QUESTION:

WHAT IS THE OPTIMAL METHOD OF DELIVERY?

EFULFILLMENT & DISTRIBUTION

With material from Supply Chain Management by Chopra S and P Meindl

Fox School of Business
TEMPLE UNIVERSITY

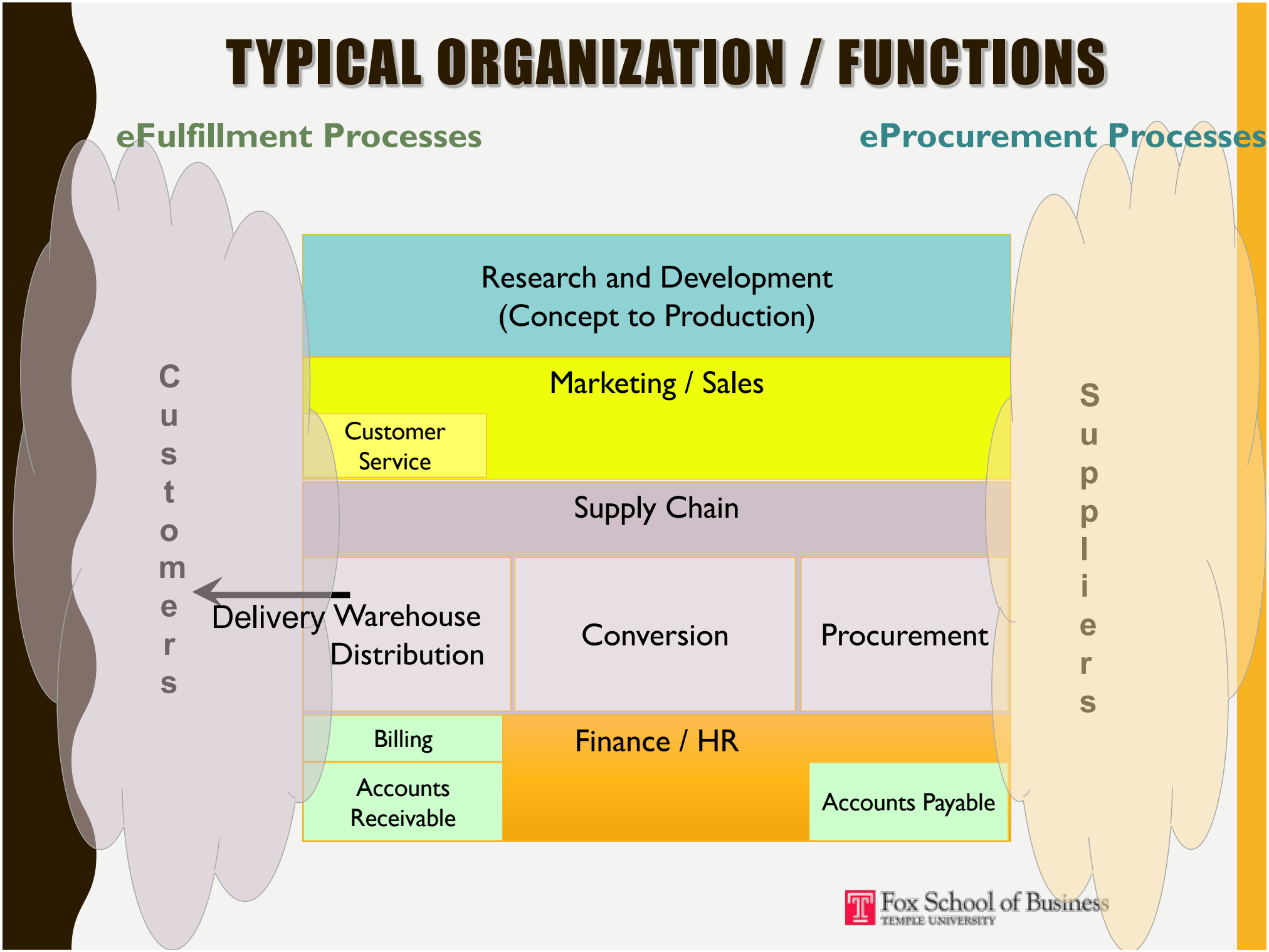
LEARNING OBJECTIVES

- Understand core eFulfillment principles
- Understand various e-distribution strategies
- Designing Distribution Networks

WHAT IS EFULFILLMENT?

