Param Pujya Dr. Babasaheb Ambedkar Smarak Samiti's
Dr. Ambedkar Institute of Management Studies & Research
Deeksha Bhoomi, Nagpur - 440010 (Maharashtra State) INDIA
NAAC Accredited with 'A' Grade
Tel: +91 712 6521204, 6521203 ,6501379
Email: info@daimsr.in

Unit II
Role of distribution in Supply Chain

Programme Educational Objectives

Our program will create graduates who:

1. *Will be recognized as a creative and an enterprising team leader.*
2. *Will be a flexible, adaptable and an ethical individual.*
3. *Will have a holistic approach to problem solving in the dynamic business environment.*

Logistics and Supply Chain Management
Course Outcomes

- CO1-Given a business situation containing the data (material and information flow) from supplier to manufacturer to the retailer, the student manager will be able to identify and explain the best Supply Chain strategy from the five supply chain strategies.

- CO2-Given a particular type of product, its manufacturer and customer, the student manager will be able to select, construct and explain the appropriate distribution network design type.

- CO3-Supplier is not able to deliver the products to the manufacturer because of one of the reasons (such as exchange rates, reliability of transportation channels, transfer price, political stability, and natural calamity). Student manager will be able to explain different types of uncertainties its solutions.

- CO4-Student manager will be able to explain all the modes of transportation and for given a situation, would be able to identify the appropriate mode of transportation.

- CO5-Student manager will be able to explain the role of technology in intermodal freight transportation and enlist and explain various technological tools, for intermodal freight security.

Distribution

- Distribution refers to the steps taken to move and store a product from the supplier stage to a customer stage in the supply chain.

- Distribution is a key driver of the overall profitability of a firm because
-
- **It directly impacts both the supply chain cost and the customer experience**.

Good distribution can be used to achieve a variety of supply chain objectives ranging……

from low cost to high responsiveness.

Response time

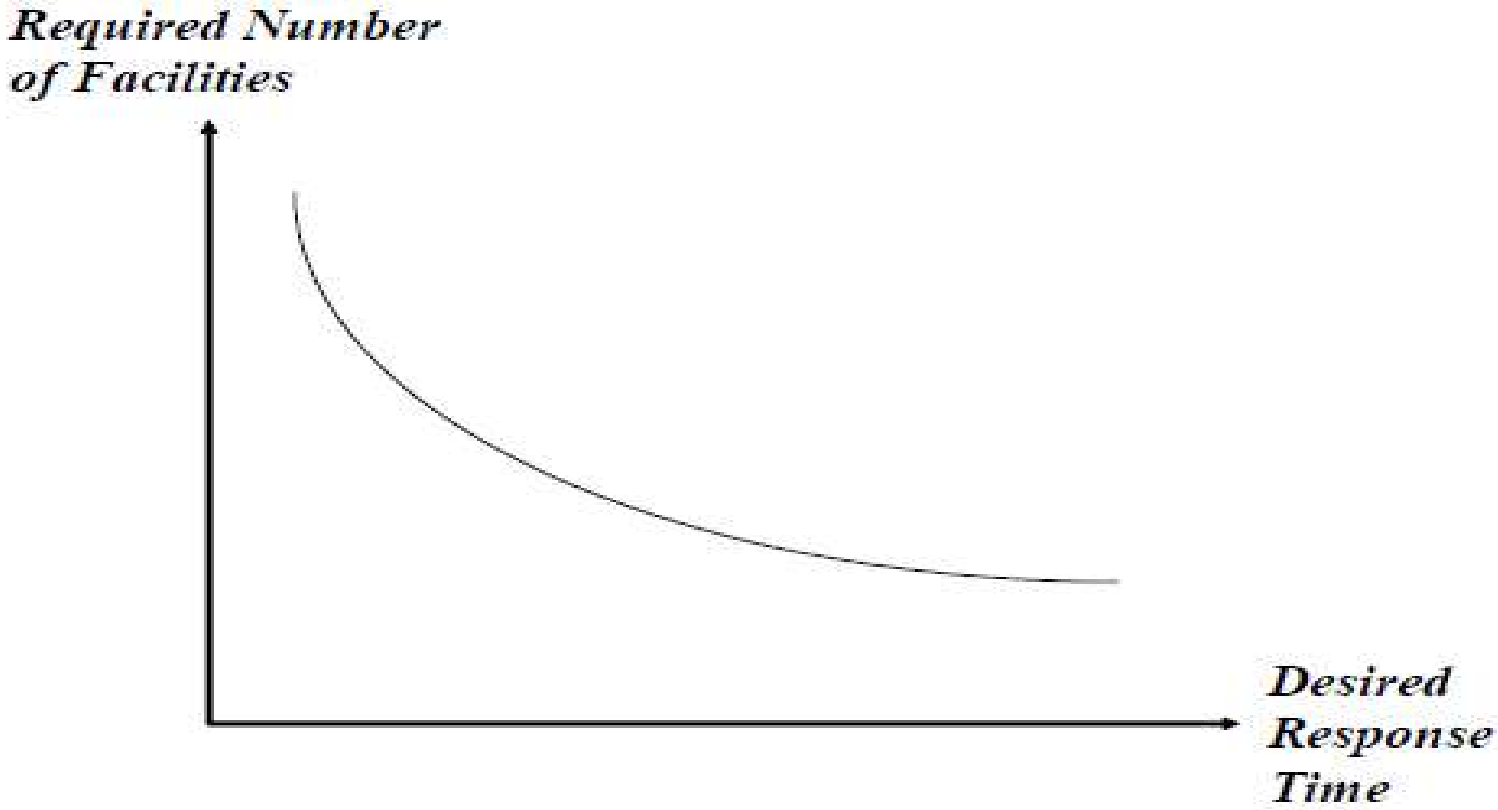


Figure 4.1: Relationship between desired response time and number of facilities

Changing the distribution network design affects the following supply chain costs:

- Inventories
- Transportation
- Facilities and handling
- Information

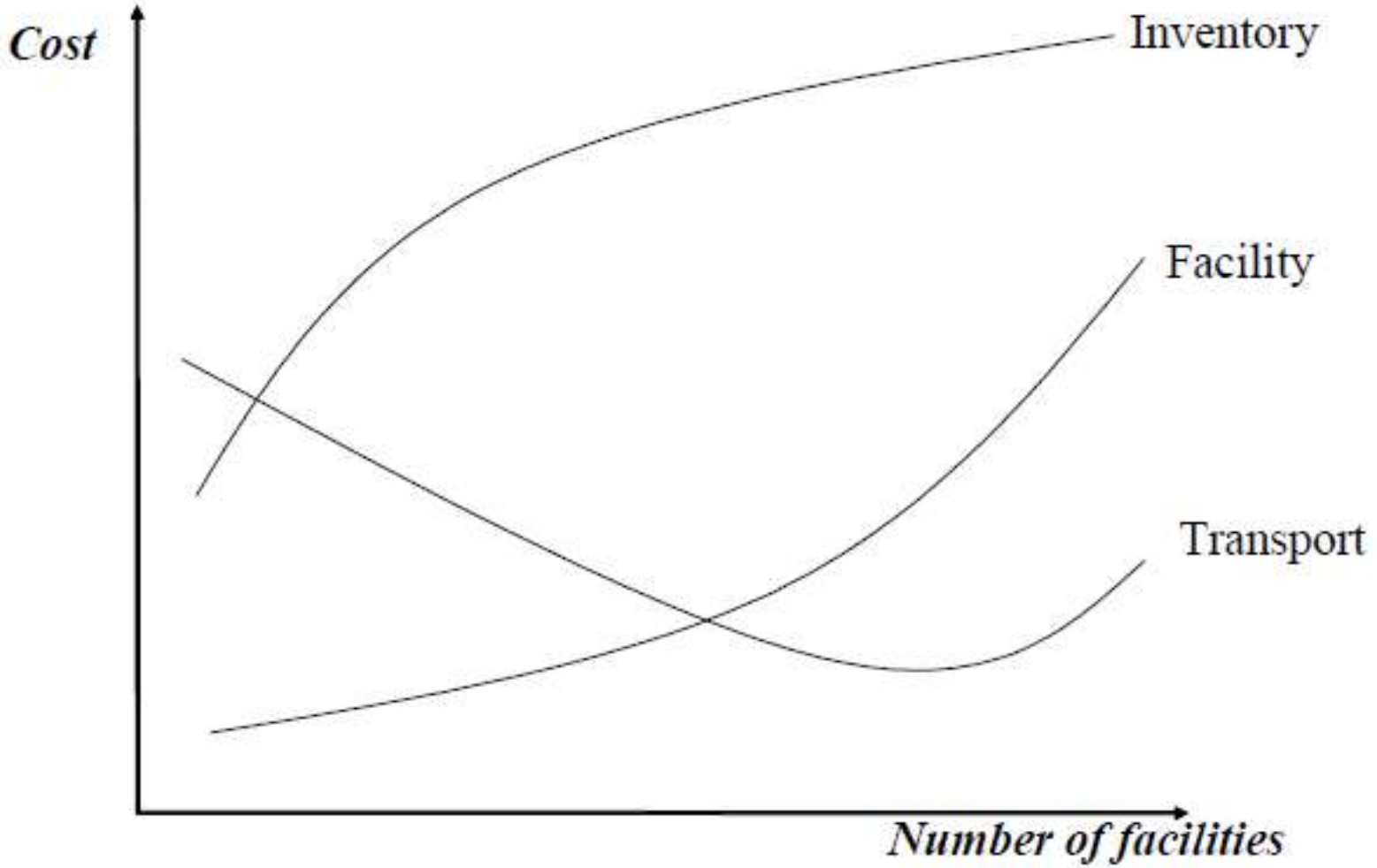


Figure 4.2: Relationship between number of facilities and logistics cost

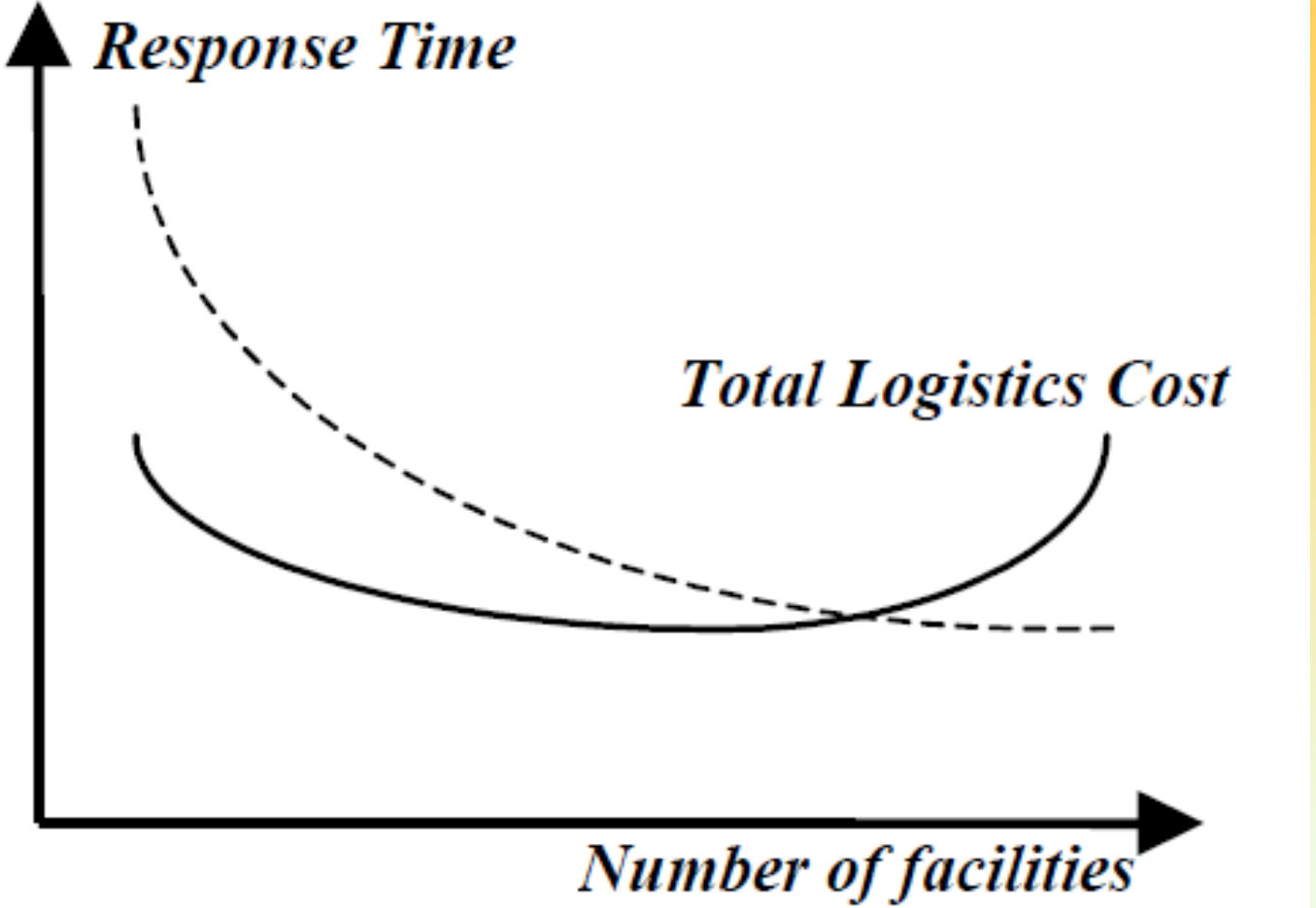


Figure 4.3: Variation in Logistics Cost and Response Time with Number of Facilities

Contd....

- **Product variety**
- **Product availability**
- **Customer experience (Amazon vs. Borders) • Order visibility**
- **Returnability**

Unit II

Factors influencing distribution network design

AMAZON.COM

- Drop-shipping fulfillment.
- Under an alternative arrangement.
- Ingram Amazon.
- Return Rates. 
- Customer Centric Model

Customer Centric

"If you do build a great experience, customers tell each other about that. Word of mouth is very powerful." Jeff Bezos

Customer focus

"We start with the customer and work backward."

Following a bottom-up approach, every decision at Amazon is driven by the customer's needs.

Frugality

"Amazon is spending money on things that matter to customers."

Frugality is part of the company's DNA: Amazon is continually looking for ways to do things cost-effectively.

Innovation

"I think frugality drives innovation, just like other constraints do."

Amazon is always looking for simple solutions in order to provide lower prices to its customer.

Amazon created a **trusted, informative** and **loyal** relationship with its customers.

Amazon Vs. Borders

E-books vs. Printed books

Social media, DVRs, search engines, caller ID, vs.
Cold-calling, TV advertisements, and the Yellow Pages

Electronic vs. Retail market

Attention vs. No attention

Factors Influencing Distribution Network Design

At the highest level, performance of a distribution network should be evaluated along two dimensions:

1. Customer needs that are met

2. Cost of meeting customer needs

The customer needs that are met influence the company's revenues, which along with cost decide the profitability of the delivery network.

- While customer service consists of many components, we will focus on those measures that are

