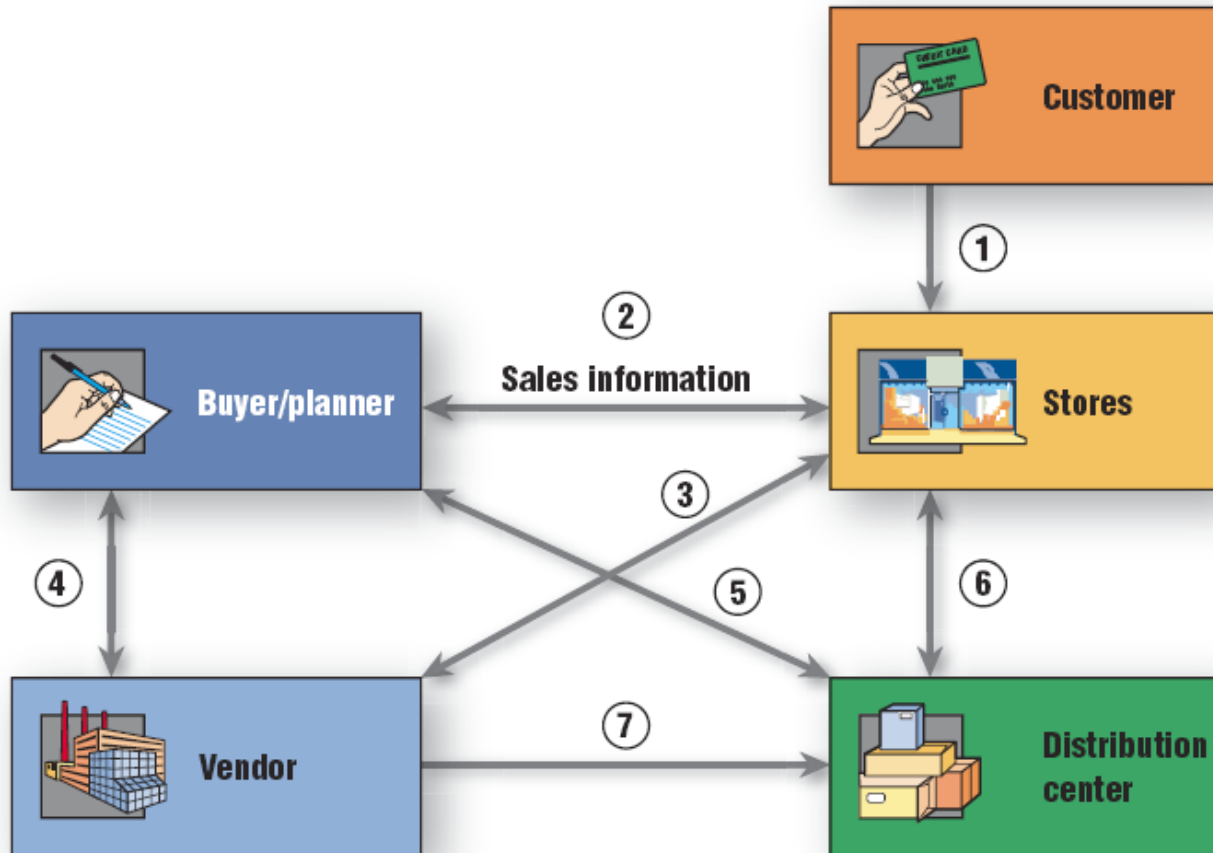
- Increased Sales from more attractive assortments in stock
- Improved Net Profit Margins from increased gross margin and lowered expenses
- Lowered inventory from less backup inventory in stock and higher asset (inventory) turnover

