

# **Supply Chain Management (3rd Edition)**

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## **Chapter 4 Designing the Distribution Network in a Supply Chain**

# Outline

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- The Role of Distribution in the Supply Chain
- Factors Influencing Distribution Network Design
- Design Options for a Distribution Network
- E-Business and the Distribution Network
- Distribution Networks in Practice
- Summary of Learning Objectives

# The Role of Distribution in the Supply Chain

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- ***Distribution***: the steps taken to move and store a product from the supplier stage to the customer stage in a supply chain
- Distribution directly affects cost and the customer experience and therefore drives profitability
- Choice of distribution network can achieve supply chain objectives from low cost to high responsiveness
- Examples: Wal-Mart, Dell, Proctor & Gamble, Grainger

# Factors Influencing Distribution Network Design

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- Distribution network performance evaluated along two dimensions at the highest level:
  - Customer needs that are met
  - Cost of meeting customer needs
- Distribution network design options must therefore be compared according to their impact on customer service and the cost to provide this level of service

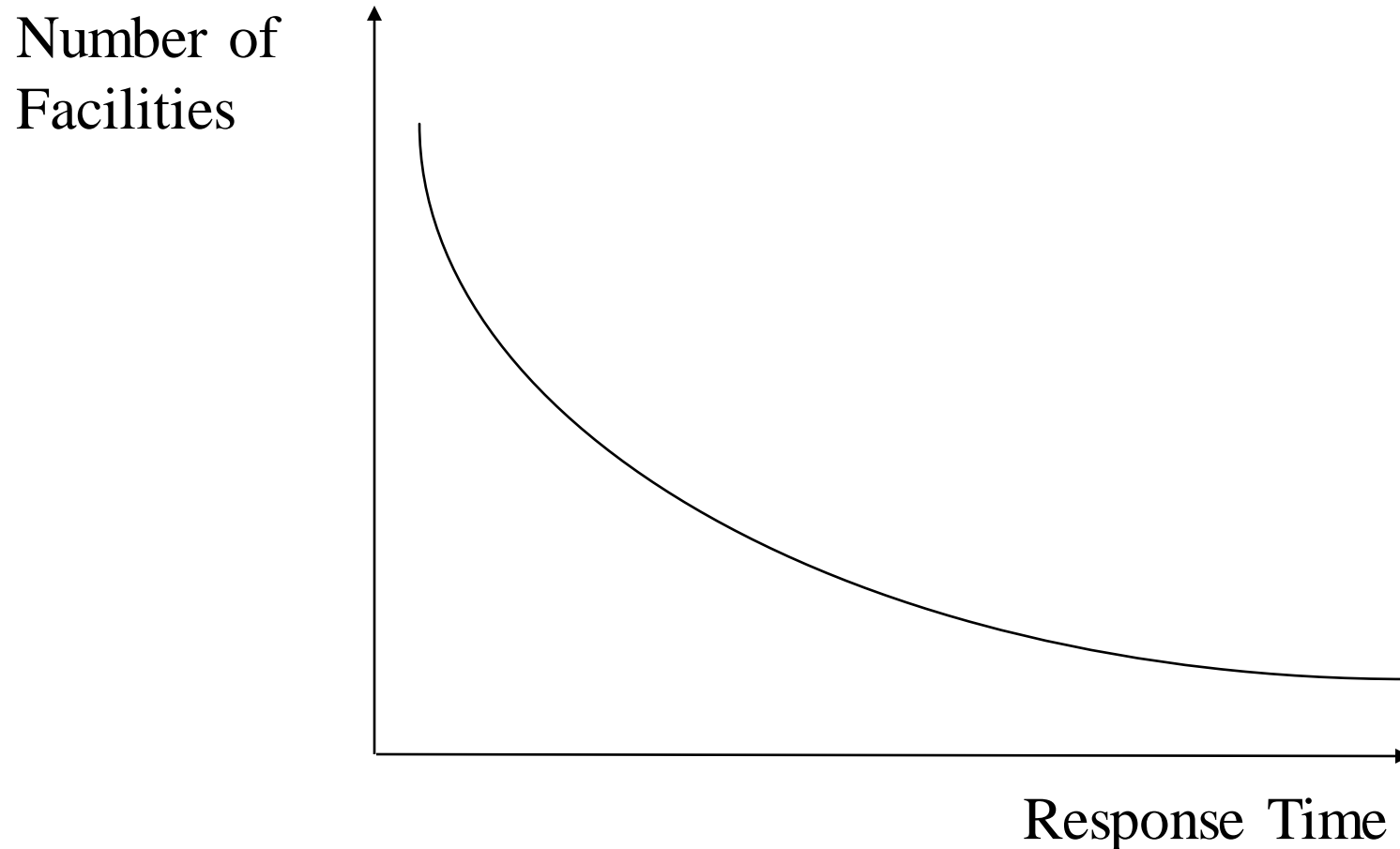
# Factors Influencing Distribution Network Design