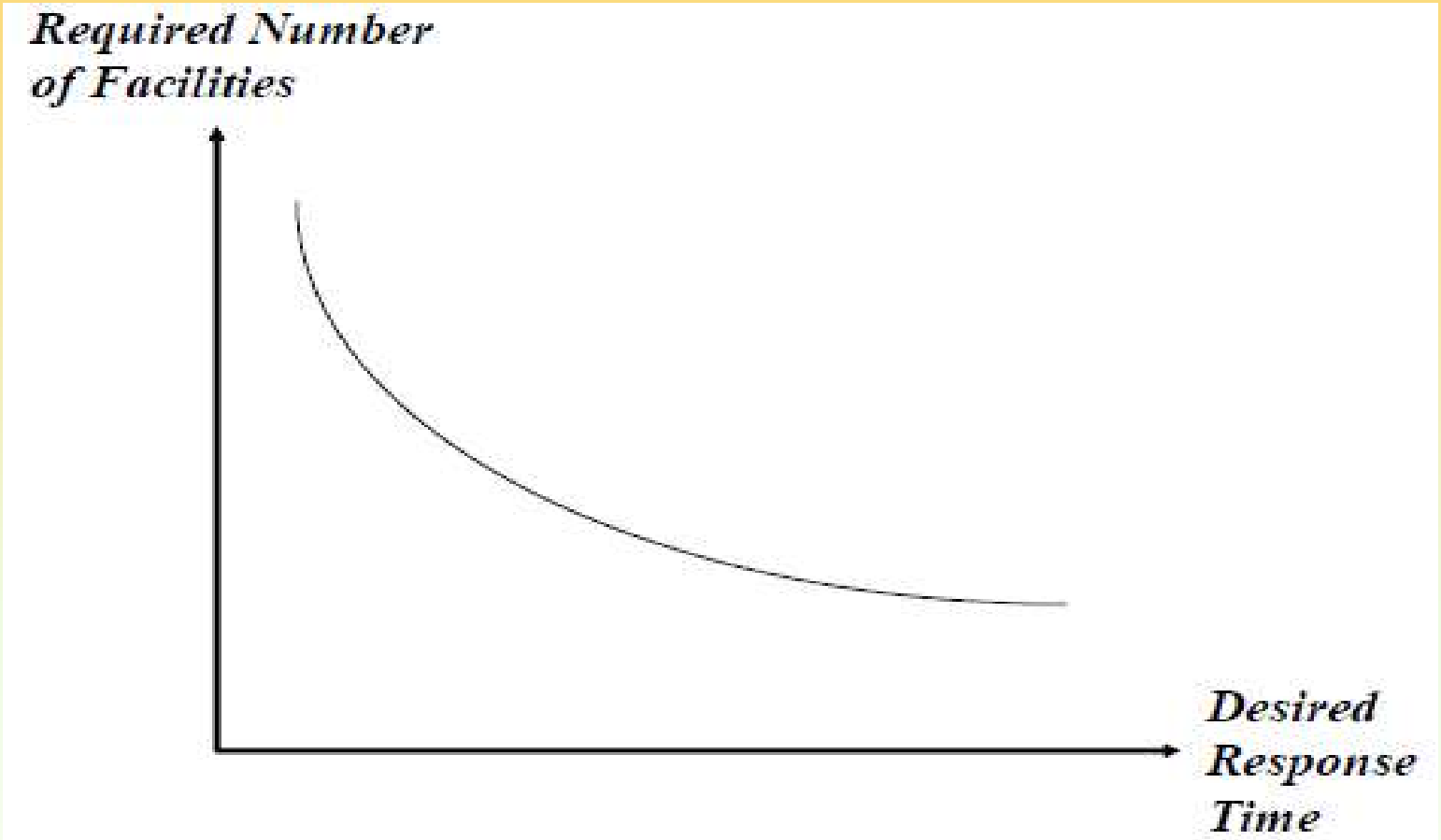
- influenced by the structure of the distribution network. These include:
- **Response time (Less vs Max facilities)**

Factors Influencing Distribution Network Design

- **Elements of customer service influenced by network structure:**
  - Response time
  - Product variety
  - Product availability

- **Supply chain costs affected by network structure:**
  - Inventories
  - Transportation
  - Facilities and handling
  - Information

Response time



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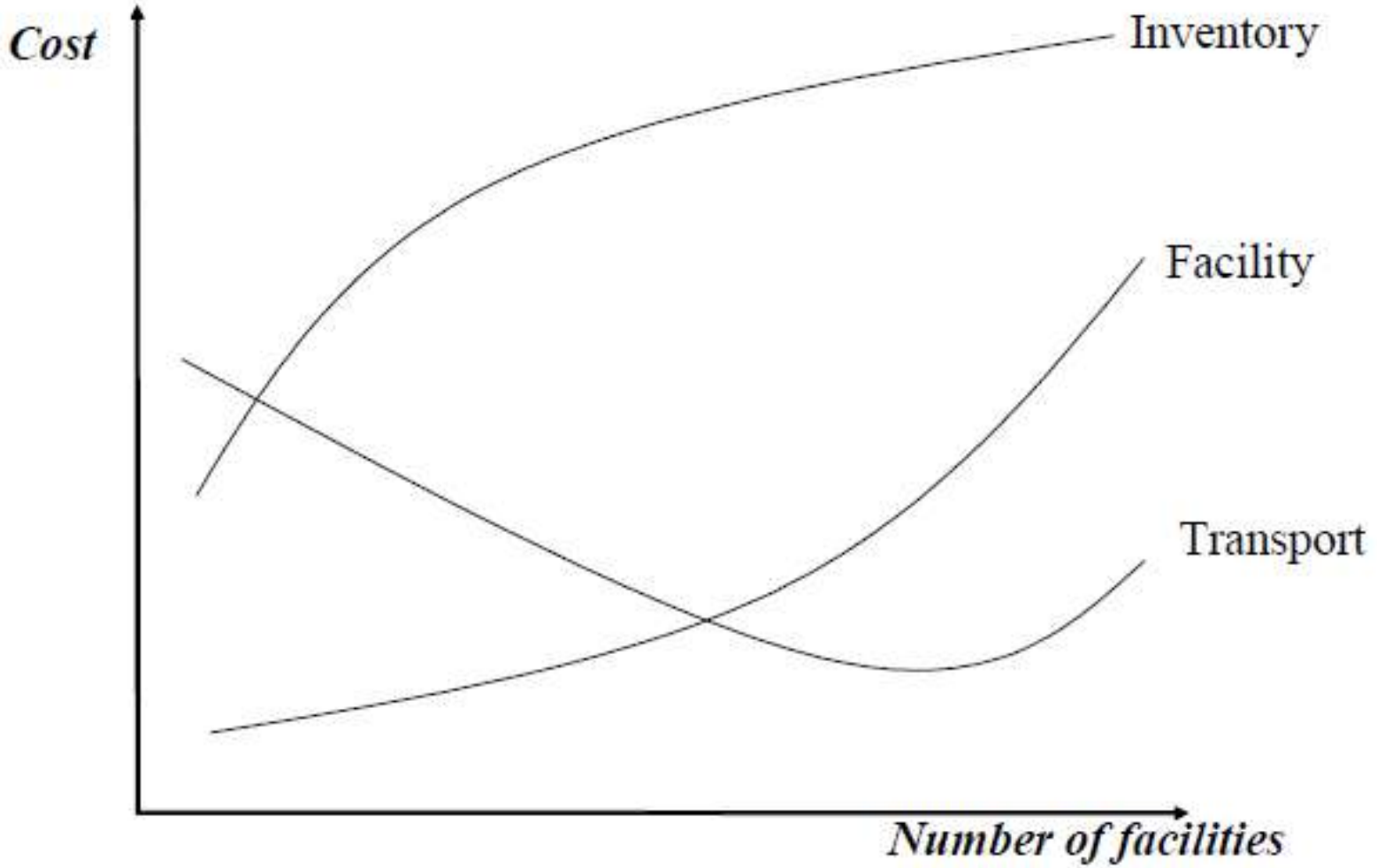

Figure 4.2: Relationship between number of facilities and logistics cost

Borders Mismanagement

Outsourcing its online book sales to Amazon from 2000-08

Failure to enter the e-book market fast enough

Betting on the physical distribution (e.g., CDs) of music precisely as the music industry was switching to online distribution

Overinvesting in physical stores with poor sales

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Contd....