- Fulfillment = delivery
- Part of the Sales or Order to Cash Process

TYPICAL ORGANIZATION / FUNCTIONS



BUSINESS PROCESS VS. FUNCTION

Function

'An operation / group who perform related tasks routinely to achieve a part of an organization's mission ..'

Business Dictionary

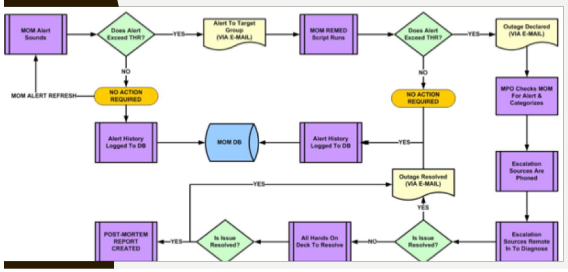
Process

'A series of logically related activities / tasks performed together to produce a defined set of results.'

Business Dictionary

'Actions an enterprise takes to achieve value creation '

ISACA



WHAT IS EFULFILLMENT?

- Fulfillment = delivery
- Types of fulfillment
  - Shop at a store
  - Home-delivery
  - Order online and pick up at store
  - …
- But eFulfillment is not just the delivery of goods or services online

EFULFILLMENT

- Set of distribution strategies
  - Deliver faster
  - Incur lowest possible cost
- Two core principles
  - Improve the use of information
  - Leverage resources

WHY EFULFILLMENT?

- Living.com
  - Online furniture retailer purchased a large furniture store
  - Declared bankruptcy a year later
  - Failure attributed to inability to deliver properly
  - Reason: the furniture store was not organized to meet the online operations

- Furniture.com
  - Launched in January 1999
  - Sales of $22 million in 2000
  - Folded due to poor logistics
  - Single central warehouse, led to inefficient delivery and increased transportation costs
  - Inability to manage regional distributors, especially repairs and returns

WHY EFULFILLMENT? (CONTD.)

- What differentiates Dell from the competition?
  - Virtual integration
  - The boundaries between suppliers, manufacturers and end users are blurred
  - Holds eight days of inventory
  - Produces to order
  - No inventory of finished goods

WHY EFULFILLMENT? (CONTD.)

- Peapod
  - First online grocer
  - Taken over by Royal Ahold, in the face of mounting losses
- Other failed online grocery stores
  - Shoplink.com, Streamline.com, WebHouse Club
  - Reason: High delivery costs

WHY EFULFILLMENT? (CONTD.)

- Amazon / Whole Foods
  Will there be a Different outcome?

EFULFILLMENT: WHAT DO YOU EXPECT?

- On-Time Delivery
- Get what ordered – quality of delivery
- Not damaged
- Accuracy of delivery vs. order
- Low Cost - Free
- Tracking – know where it is, expected delivery
- Fast delivery

EFULFILLMENT CHALLENGES

- High Customer Expectations
- Faster Delivery (Next day, Same Day)
- On-time Delivery
- Visibility (end to end)
- Order and Delivery complexity
- International Supply Chain (Customs, etc.)
- Total Cost (competition)

EFULFILLMENT: VALUE-ADDED SERVICES

- Real-time inventory visibility & product availability
- Real-time package-tracking capability
- Real-time online payment approval
- Easily accessible customer service
- Multiple delivery options
- Real-time visibility of order status
- Single consolidated shipments

LEARNING OBJECTIVES

- Understand core eFulfillment principles
- Understand various e-distribution strategies
- Designing Distribution Networks