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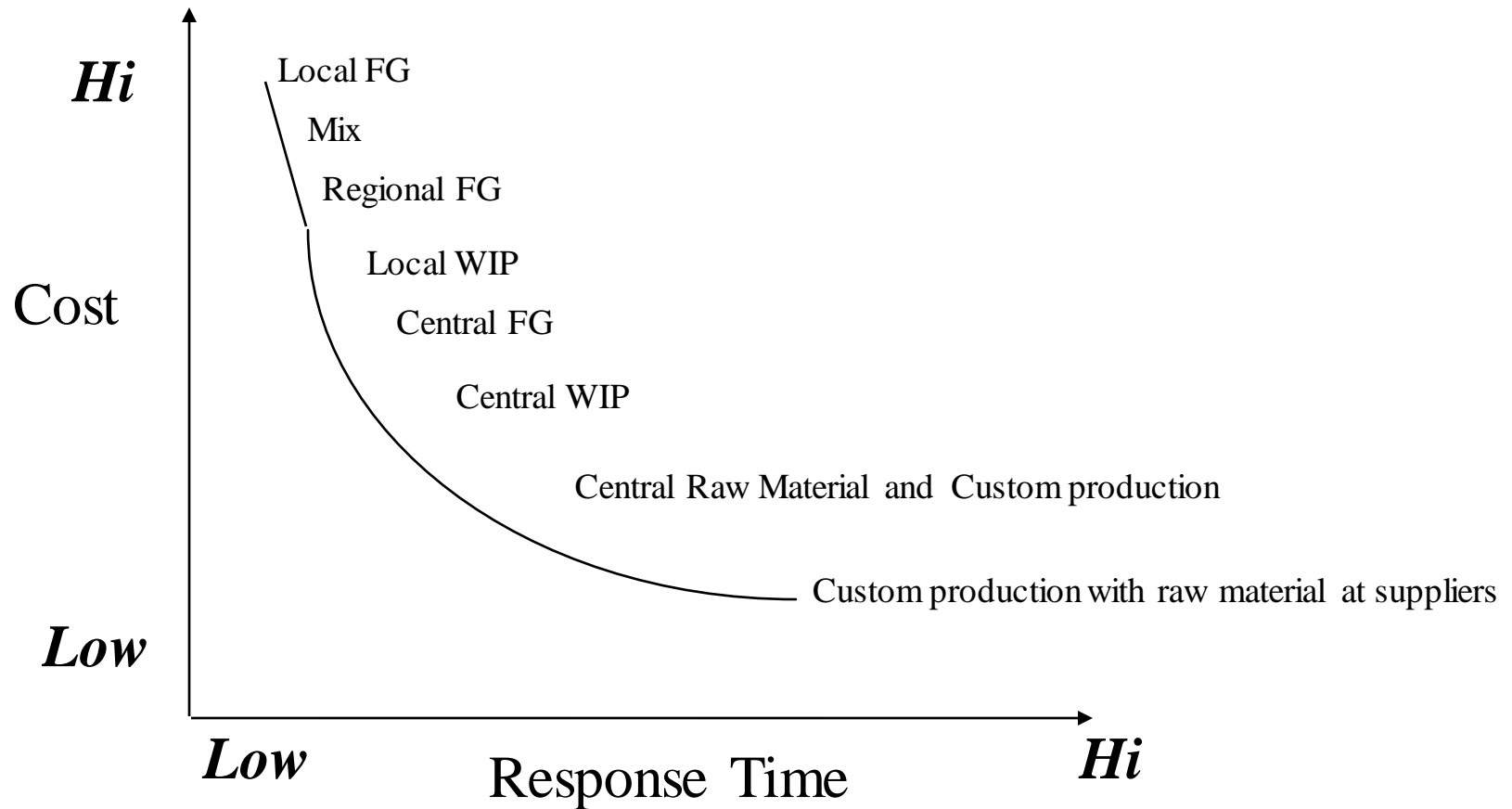
- Elements of customer service influenced by network structure:
  - Response time
  - Product variety
  - Product availability
  - Customer experience
  - Order visibility
  - Returnability
- Supply chain costs affected by network structure:
  - Inventories
  - Transportation
  - Facilities and handling
  - Information

# Service and Number of Facilities (Fig. 4.1)

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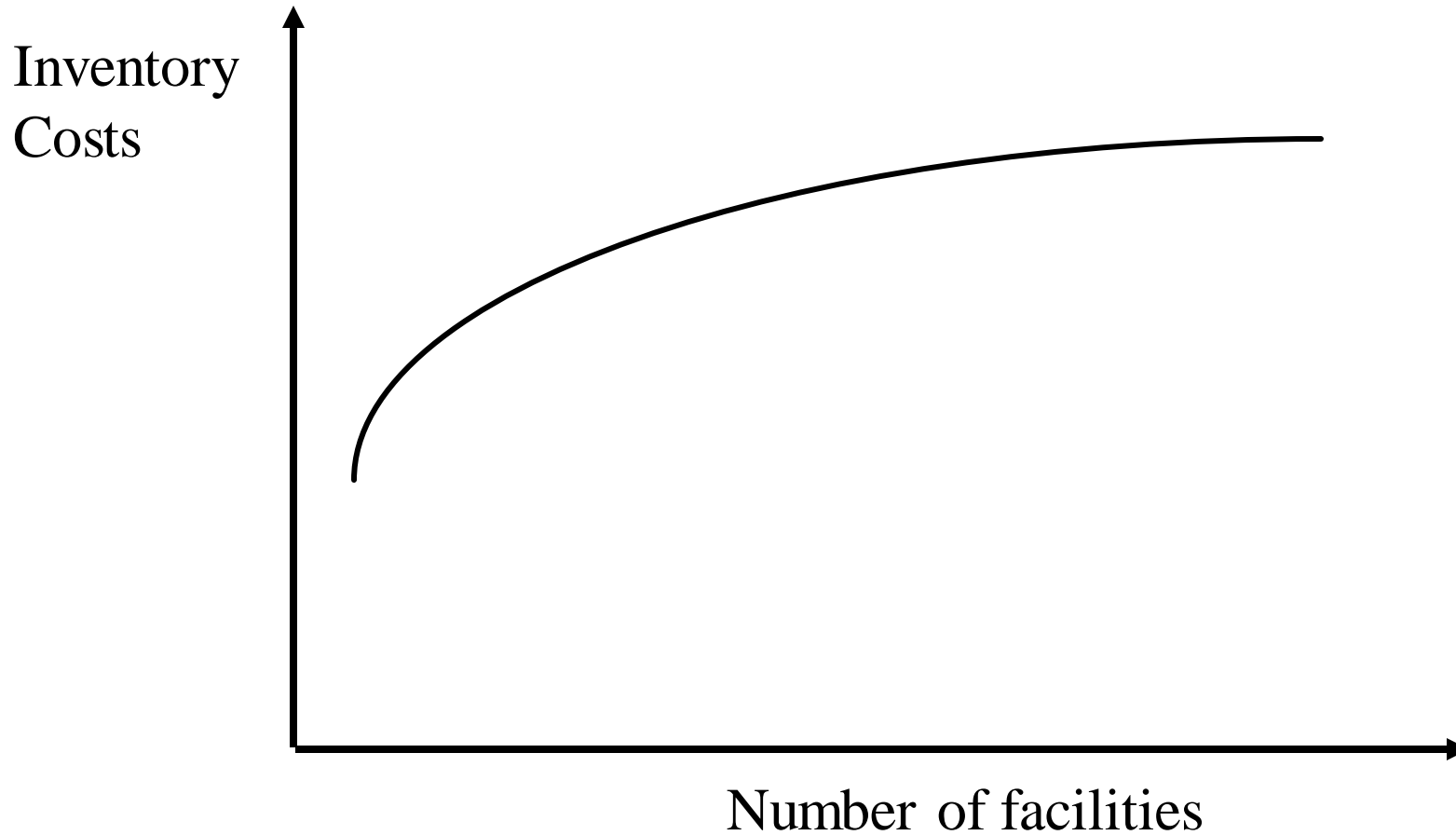