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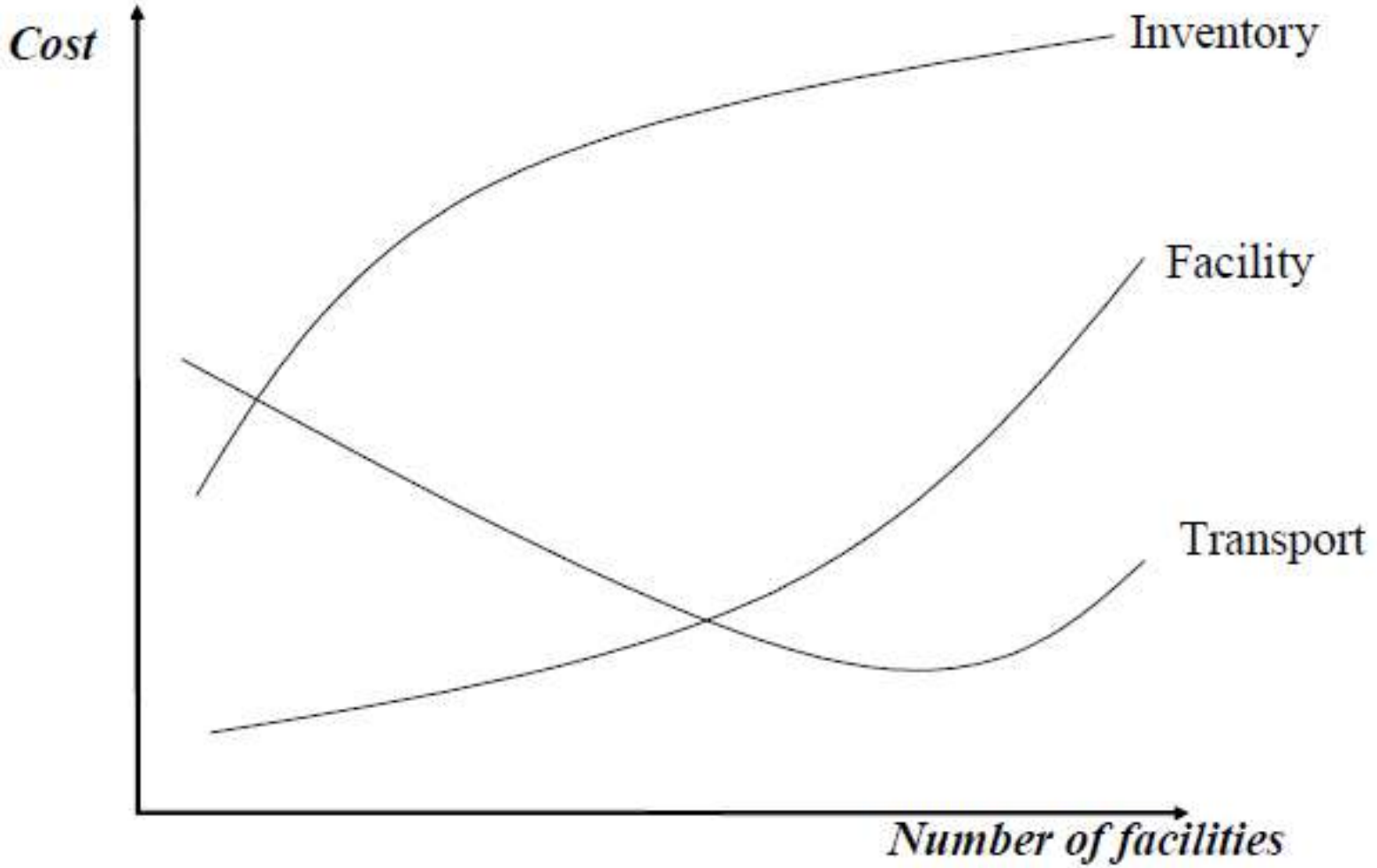

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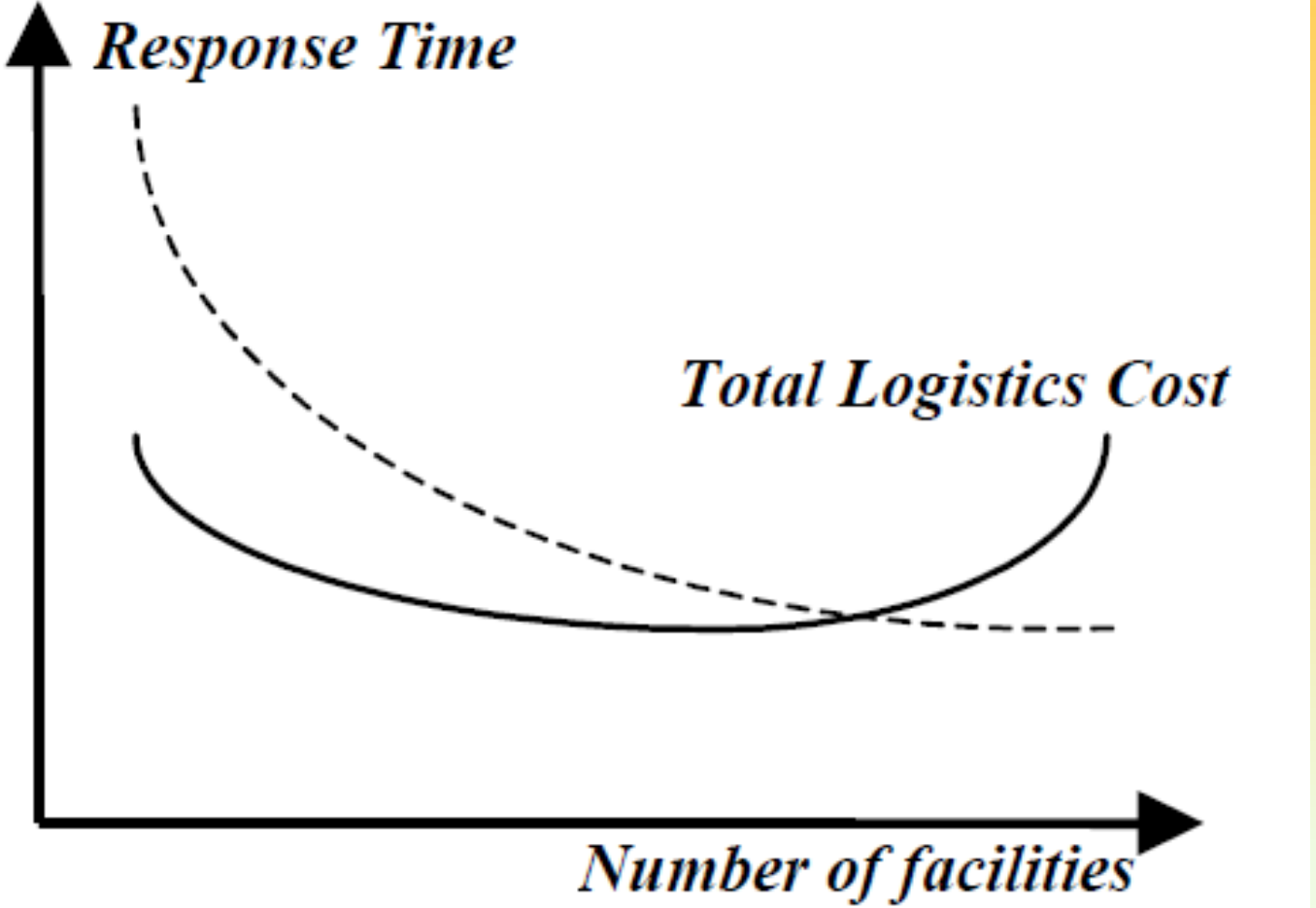

Figure 4.3: Variation in Logistics Cost and Response Time with Number of Facilities

Contd....

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Network Design Decisions

- **Facility role:** **What role should each facility play? What processes should be performed at each facility?**
- **Facility location:** **Where should facilities be located?**
- **Capacity allocation:** **How much capacity should be allocated to each facility?**
- **Market and supply allocation:** **What markets should each facility serve? Which supply sources should feed each facility?**
- **(How many plants, DC's, retail stores, etc. to build?)**

Unit II
Design options for a distribution network

Dr. Dipesh Uike

Based on the choices for the two decisions, there are six distinct distribution network designs that are classified as follows:

1. Manufacturer storage with direct shipping

2. Manufacturer storage with direct shipping and in-transit merge

3. Distributor storage with package carrier delivery

Contd.....