CORE PRINCIPLES

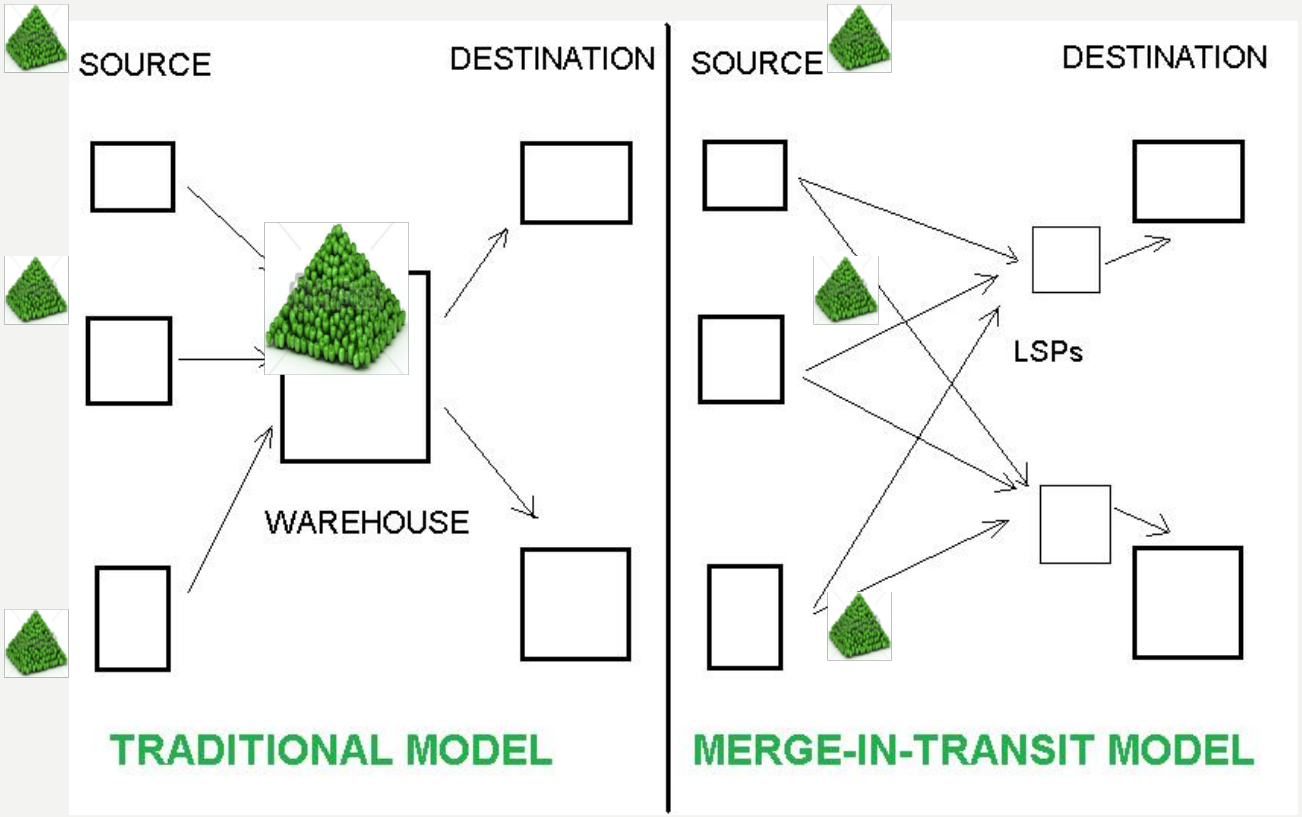
- Improve the use of information
  - Logistics postponement
  - Dematerialization

- Leverage existing resources
  - Clicks and mortar (ship-to-store)
  - Existing Delivery Services
  - Leveraged shipments