# The Cost-Response Time Frontier



# Inventory Costs and Number of Facilities (Fig. 4.2)

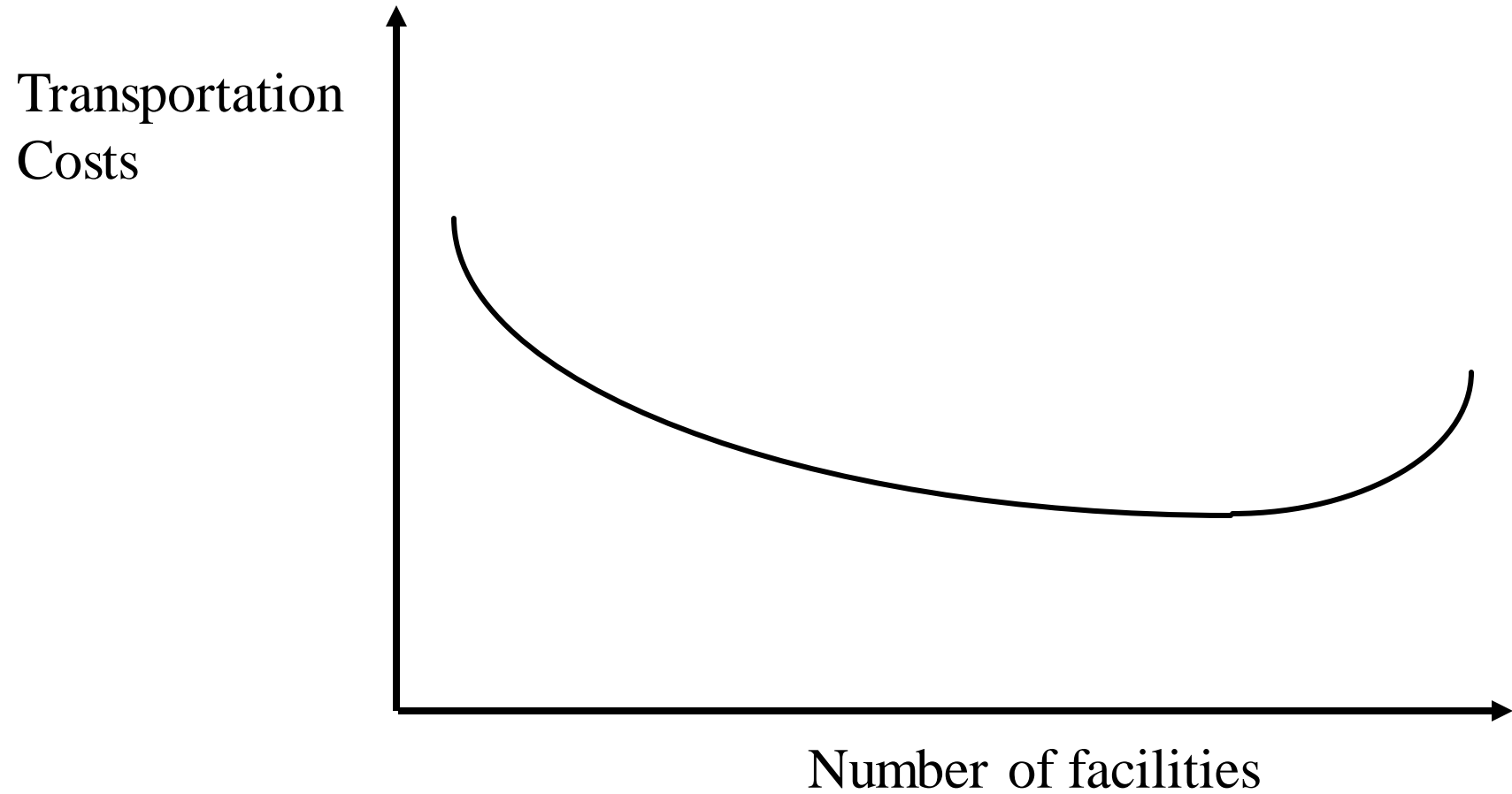
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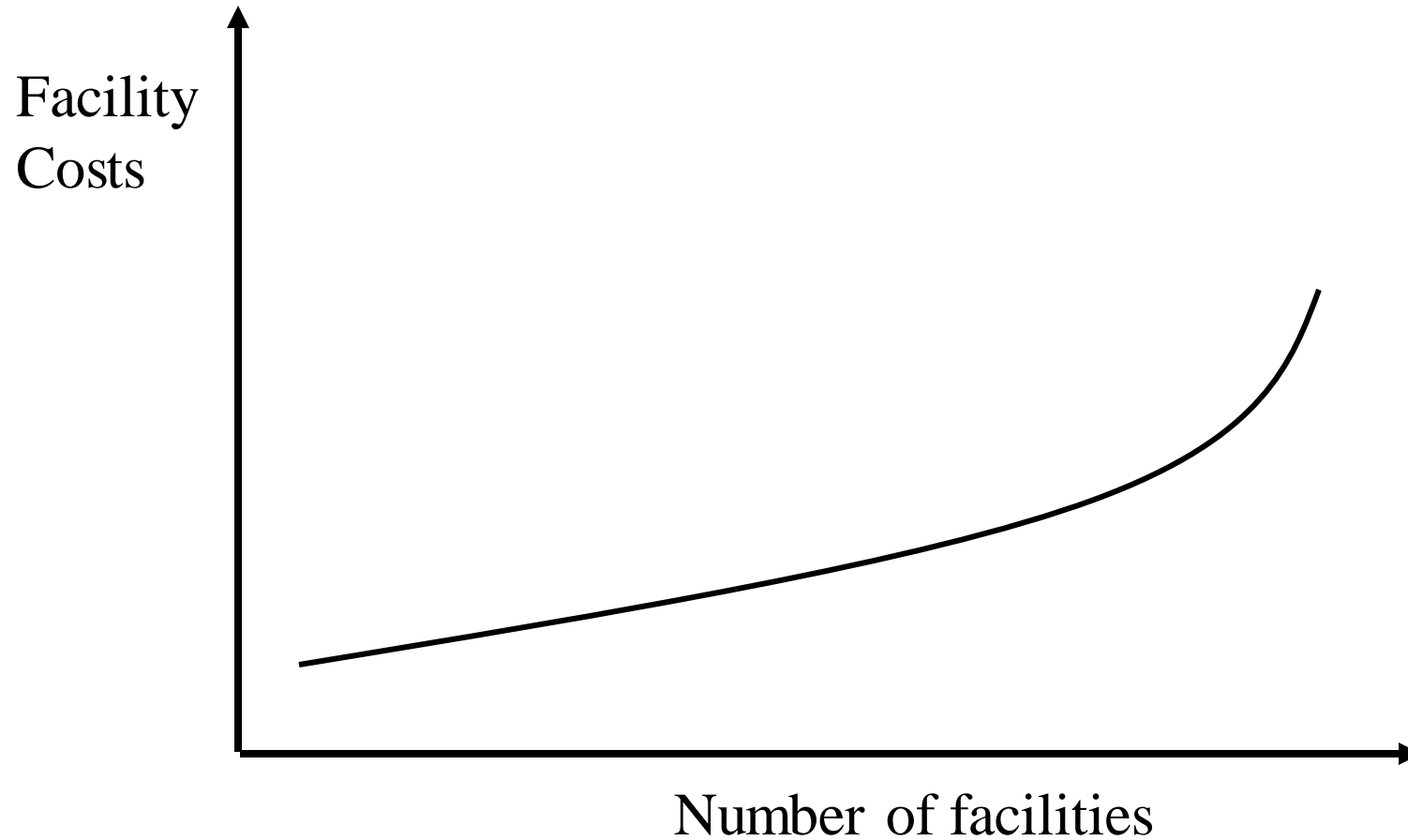
# Transportation Costs and Number of Facilities (Fig. 4.3)