**Same Sales Using Less Inventory**

# Information and Merchandise Flows



# Information Flows



# Information Flows

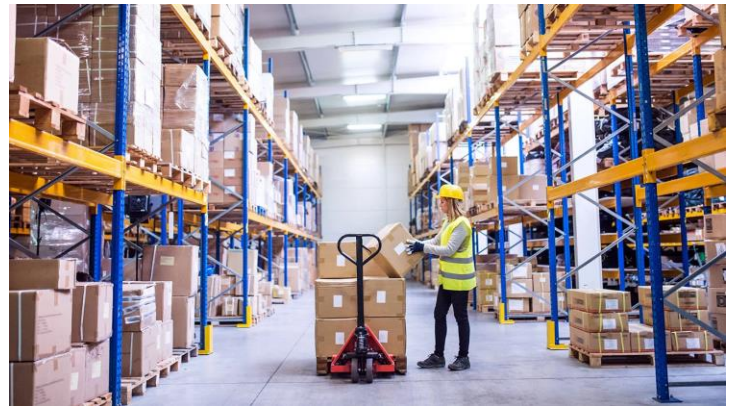
When a customer purchases a toaster oven, sales associate scans UPC code on merchandise and customer credit card/loyalty card (Flow 1)



Information about purchase is transmitted from POS terminal to the buyer/planner. The planner uses this information to monitor and analyze sales and decide to reorder more toaster ovens or reduce its prices if sales are below expectations (Flow 2)

# Information Flows

Sales transaction data are sent directly from the store to the vendor, and the vendor decides when to ship more toaster ovens to the distribution center and stores (Flow 3)



When inventory drops to a specified level in the distribution center, buyer/planner communicates with vendor, and then places a purchase order to re-supply stores with toaster ovens (Flow 4)

# Information Flows

Buyer/planner notifies distribution center about incoming orders and how they are to be distributed to stores (Flow 5)



Store managers inform distribution center about receipt of toaster ovens and coordinate deliveries (Flow 6)