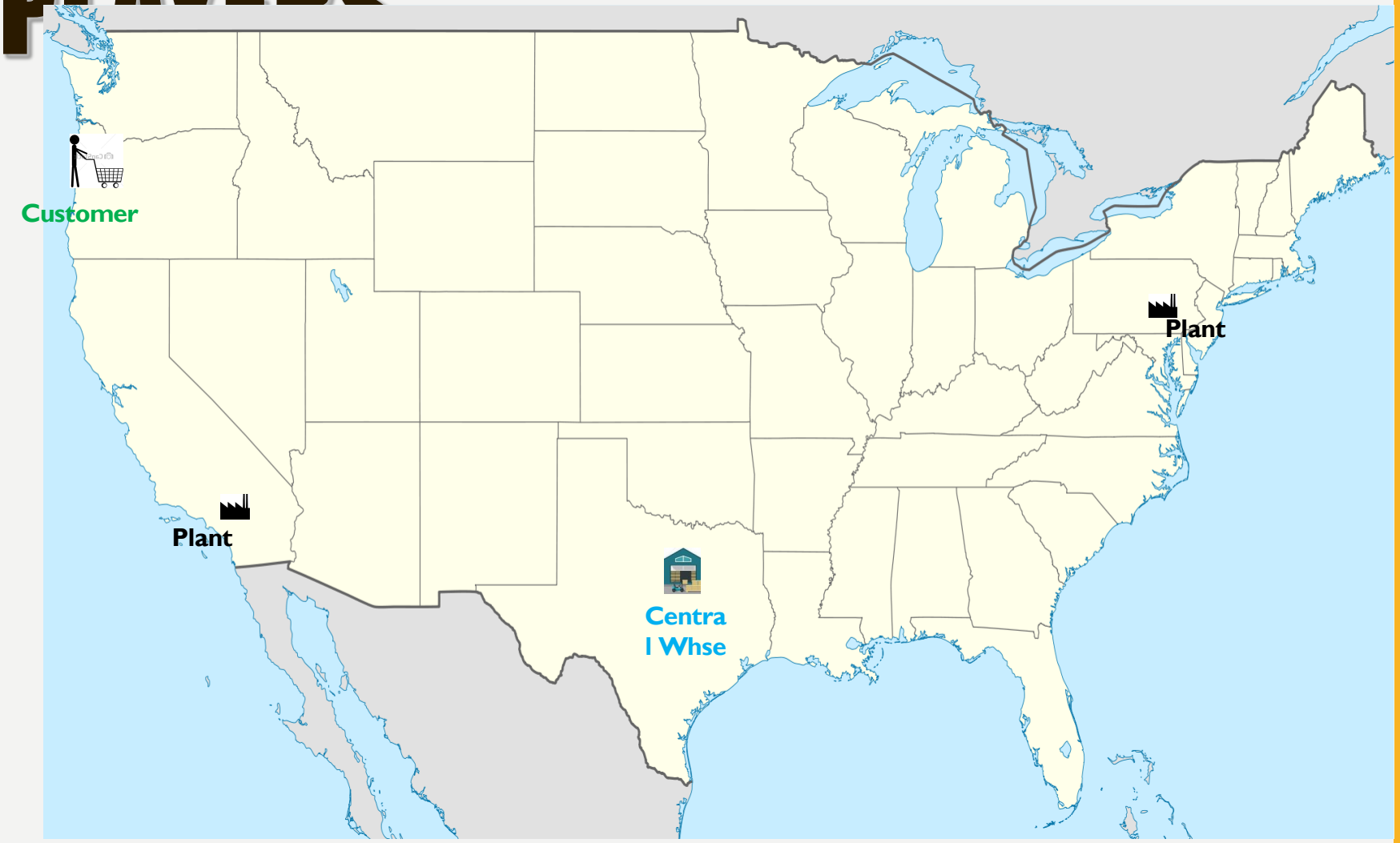
E-DISTRIBUTION STRATEGIES

- Logistics Postponement
  - Merge in Transit
  - Rolling Warehouse
- Dematerialization
- Resource Exchange
- Leveraged Shipments
- Click and Mortar