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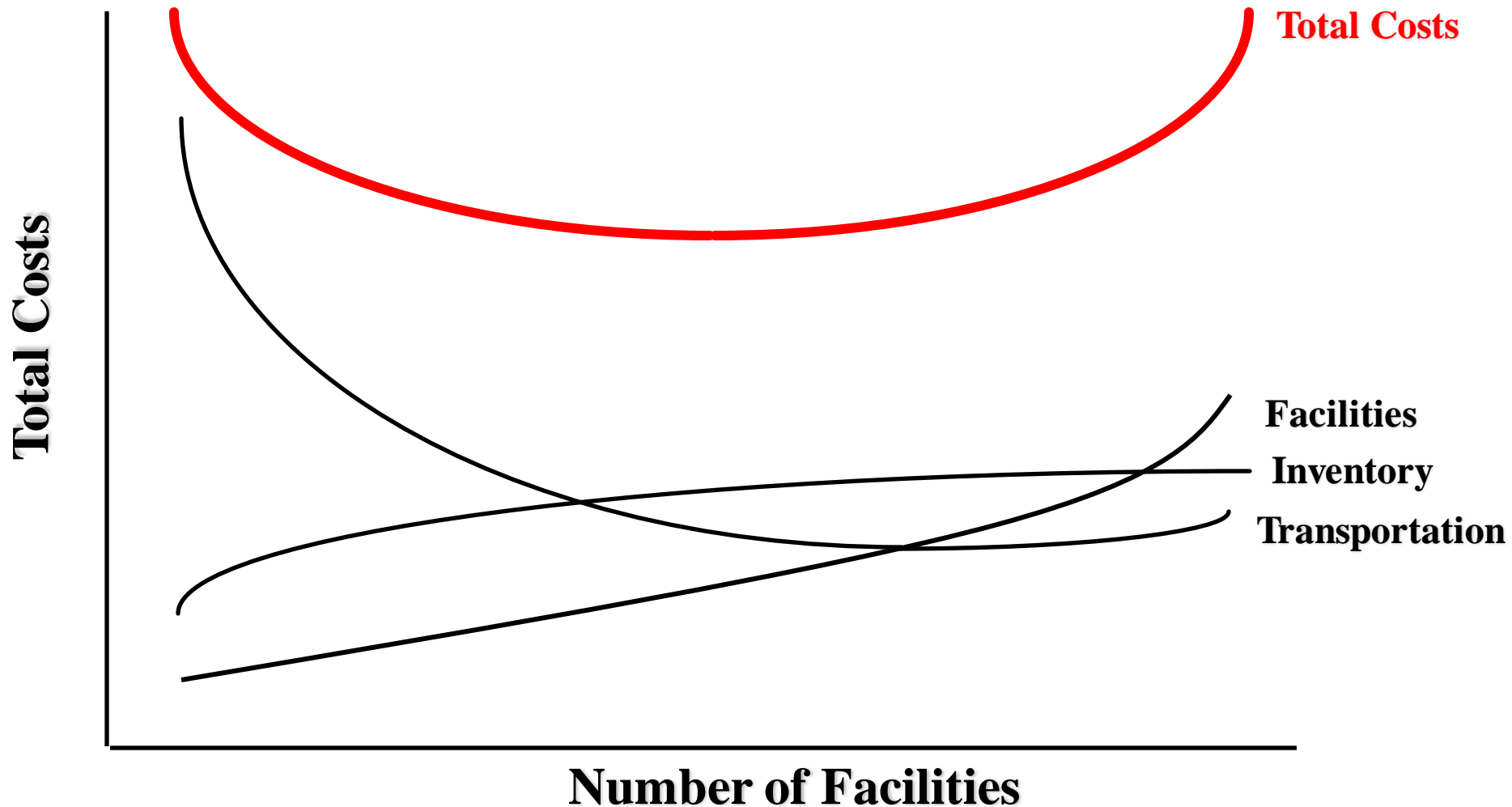