4. Distributor storage with last mile delivery

5. Manufacturer / distributor storage with costumer pickup

6. Retail storage with customer pickup

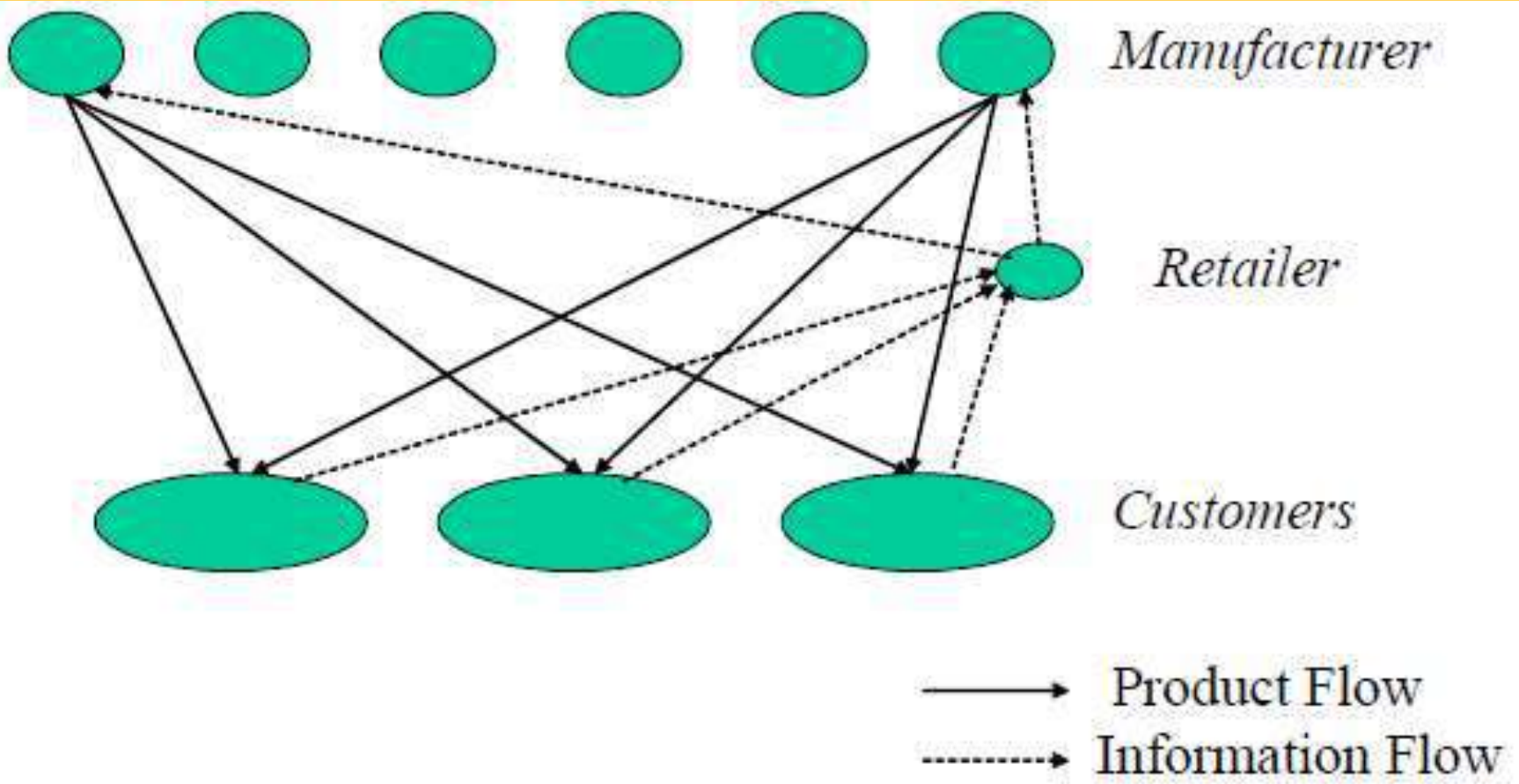

Figure 4.4: Manufacturer Storage with Direct Shipping