MERGE IN TRANSI

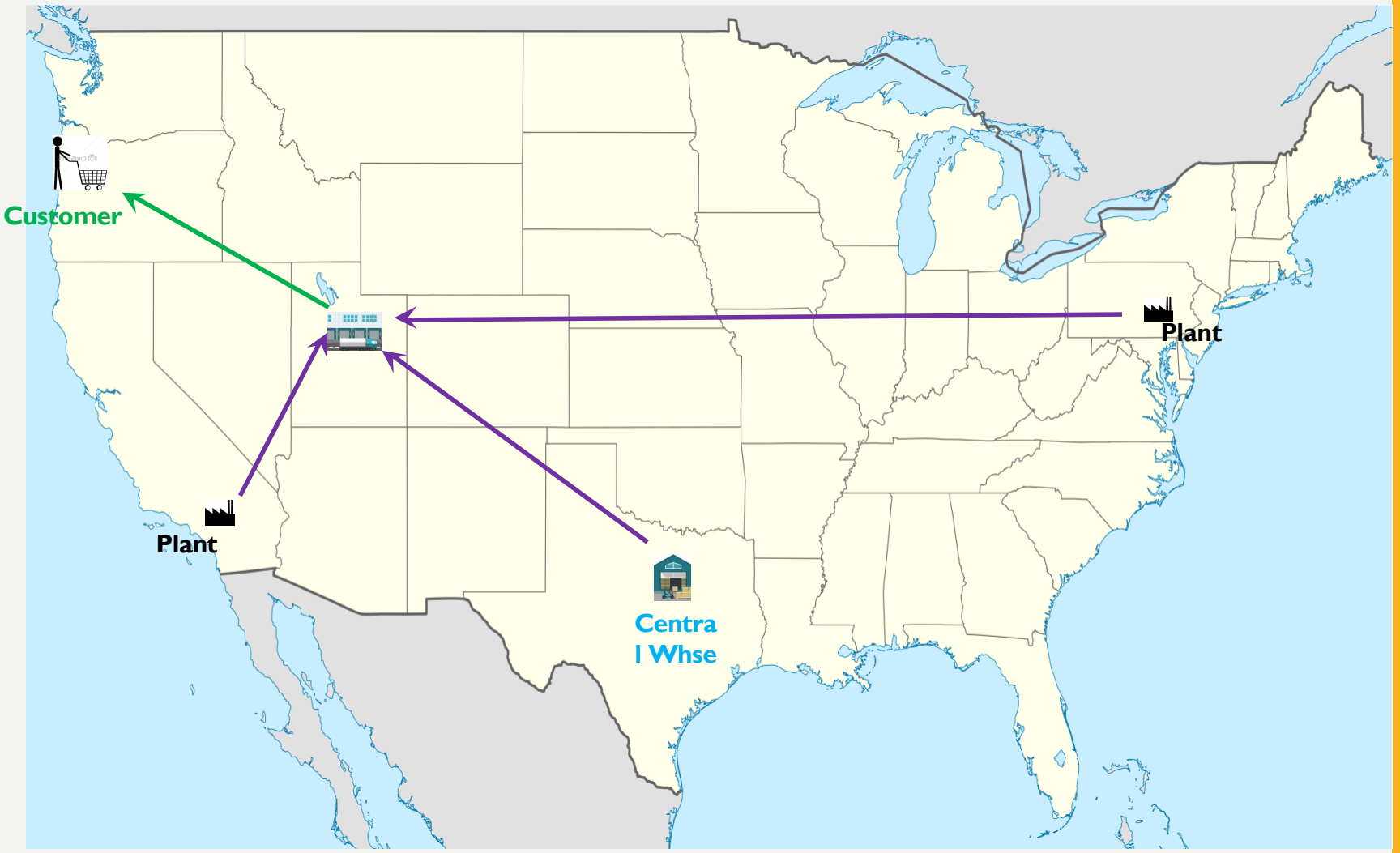


MERGE IN TRANSIT - PLAYERS

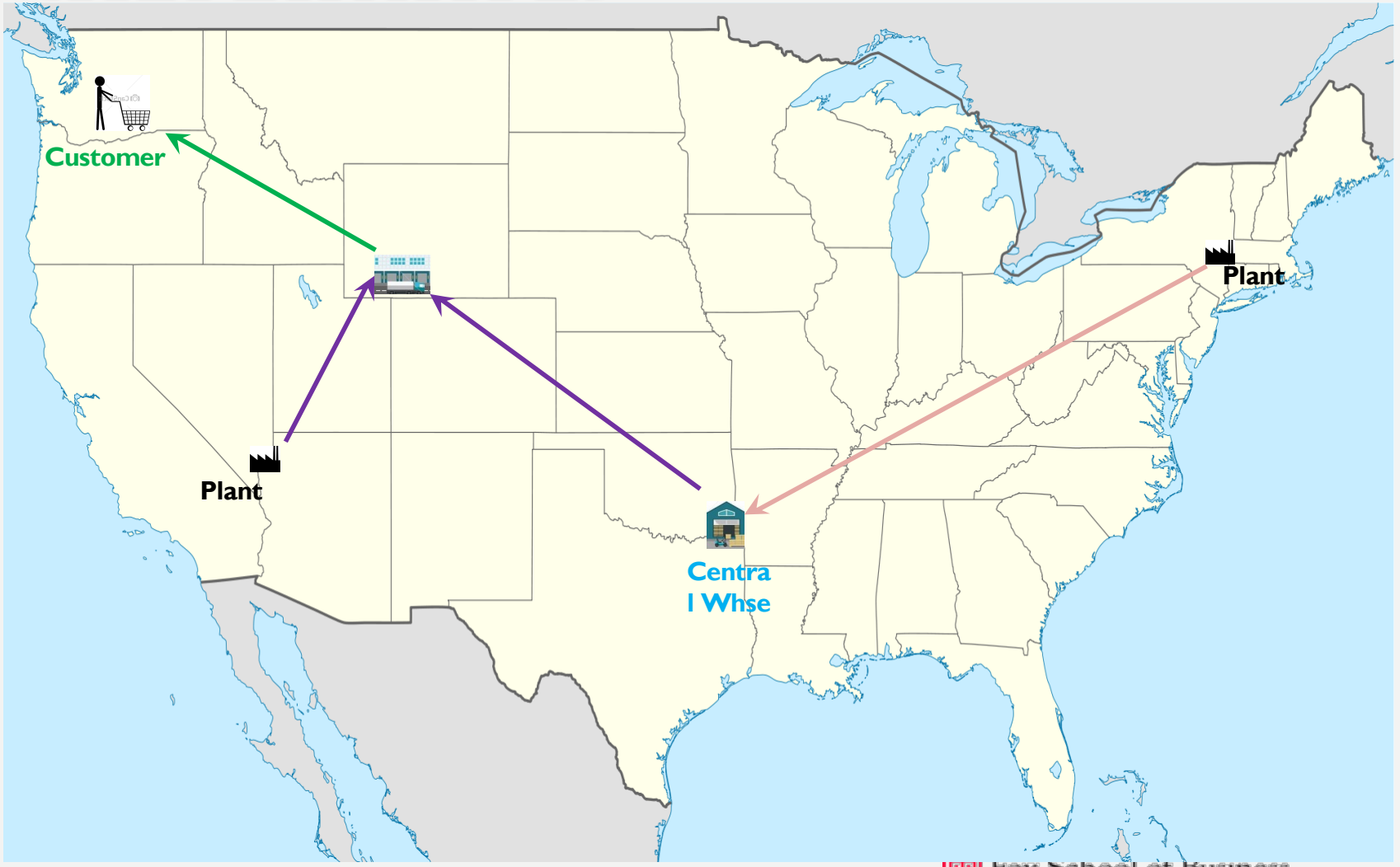


MERGE IN TRANSIT - BEFORE

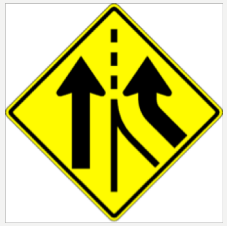
MERGE IN TRANSIT



MERGE IN TRANSIT (ALTERNATE)



Merge in transit



- Examples:
  - Dell (makes computer) and merges monitor, keyboards, etc. from suppliers by UPS at defined sites
  - Starbucks
    - New store builds delivered in 5 bundles