# Facility Costs and Number of Facilities (Fig. 4.4)

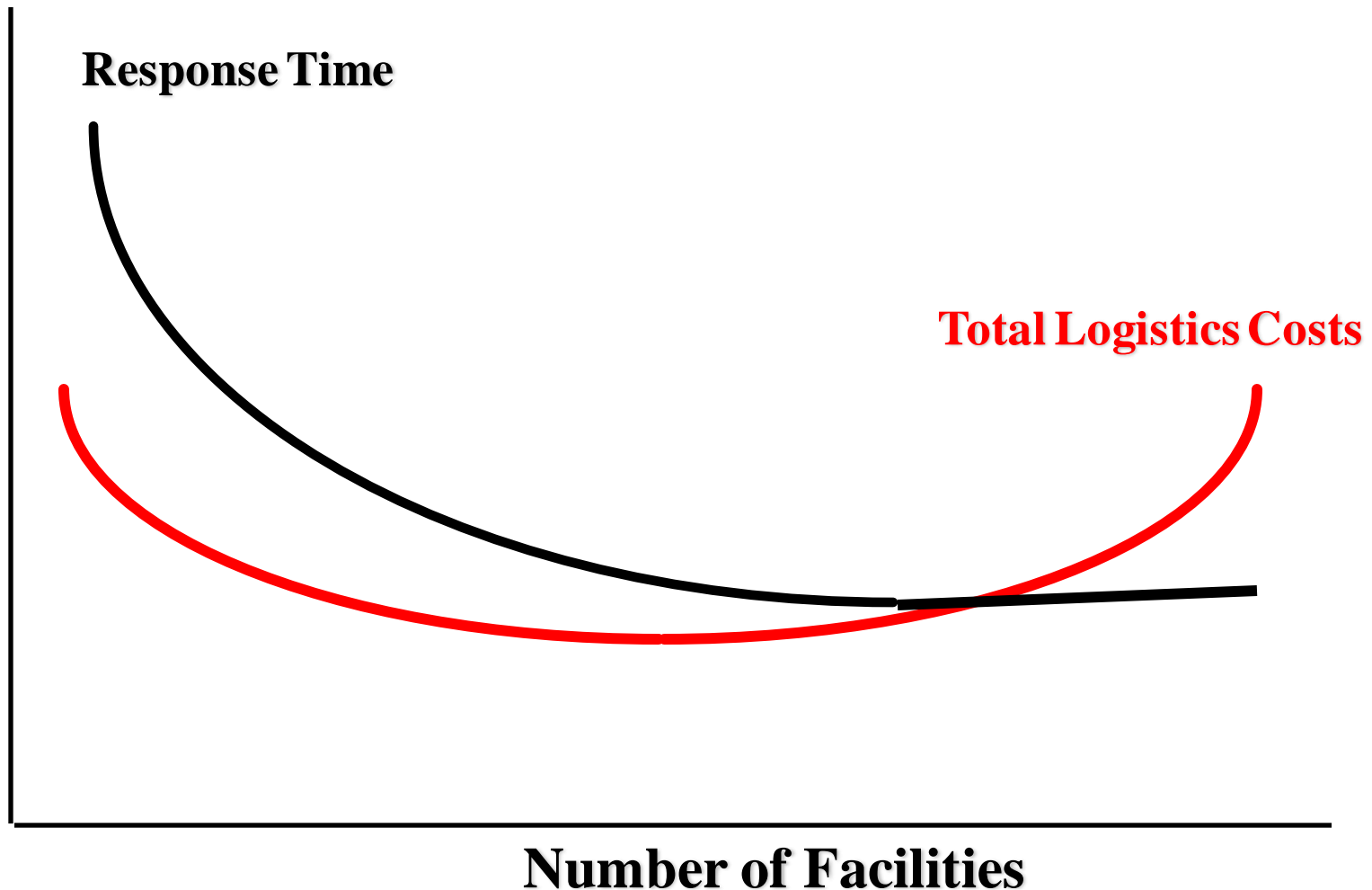
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# Total Costs Related to Number of Facilities