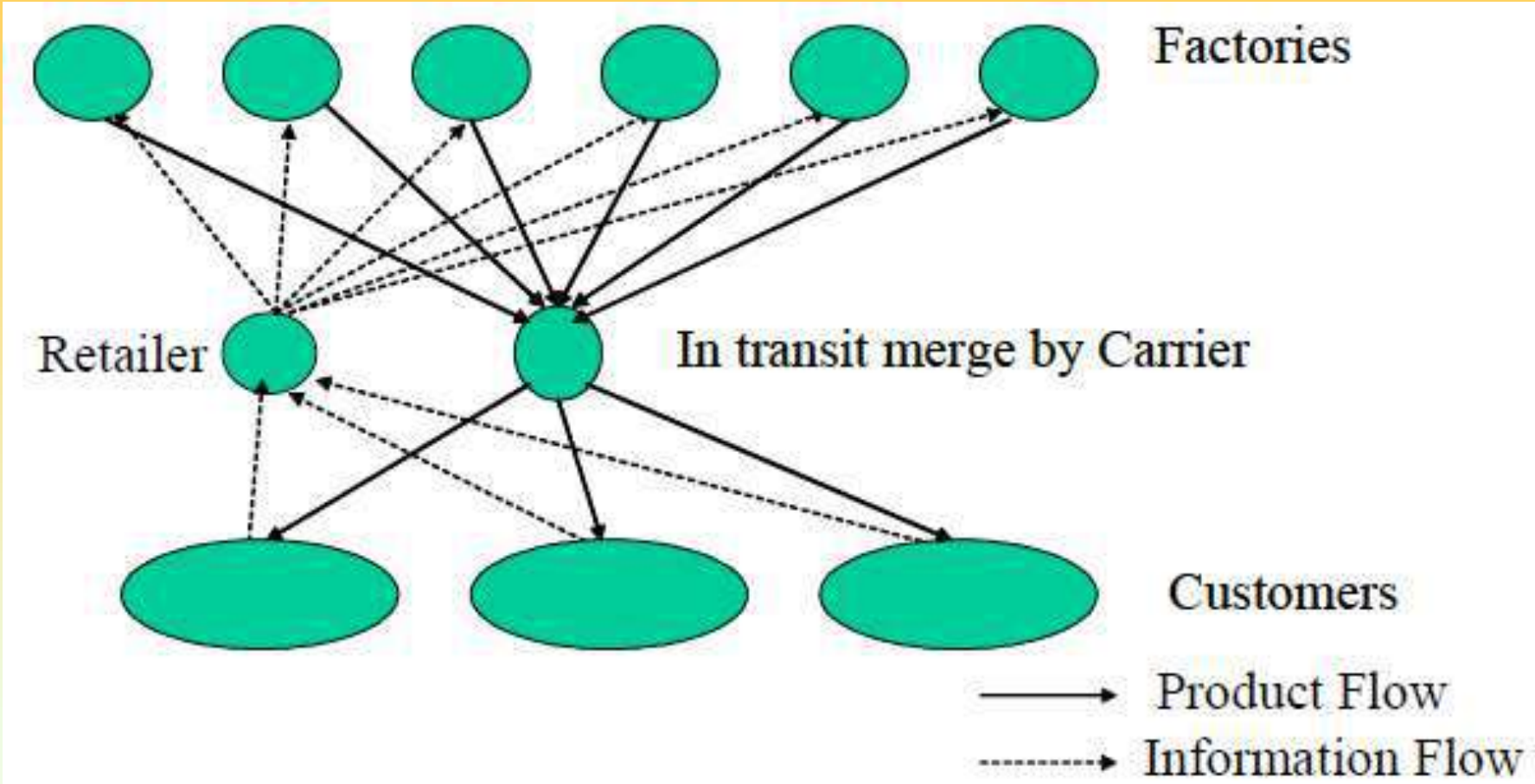

Figure 4.5: In-Transit Merge Network

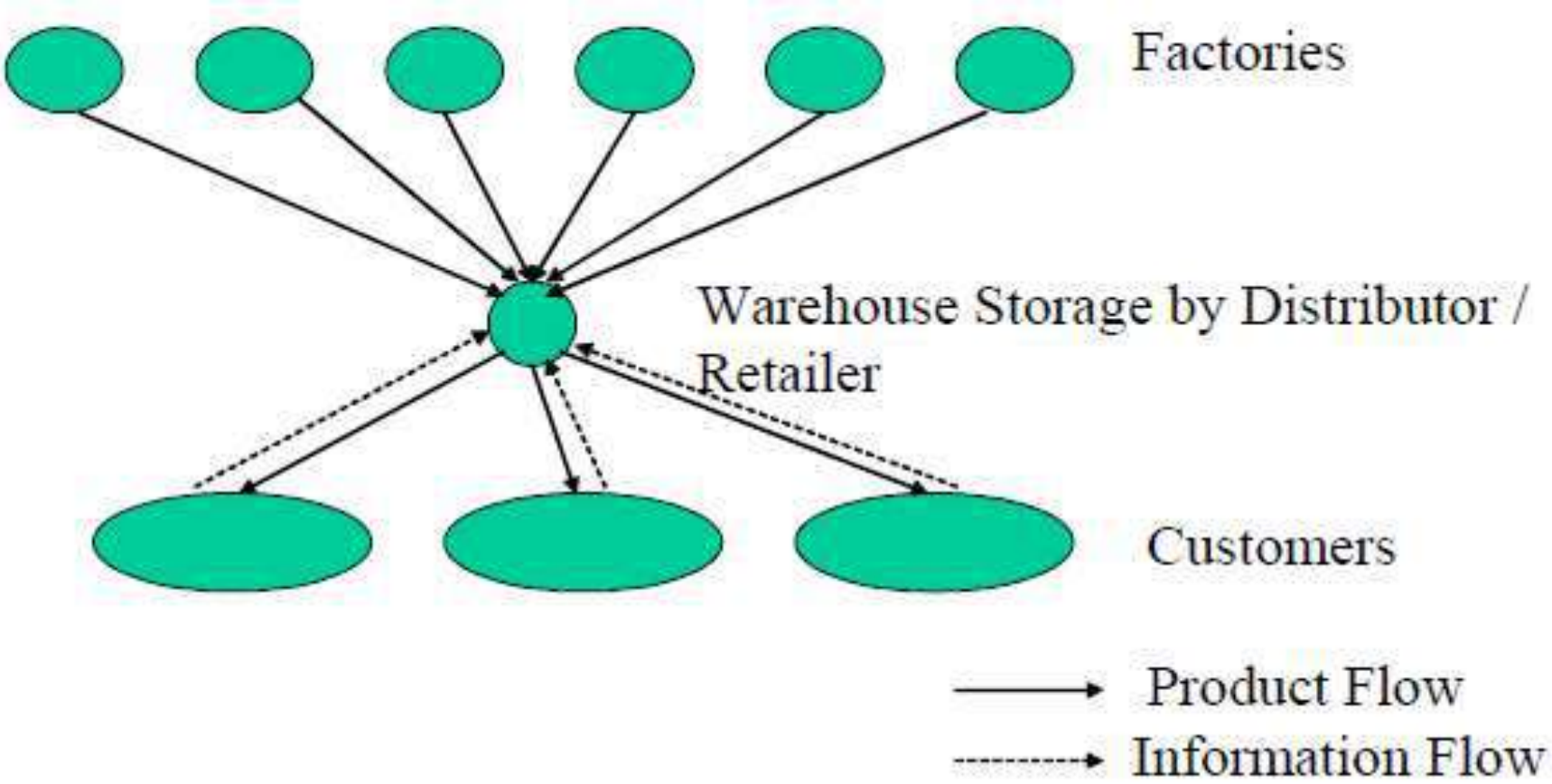

Figure 4.6: Distributor Storage with Carrier Delivery

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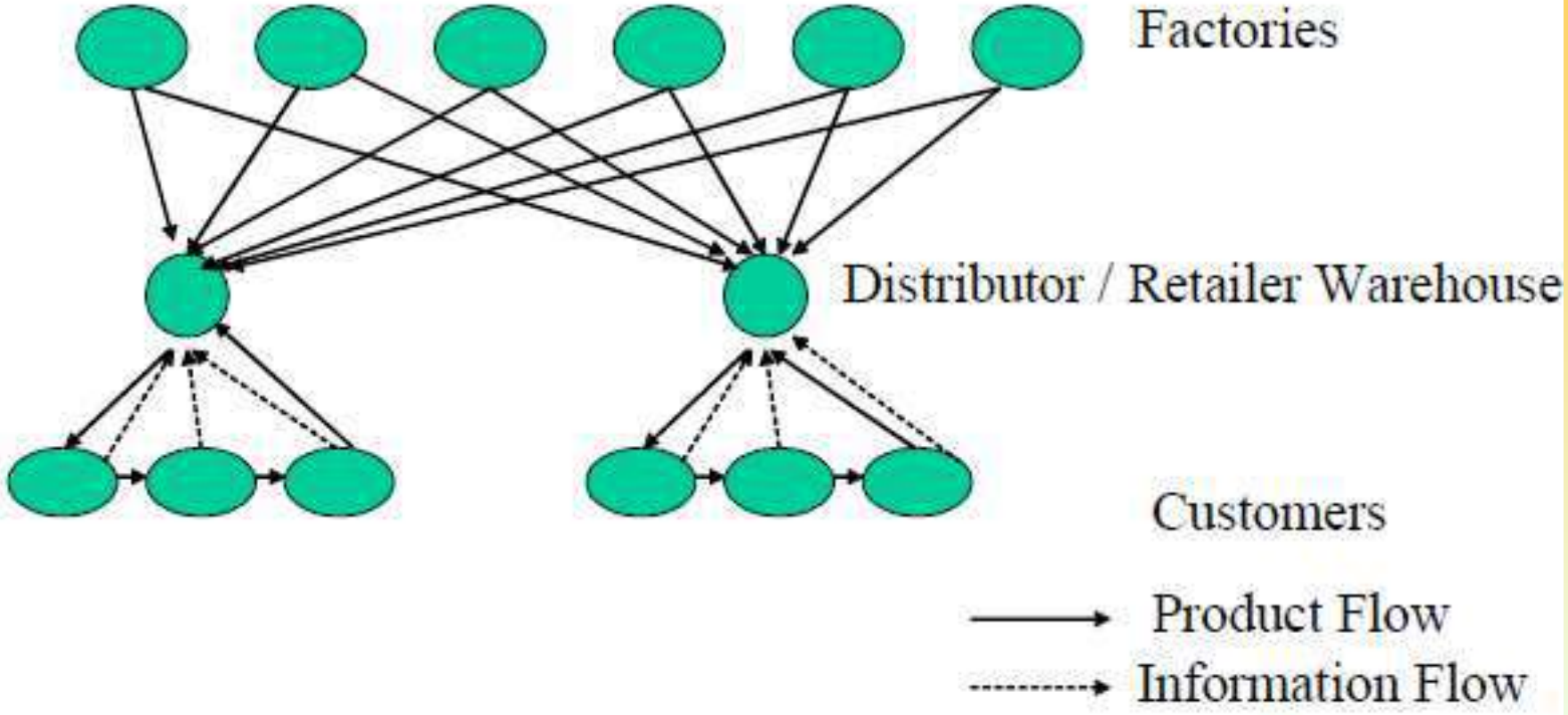