    - Bundles merged from various suppliers
    - Reduces total build time
- Success:
  - Data and models to plan, execute the coordination
  - Choreography – impeccable timing – Do what you say
  - Manage the complexity

ROLLING WAREHOUSE

Characteristics

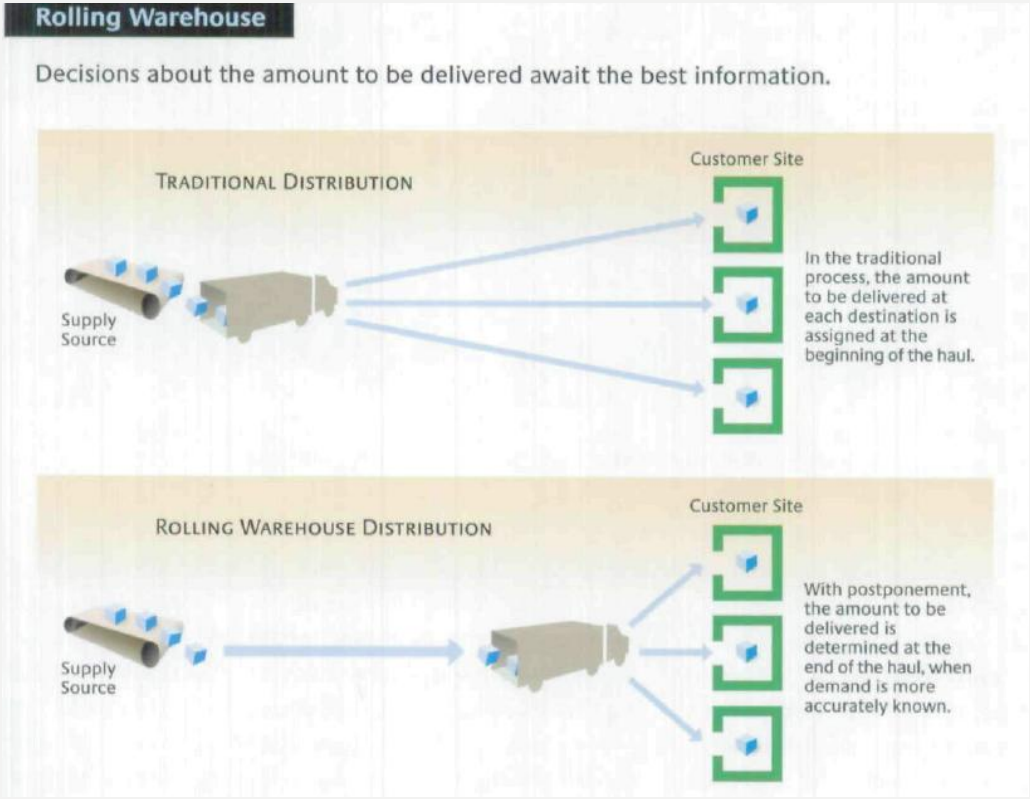
- Products in a shipment not pre-assigned to any destination
- Such information is passed to the fulfilling agent or determined at time of delivery
- Better meet current demand