# Variation in Logistics Costs and Response Time with Number of Facilities (Fig. 4.5)

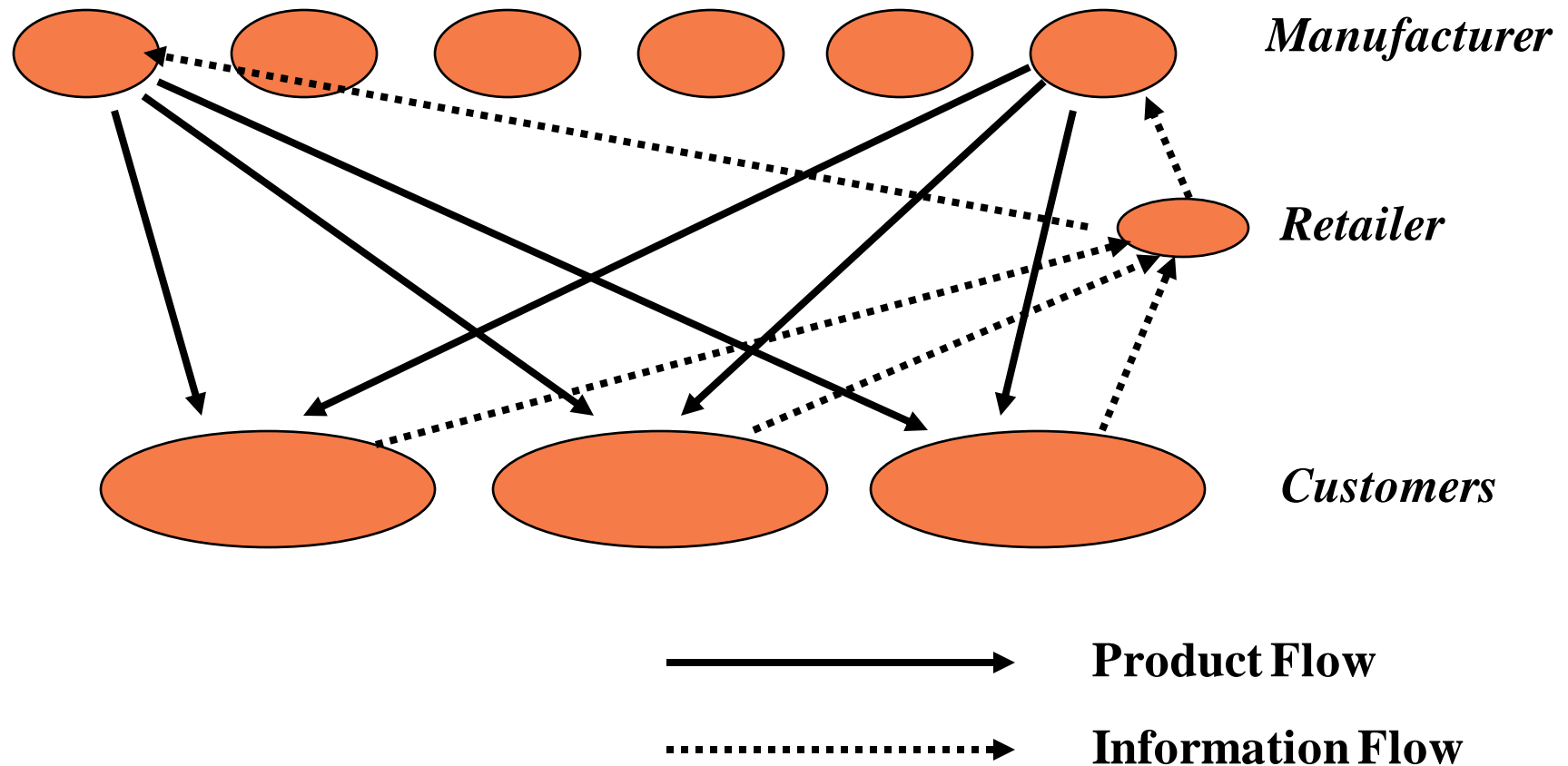


# Design Options for a Distribution Network

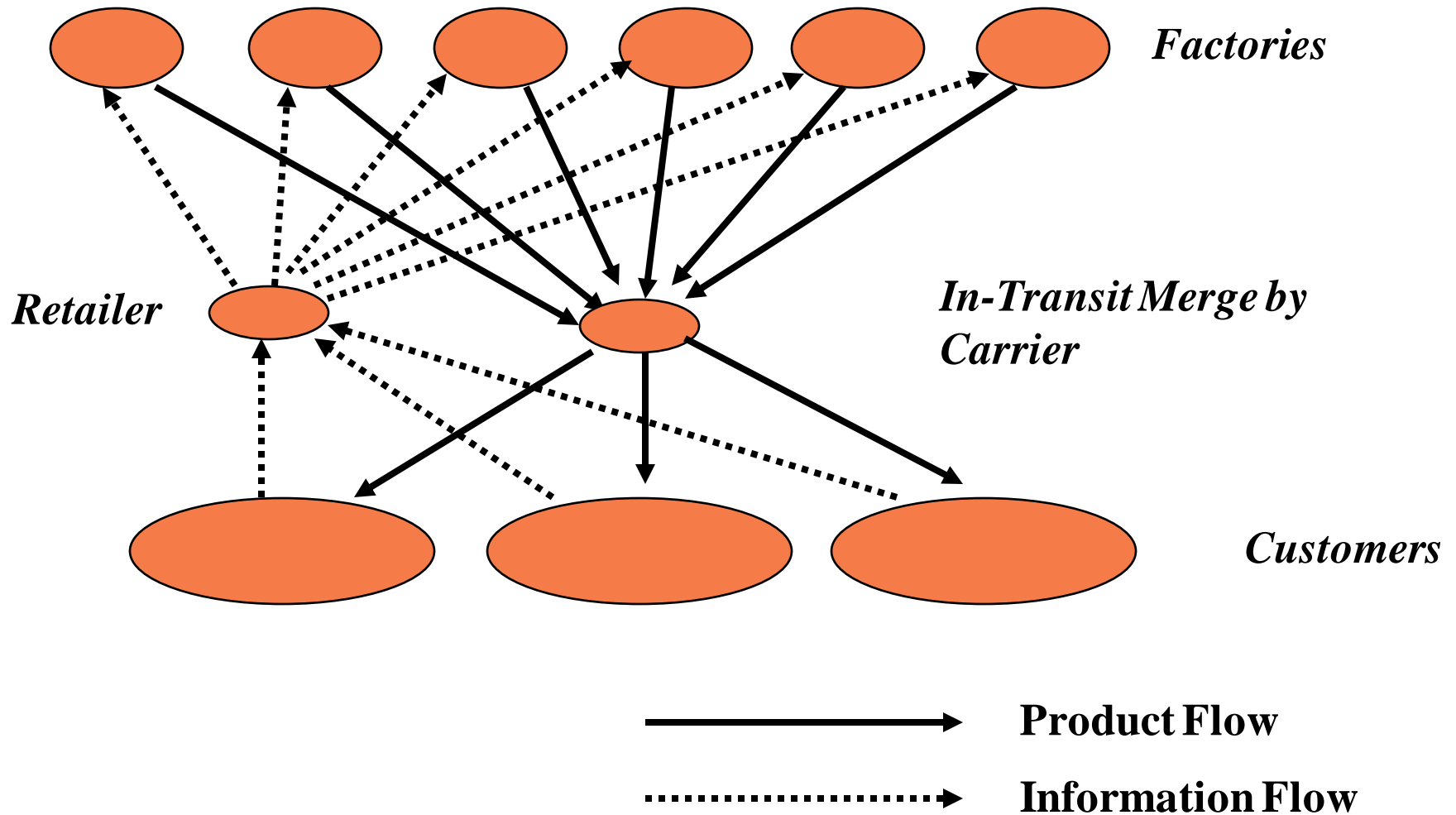
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- ❑ Manufacturer Storage with Direct Shipping
- ❑ Manufacturer Storage with Direct Shipping and In-Transit Merge
- ❑ Distributor Storage with Carrier Delivery
- ❑ Distributor Storage with Last Mile Delivery
- ❑ Manufacturer or Distributor Storage with Consumer Pickup
- ❑ Retail Storage with Consumer Pickup
- ❑ Selecting a Distribution Network Design