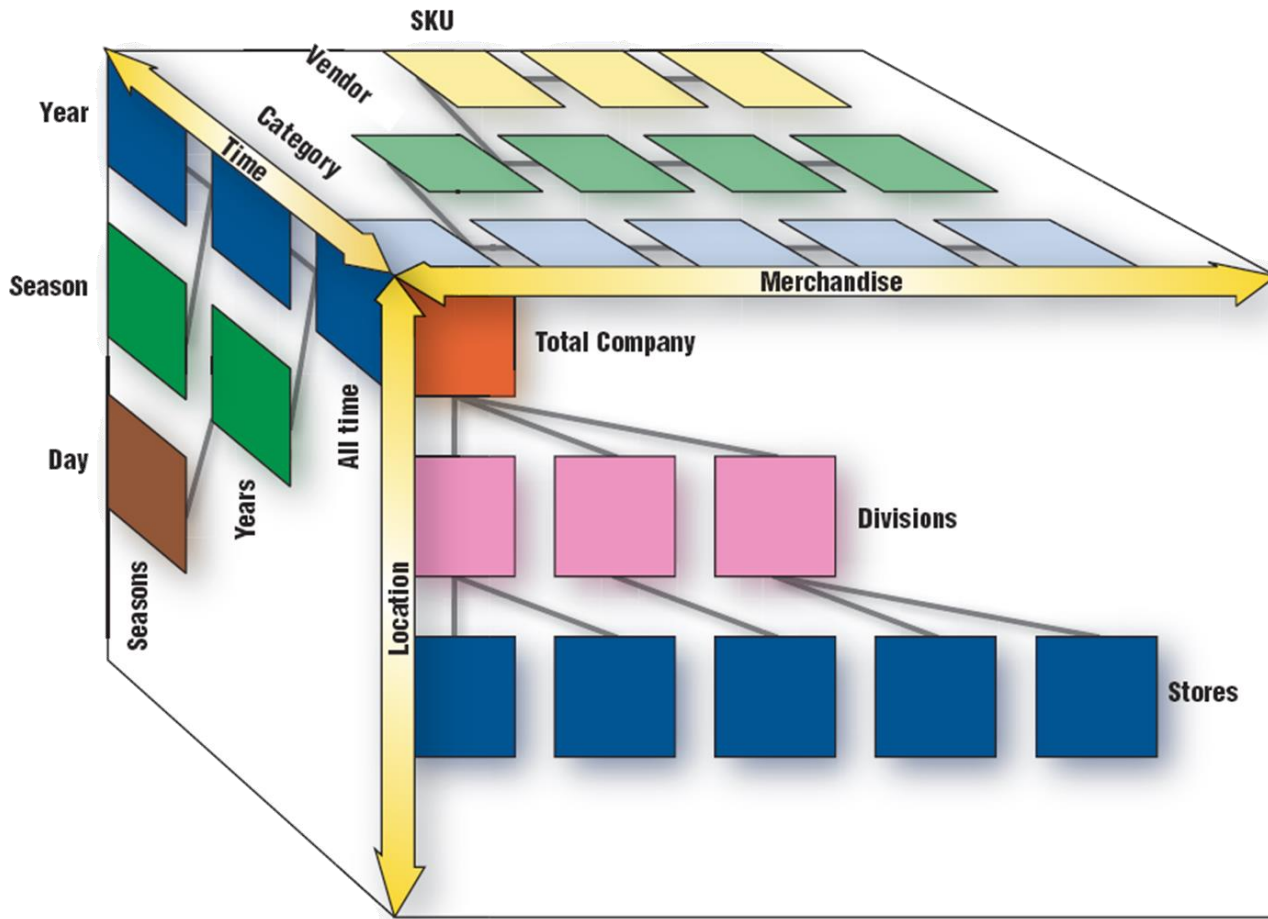


When the manufacturer ships the toaster ovens to the distribution center, it sends an advanced shipping notice to the distribution center (Flow 7)

# Data Warehousing

- Data warehousing is the coordinated and periodic copying of data from various sources, both inside and outside the enterprise, into an environment ready for analytical and informational processing
- *Wal-Mart makes good use of its data warehouse. Experts estimate that it is second in size only to that of the U.S. government*

# Data Warehousing



SOURCE: SAS Retail.

# Electronic Data Interchange

- EDI is the computer-to-computer exchange of business documents between retailers and vendors
  - Merchandise sales, Inventory On Hand, Orders
  - Advanced shipping notices,
  - Receipt of merchandise, Invoices for payment

# Electronic Data Interchange

- EDI is the computer-to-computer exchange of business documents between retailers and vendors
  - Standards:
    - UCS (Uniform Communication Standard)
    - VICS (Voluntary Interindustry Commerce Solutions)
  - Transmission system:
    - Intranet: local area network (LAN) that employs Internet technology
    - Extranet: collaborative network that uses Internet technology to link businesses with suppliers, customers, etc.

# EDI Security

- There are implications of security failures (loss of data, loss of public confidence), but retailers have security policy objectives:

Authentication – system assures person on other end of session is who it claims to be