Figure 4.7: Distributor Storage With Last Mile Delivery

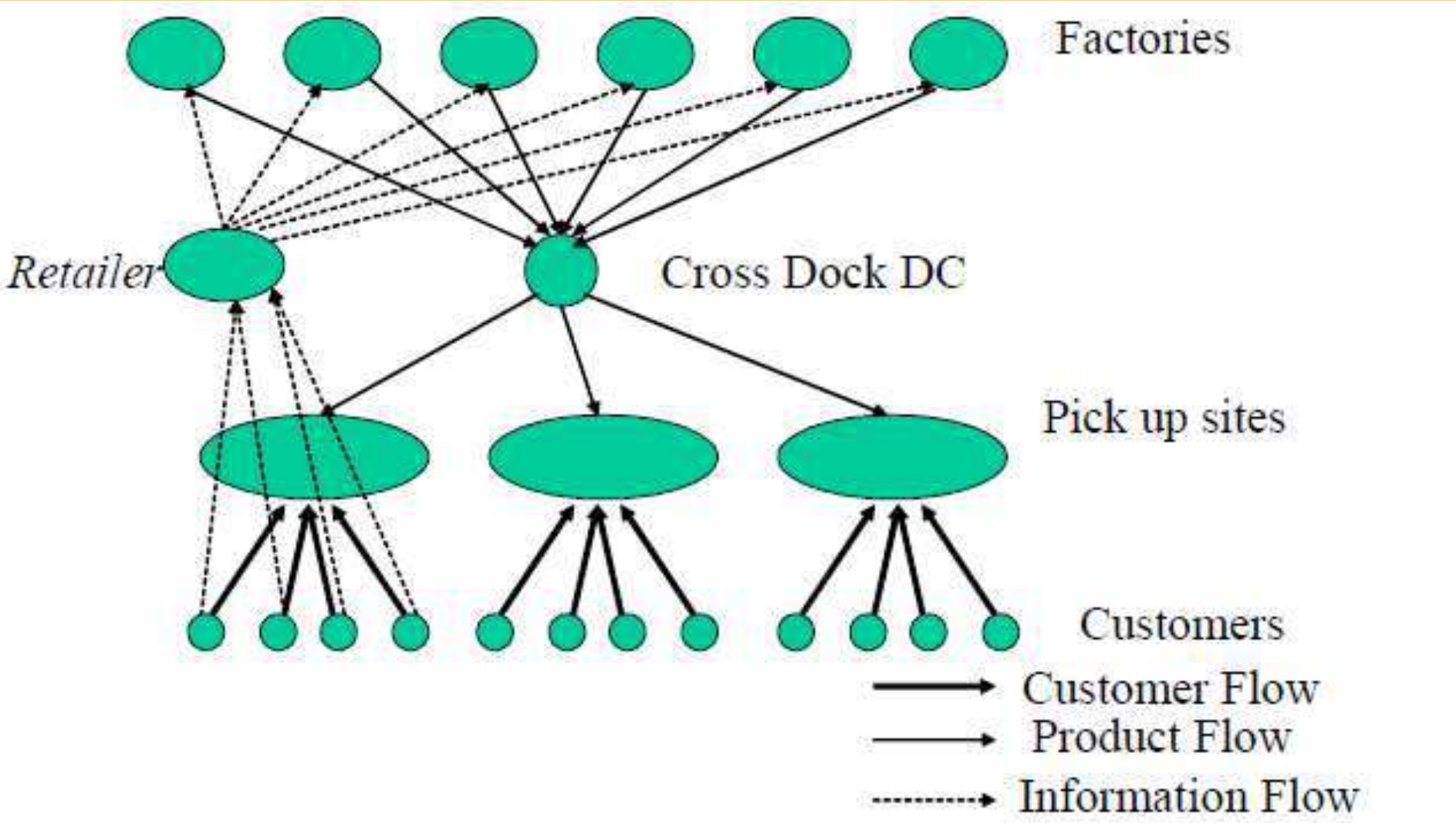
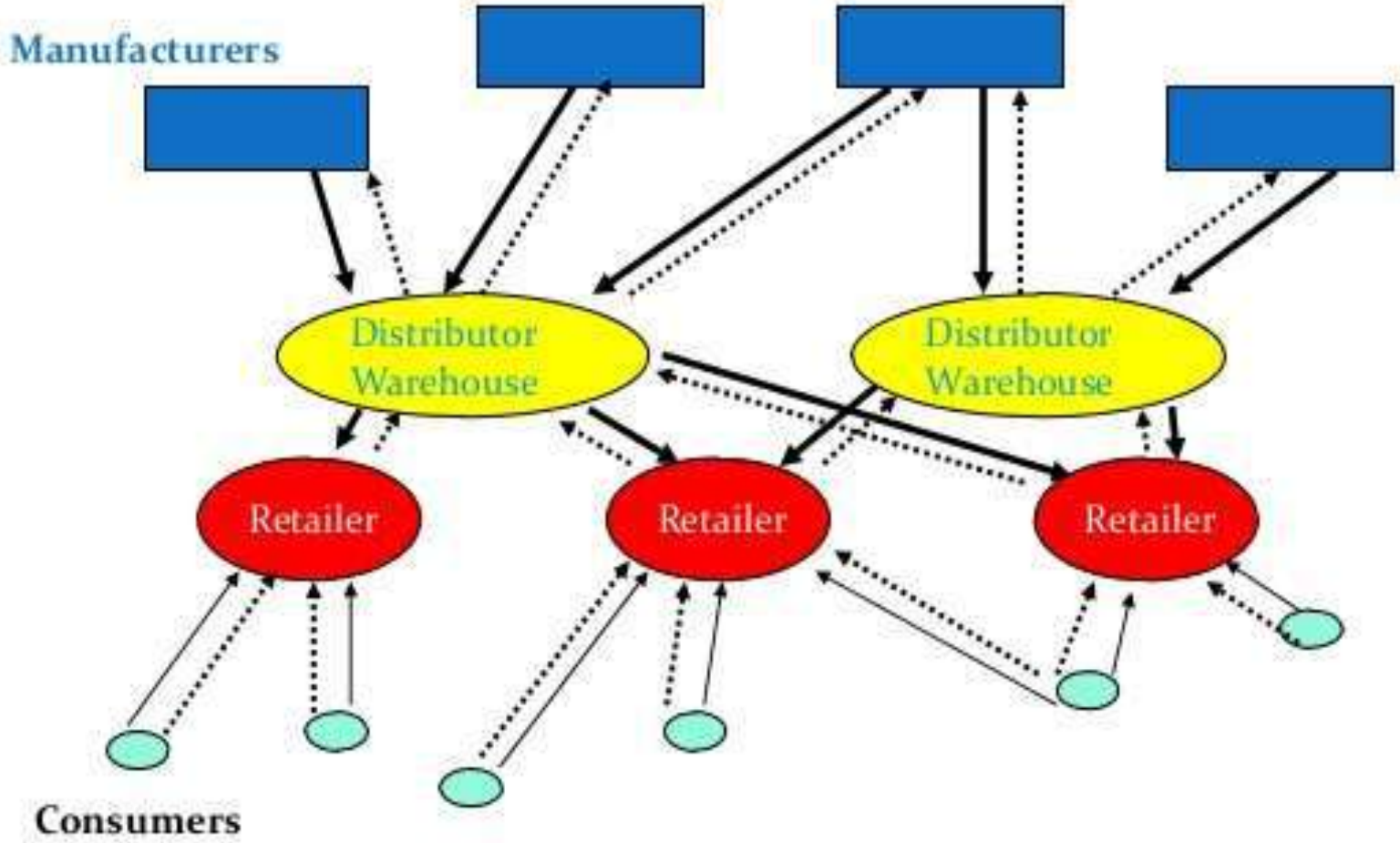


Figure 4.8: Manufacturer or Distributor Warehouse Storage with Consumer Pickup

Retail Storage with customer pickup



E-Business and the Distribution Network

Depending on the firm, the product and core customer base, e-Business will have different impacts on:

- Customer Service (i.e. Responsiveness of Supply Chain):

  Response time (non downloadable products), Product variety, Product availability, Customer experience, Time to market, Order visibility, Returnability, Direct Sales to Customers, Efficient Funds Transfer,

- Costs Facilities , Inventory, Transportation, Information
- In general, E-Business provides an easier way to adjust Pricing: *Flexible Pricing*, Product Portfolio, and Promotions
- Example: Table 4-10 in the text summarizes Dell's online business with respect to two different products:
  - customized, high-value PCs verses standardized, commodity PCs

Types of E-business

Business-to-Business (B2B)

Business-to-Consumer (B2C)

Consumer-to-Consumer (C2C)

Consumer-to-Business (C2B).

Business-to-Administration (B2A)

Consumer-to-Administration (C2A)

Unit II
Distribution network design advantages to business

Aligning Your Distribution Network for Competitive Advantage

Identify Scope and Current Network Constraints

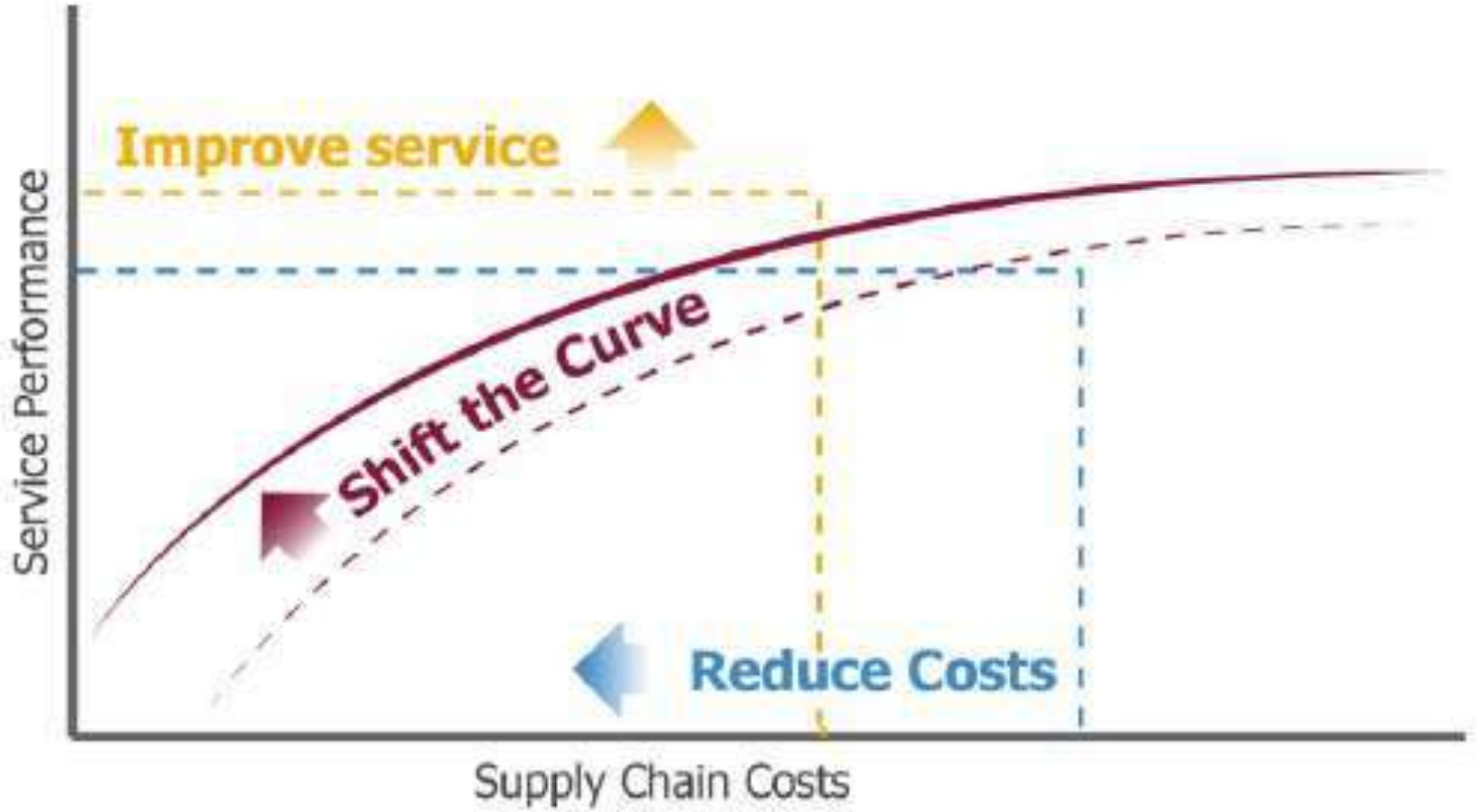
Determining the scope of design in a distribution network strategy is crucial. One reason is that the distribution network needs to realign with shifts in business. For example, a change in your sales volume, customer base, requirements, geographic markets, etc. may necessitate a change in your network strategy.