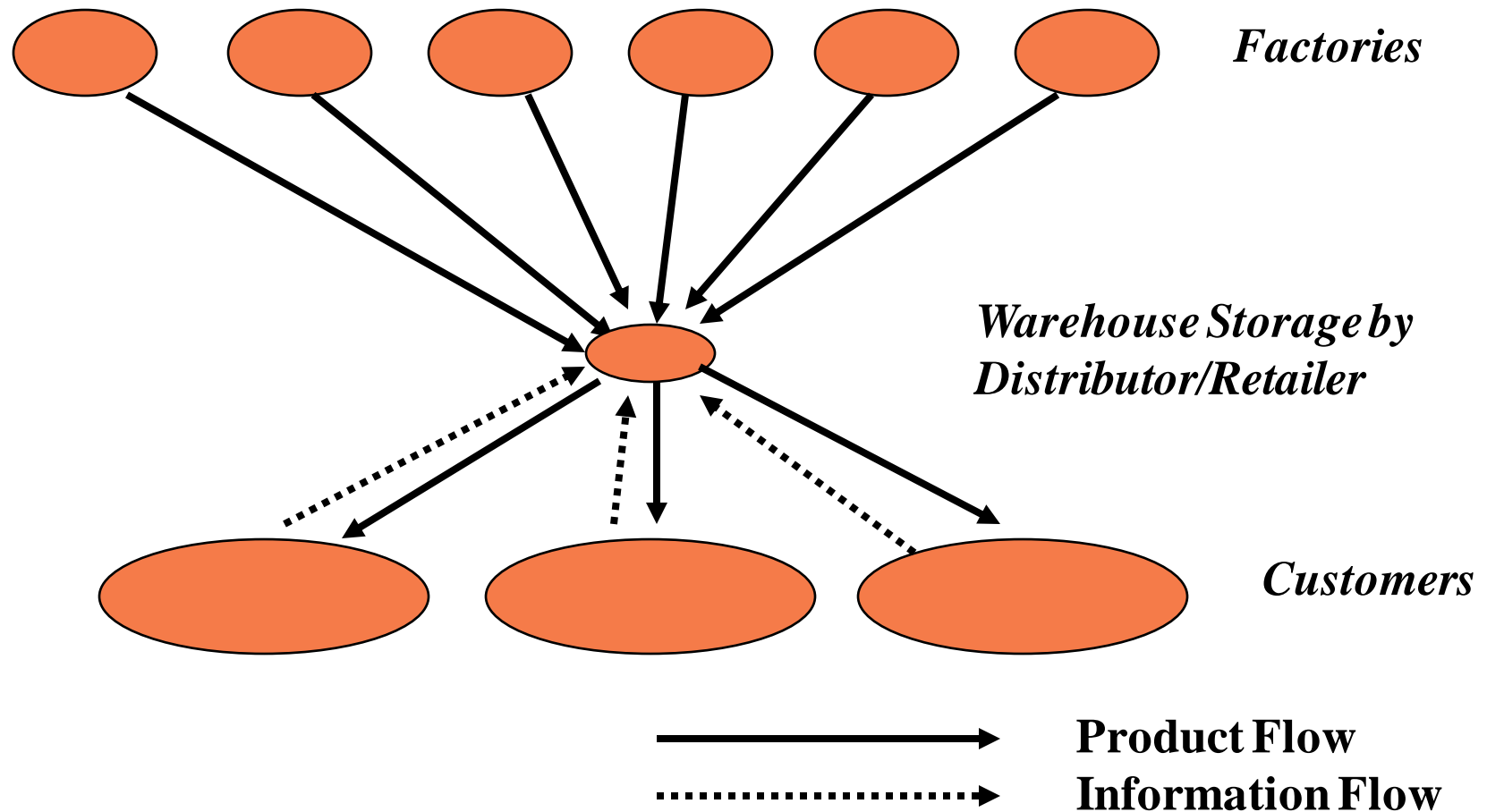
# Manufacturer Storage with Direct Shipping (Fig. 4.6)