Authorization - that person has permission to carry out request

Integrity – info arriving is the same that was sent

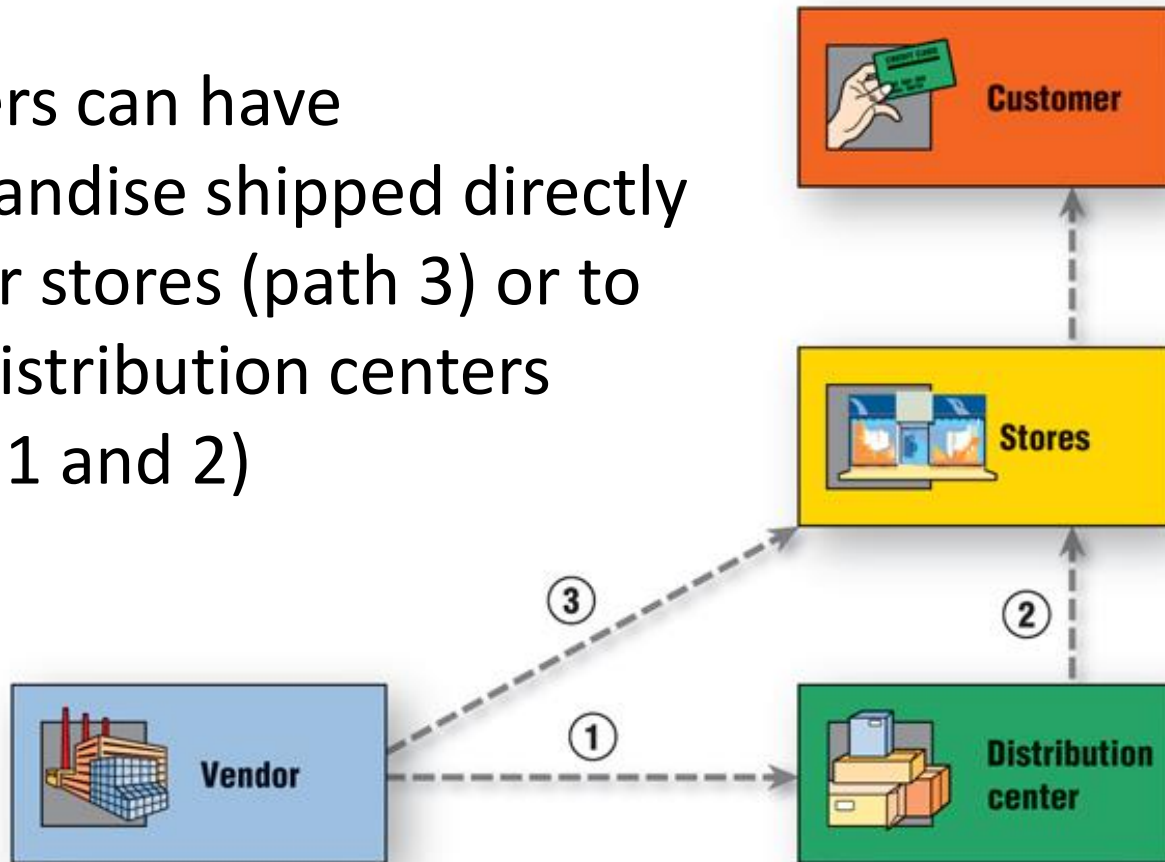


# The Physical Flow of Merchandise - Logistics

- Logistics:
  - The aspect of supply chain that refers to the planning, implementation, and control of the efficient flow and storage of goods, services, and related information from the point of origin to the point of consumption to meet customers' requirements

# Merchandise Flow

Retailers can have merchandise shipped directly to their stores (path 3) or to their distribution centers (paths 1 and 2)