Where We Are
Where We Need to Be
Required Shift in Capacity
• Volume Growth (or Erosion)
• New (or Lost) Customers
• New (or Changed) Customer Requirements
• New (or Changed) Distributor Capabilities
• New (or Reduced) Services
• New (or Retrenched) Geographic Markets
• New (or Rationalized) Products
• Acquired/Merged (or Sold) Businesses
•Desire to Outsource (or Insource) Logistics Functions

Contd....

Determine Your Goals

If you are experiencing customer service problems, you may be trying to shift your cost versus service curve. Or perhaps you are simply trying to reduce costs. Identifying these goals up front will drive decisions about where the distribution network strategy may be concentrated.



Cost Reduction Tactics

- Rationalize Inventory Investment
- Minimize Transportation Costs
- Minimize Warehouse Space Costs
- Minimize Warehouse Labor Costs
- Minimize Administrative Costs
- Minimize Tax Burden
- Minimize Fulfillment Error Rates

Service Improvement Tactics

- Increase On-time Performance
- Increase Fill Rate Percentages
- Increase Flexibility

Contd....

Gather Data on the Current Network Situation

Understanding the current network is the most difficult and time-consuming step associated with any distribution network strategy. When done properly, it allows informed decision-making and confidence in the output of the modelling tools. The saying, “garbage in, garbage out,” applies here.

Contd....

Data that needs to be collected and verified may include:

- Description of all items distributed— dimensions, weight, classifications, units/carton, units/pallet, unit of measure, unit cost, etc.
- Physical addresses of suppliers, customers, and facilities
- Historical line-item demand by SKU by customer for a 12-month period
- Historical line-item supply by SKU by vendor for a 12-month period
- Historical line-item production and/or throughput by SKU by facility for a 12-month period
- Historical transportation costs and modes (LTL, parcel, truckload, rail, etc.) for all shipments being analyzed
- Historical facility labor and operating costs for each facility in the network
- Historical inventory level snapshots by SKU or product category
- Historical storage and production utilization rates

Contd....

- Current productivity measures for each facility or process being studied
- Current throughput and storage capacities for each facility being studied
- Transportation rate tables for any mode of transportation being used in the network
- Service level requirements by customer and product category
- **Growth forecast information for a planning horizon, including:**

Contd....

Select Design Tools

There are several tools that can shorten the time it takes to develop the network design, provide greater insight into the current network situation and how changes will impact the network, and provide better decision-making information. Network design tools include:

- Database analysis software and spreadsheet software: used to cleanse and verify data and to analyze alternatives for simple networks or small segments of large networks.
- Mapping software: illustrates changes in network structure without relying solely upon tables and graphs. Software that can illustrate changes in product flow and costs from location to location within a network provides valuable insight into the impact of “what if” type questions.

Contd....

Transportation rating packages: used for rating thousands of shipments at once for different transportation modes. Parcel and LTL rating packages are particularly useful as different weights impact the cost of a shipment (unlike truckload, rail or container shipments that operate primarily on a cost per mile or a cost per shipment basis).

- **Mileage calculation software:** provides distance calculations between addresses, zip codes, or cities. These are extremely helpful with a network realignment in determining the impact on overall transit time and transportation cost (if lane costs are provided on a cost per mile basis).

Contd.....

Supply chain optimization software: does an excellent job of providing the best answer for particular time snapshots of a network, while taking into consideration the constraints outlined in Steps 1 and 2 (minimize cost, maximize revenue, improved customer service, etc.) There are a number of optimization tools available at varying levels of price and complexity.

- **Dynamic supply chain simulation software:** simulates the day-to-day operation of a network. Simulation software goes a step beyond optimization software by using randomized order profiles based on your network constraints. Network costs, volumes, inventories, production capacity, distribution capability, and customer service can be evaluated at a tactical level with this type of software.

Total Distribution Network Cost

Transportation Costs

- Inbound
- Outbound
- Inter-Plant
- Route Delivery
- Returns
- **Fleet Costs**
  - Maintenance
  - Equipment Lease
  - Fuel
  - Tolls
  - Taxes
  - Insurance

Labor Costs

- **DC**
  - Direct
  - Indirect
- **Support Operations**
  - Direct
  - Indirect
- Severance
- Training

Systems Costs

- WMS
- WCS
- TMS
- LMS
- Other Supply Chain Execution Systems

Inventory Carrying Costs

- **Product Cost**
  - Inventory-
  - Purchase
  - Quantity
  - Discounts
  - Freight
  - Allowances
  - Others

Facility Costs

- Distribution Centers
- Support Facilities
- Land Costs
- **Maintenance**
  - Grounds
  - Facility
  - Equipment
- Warehouse Equipment
- **Energy/ Utilities**
  - Electric
  - Gas
  - Water

Other Costs

- Professional Services
- **Migration Cost**
  - Personnel
  - Materials
  - Inventory
  - Facility Open-Close
- **Taxes**
  - Property &
  - Equipment
  - Inventory
  - Sales
  - Fuel
  - Others
- **Insurance**
  - Property
  - Liability
- Incentives Rebates

The business case can only be accurately validated by understanding all of the network costs associated with our Client's supply chain network

Why do you need to model your Supply Chain, Logistics or Distribution Network Design?

Reduced distribution costs

Improved understanding of customer service needs and options

Improved understanding of service costs

Appropriate balance of storage, inventory and transport costs

Graphical mapping of customer demand and density

Access to leading distribution network modelling tools and methods

Also, this type of work is often linked with customer profitability analysis,

The Symptoms of a Misaligned Distribution Network Design

Increasing Costs and Shrinking Margins

too Much Inventory

Falling Levels of Customer Service

Network Inflexibility

Unit II
Distribution Network Design
Advantages To Business

Business requirements of a network will change because of....

mergers and acquisitions,

entering new markets,

expanding product ranges or

indeed changes to the regulatory environment.

Risk of old Distribution Network

Network costs could be 10-15% higher than expected norms.

Service lead times may be adversely impacted.

Excessive product damage could be occurring.

Inventory investment is abnormally high.

Product availability is a major issue.

DN modelling factors

Networks can be modelled from factory to the consumer, taking into account all the key cost and service drivers such as:

Customer location

Order size and frequency

Transport costs

Transport vehicle types

Transport modes

Warehouse (Distribution Centre) size, location, resources, costs…

Service level requirements

Factory and supplier locations

Ports of entry for imported products

and many more key variables

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Thank You