# In-Transit Merge Network (Fig. 4.7)

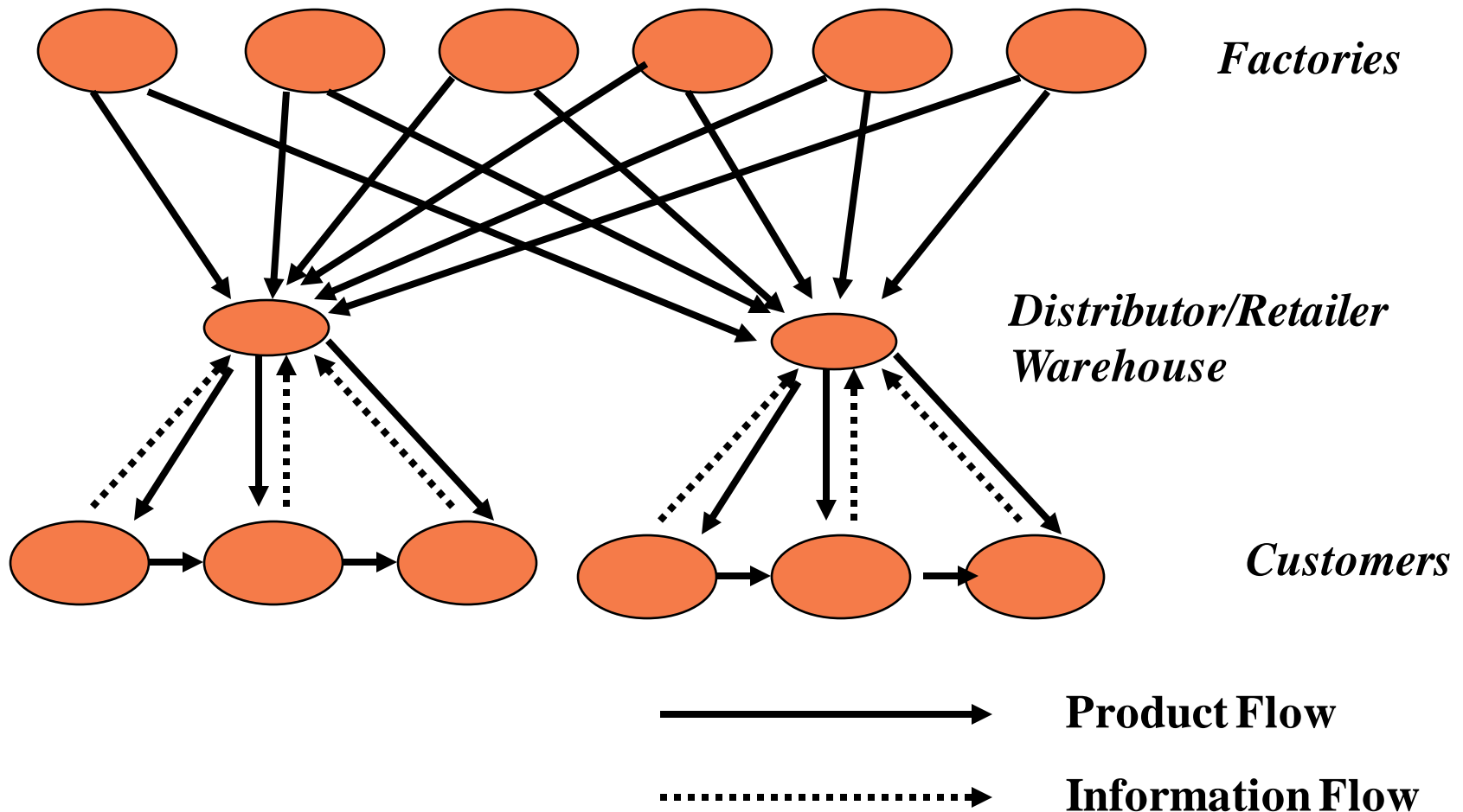


# Distributor Storage with Carrier Delivery (Fig. 4.8)

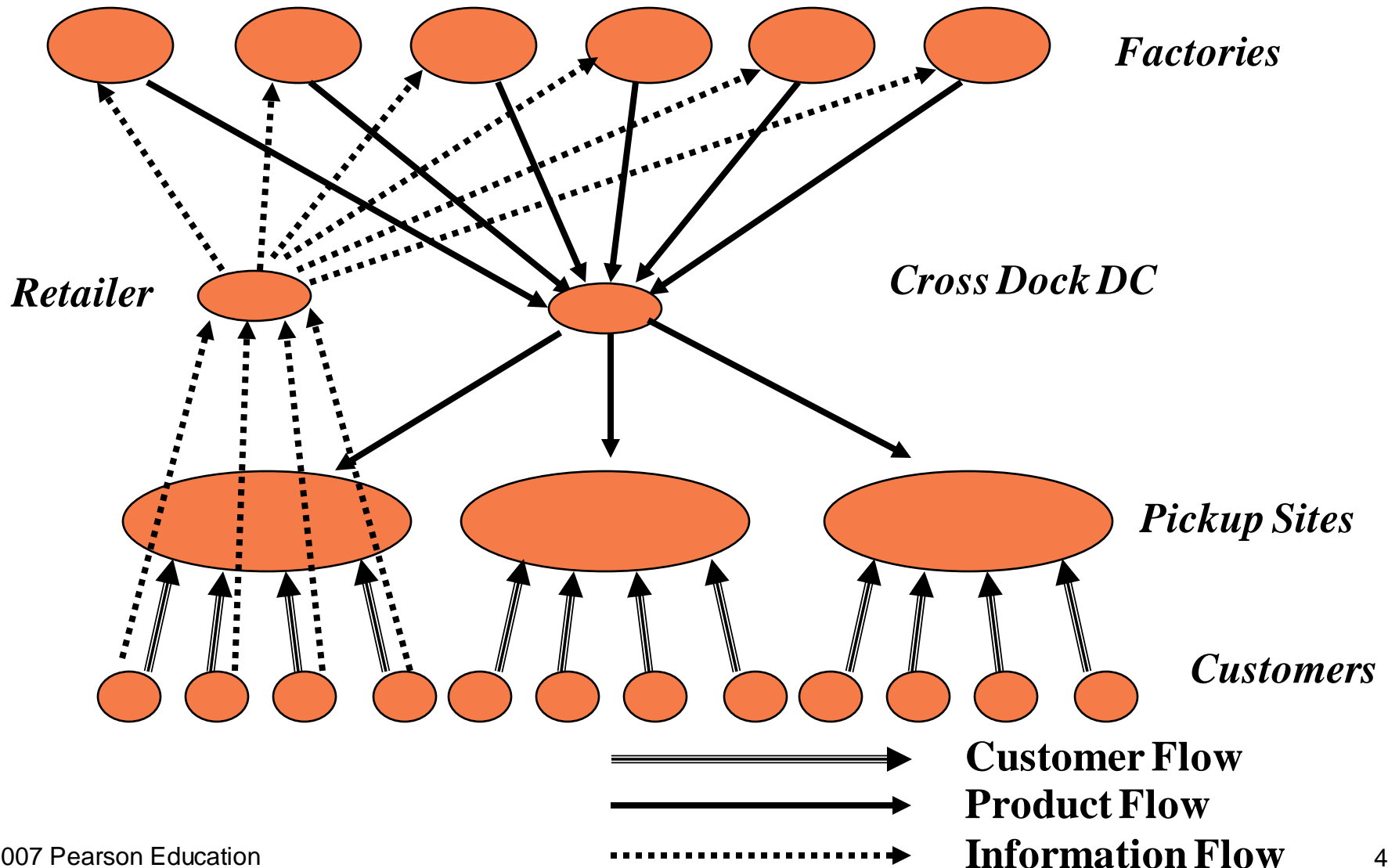




# Distributor Storage with Last Mile Delivery (Fig. 4.9)



# Manufacturer or Distributor Storage with Customer Pickup (Fig. 4.10)



# Comparative Performance of Delivery Network Designs (Table 4.7)

	Retail Storage with Customer Pickup	Manufacturer Storage with Direct Shipping	Manufacturer Storage with In-Transit Merge	Distributor Storage with Package Carrier Delivery	Distributor storage with last mile delivery	Manufacturer storage with pickup
Response Time	1	4	4	3	2	4
Product Variety	4	1	1	2	3	1
Product Availability	4	1	1	2	3	1
Customer Experience	5	4	3	2	1	5
Order Visibility	1	5	4	3	2	6
Returnability	1	5	5	4	3	2
Inventory	4	1	1	2	3	1
Transportation	1	4	3	2	5	1
Facility & Handling	6	1	2	3	4	5
Information	1	4	4	3	2	5

# Linking Product Characteristics and Customer Preferences to Network Design

	Retail Storage with Customer Pickup	Manufacturer Storage with Direct Shipping	Manufacturer Storage with In-Transit Merge	Distributor Storage with Package Carrier Delivery	Distributor storage with last mile delivery	Manufacturer storage with pickup
High demand product	+2	-2	-1	0	+1	-1
Medium demand product	+1	-1	0	+1	0	0
Low demand product	-1	+1	0	+1	-1	+1
Very low demand product	-2	+2	+1	0	-2	+1
Many product sources	+1	-1	-1	+2	+1	0
High product value	-1	+2	+1	+1	0	-2
Quick desired response	+2	-2	-2	-1	+1	-2
High product variety	-1	+2	0	+1	0	+2
Low customer effort	-2	+1	+2	+2	+2	-1

# E-Business and the Distribution Network

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- Impact of E-Business on Customer Service
- Impact of E-Business on Cost
- Using E-Business: Dell, Amazon, Peapod, Grainger

# Distribution Networks in Practice

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- ❑ The ownership structure of the distribution network can have as big an impact as the type of distribution network
- ❑ The choice of a distribution network has very long-term consequences
- ❑ Consider whether an exclusive distribution strategy is advantageous
- ❑ Product, price, commoditization, and criticality have an impact on the type of distribution system preferred by customers

# Summary of Learning Objectives

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- ❑ What are the key factors to be considered when designing the distribution network?
- ❑ What are the strengths and weaknesses of various distribution options?
- ❑ What roles do distributors play in the supply chain?