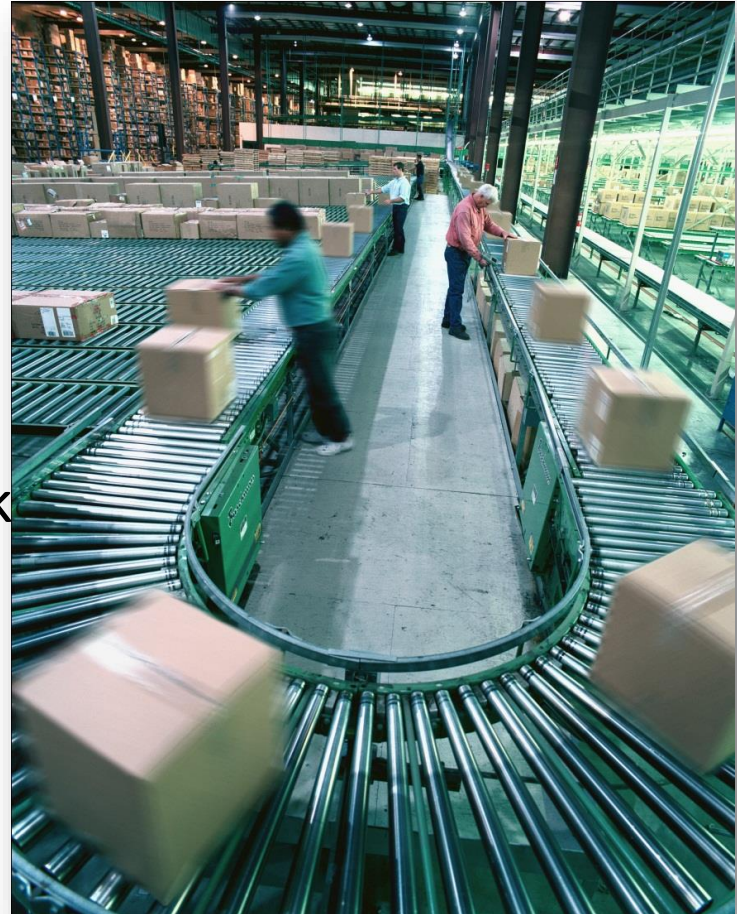
# Activities Performed by Distribution Center

- Managing inbound transportation
- Receiving and checking merchandise
- Storing or cross docking merchandise
- Getting merchandise floor ready
  - Ticketing and marking
  - Putting on hangers
- Preparing to ship merchandise to a store
- Managing outbound transportation



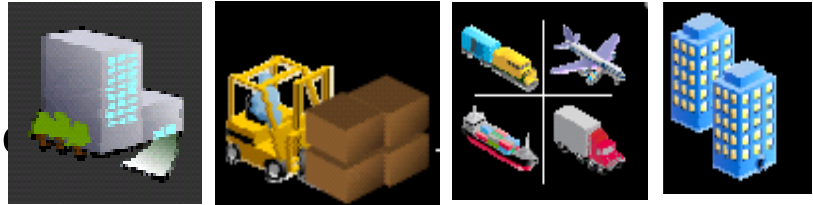
# Advantages of Using a Distribution Center

- More accurate sales forecasts are possible when retailers combine forecasts for many stores serviced by one distributor
- Enables retailers to carry less merchandise in the store
- Easier to avoid running out of stock
- Retail store space is more expensive than space at the distribution center



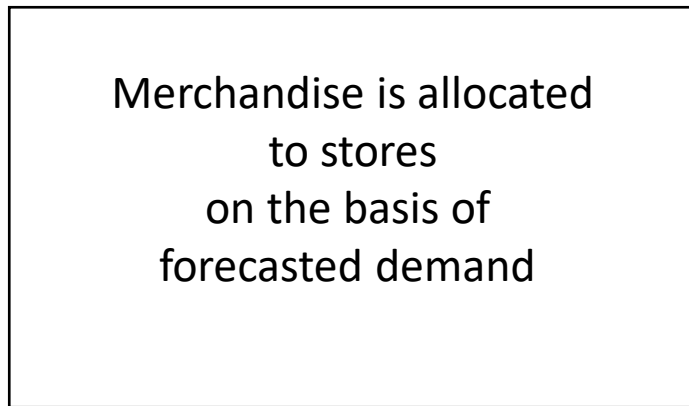
# Outsourcing Logistics

- Retailers consider outsourcing logistical functions if those functions can be performed better or less expensively by third-party logistics companies
- Transportation
- Warehousing
- Freight Forwarders
- Integrated Third-Party Logistics Solutions

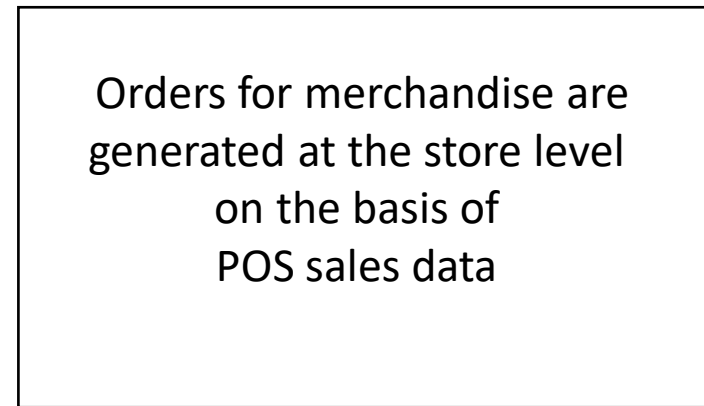


# Pull and Push Supply Chain

## Push Supply Chain



## Pull Supply Chain



Less costly than a pull supply chain  
Less sophisticated information needed system  
to support it  
Efficient for merchandise that has steady,  
predictable demand

Less likely to be overstocked or out of stock  
Increases inventory turnover  
Responsive to changes in customer demand  
Efficient when demand is uncertain, and hard  
to forecast

# Advantages of Direct Store Delivery

- Gets merchandise faster, and is thus used for perishable goods (meat and produce)
- Helps the retailer's image of being the first to sell the latest product (video games) or fads
- Some vendors provide direct store delivery for retailers to ensure that their products are on the store's shelves, properly displayed, and fresh

# Reverse Logistics

- The process of moving returned goods from their customer destination for the purpose of capturing value or proper disposal
- Retailers recover loss through on-line auctions
- Reverse-logistics systems are challenging
  - Items may be damaged or require special handling
  - Transportation costs are high

# Supply Chain for Fulfilling Catalog and Internet orders

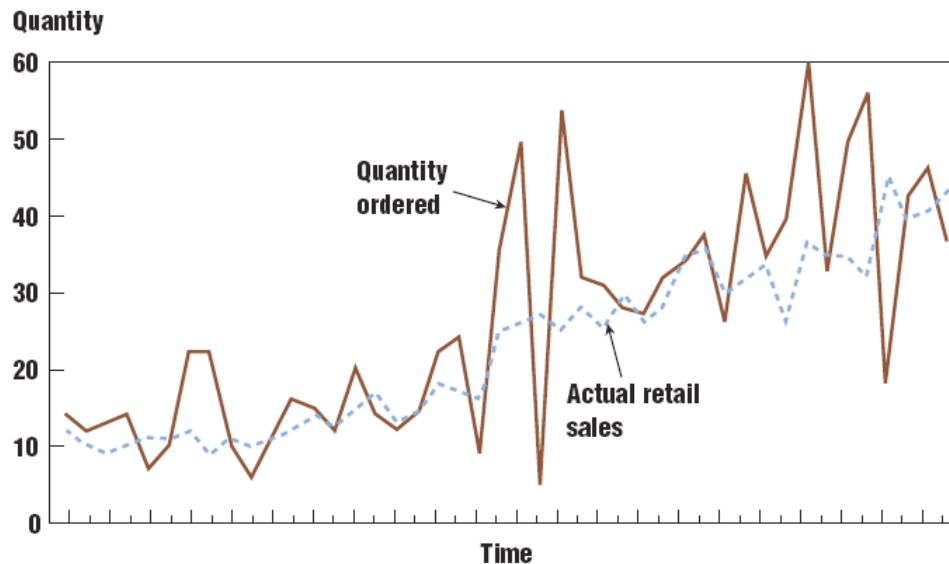
- When fulfilling orders from individual consumers, retailers ship small packages with one or two items to a large number of different places
  - Distribution centers for picking and packing orders for consumers

# Drop Shipping

- **Drop-shipping**, or *consumer direct fulfillment*, is a system in which retailers receive orders from customers and relay these orders to vendors and then the vendors ship the merchandise ordered directly to the customer.
- Drop-shipping has been used for years by companies that sell bulky products such as lumber, iron, and petroleum, as well as catalog and mail-order companies.

# Collaboration between Retailers and Vendors in Supply Chain Management

- Bullwhip Effect - The built up inventory in an uncoordinated channel where retailers and vendors do not coordinate their supply chain activities



# What Causes a Bullwhip Effect?

- Delays in transmitting orders and receiving merchandise
- Over-reacting to shortages
- Ordering in batches rather than generating a number of small orders

# Collaboration between Retailers and Vendors in Supply Chain Management

Four approaches for coordinating supply chain activities to reduce the level of inventory in the chain and reduce the number of stock-outs

(in order of the level of collaboration)



- Use EDI
- Share information to reduce need for backup inventory, improve sales forecasts and production efficiency
- Vendor manage inventory (VMI)
- Collaborative planning, forecasting and replacement (CPFR)

# Initial Efforts at Coordinating Vendor and Retailer Supply Chain

## **Efficient Consumer Response (ECR) – Food Retailing**

- Trade Promotions => Forward Buying  
=> Extremely Uneven Production
- Motivation for Packaged Goods Mfrg
  - Stop Price Promotion, Forward Buying
  - Level Out Demand
- Motivation for Supermarkets
  - Rise of Warehouse Clubs/Discount Store
    - Use of EDLP Pricing
  - Need to Become More Efficient
  - Excessive Inventory - \$30 Billion

## **Quick Response (QR) - Apparel**

- Inherently Unpredictable Demand
- Old Solution - Over Buying and Markdown
- Quick Response (modeled after JIT)
  - Provide Initial Assortment
  - Forecast Sales for Intermediate Form
  - Monitor Early Sales
  - Make Final Assortment

# Vendor Managed Inventory (VMI)

- Manufacturer access to POS information
- Replenishment automatically triggered
- Enables demand-based view of replenishment & production planning
  - reduce bull whip effect

# CPFR (Collaborative Planning, Forecasting, and Replenishment)

- Developed by VICS and adopted by ECR Europe
- The sharing of forecast and related business information and collaborative planning between retailers and vendors to improve supply chain efficiency and product replenishment
- The most advanced form of retailer-vendor collaboration that involves sharing proprietary information, such as business strategies, promotion plans, new product developments and introductions, production schedules, and lead time information.

# CPFR (Collaborative Planning, Forecasting, and Replenishment)

- Common goals
- A single demand forecast developed collaboratively
- Collaborative Promotional planning & execution
- A single, shared data source
- Improved inventory management across Supply Chain
- Optimized replenishment strategies with joint ownership
- Process simplicity creates optimal framework for success

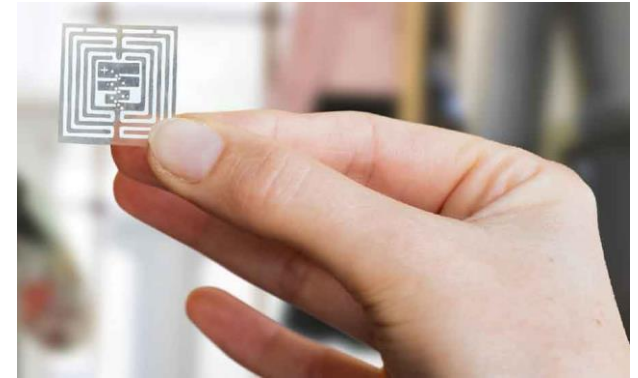
# Radio Frequency Identification (RFID)

- Radio Frequency Identification (RFID) allows an object or a person to be identified at a distance using radio waves.
- Reduces warehouse and distribution labor costs
- Reduces point of sale labor costs
- Inventory savings by reducing inventory errors
- Reduces theft – products can be tracked
- Reduces out of stock conditions



# Impediments to the Adoption of RFID

- RFID is expensive – the return on investment is low
- It still only makes sense to put tags on pallets, cartons, expensive merchandise or high theft items
- RFID generates more data than what can be currently processed
- Consumers worry about privacy invasion



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