Examples

- Home Oil Delivery
- Home Milk Delivery
- Ag Bulk Distribution

Fox School of Business
TEMPLE UNIVERSITY

ROLLING WAREHOUSE

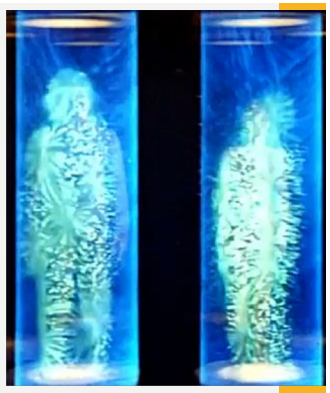


Fox School of Business
TEMPLE UNIVERSITY

DEMATERIALIZATION

- Material (Physical) flow costs
  - Handling
  - Loading
  - Unloading
  - Warehousing
  - Shipping
  - Returns
  - Spoilage
  - Damage

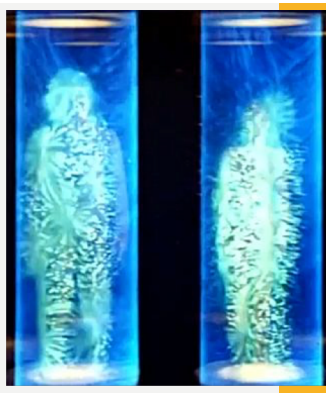
DEMATERIALIZATION (CONTD.)



- Wherever possible, replace physical material flow with information flow
- Shift reliance on products to services by leveraging information

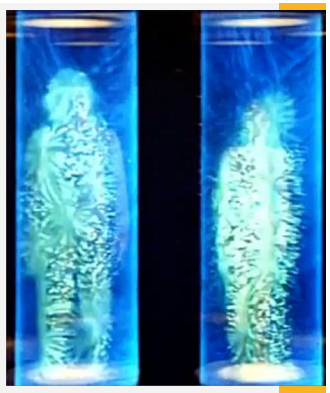
- Example: Online greeting cards
  - Most cards are free of cost
  - Instant delivery
  - No holding costs, inventory buildup
  - Ability to offer value-added services

DEMATERIALIZATION EXAMPLES



- XILINX®
  - Semiconductor manufacturer makes field-programmable circuits
  - Circuits can be configured based on client needs
- RECRUIT Co. of Japan
  - Used to publish seven-volume directory of job openings in Japan
  - Today, no such paper directories are published
  - Cost savings, ease of use, …

DEMATERIALIZATION EXAMPLES



- Car Sharing
  - Shift reliance on products (auto) to a service by leveraging information
  - Using technology (including RFID) to leverage expensive assets

RESOURCE EXCHANGE

Fox School of Business
TEMPLE UNIVERSITY

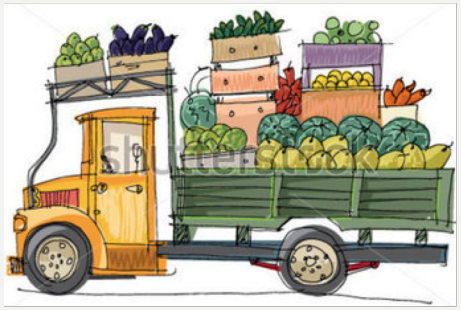
RESOURCE EXCHANGE (CONTD.)

RESOURCE EXCHANGE (CONTD.)

- How it works:
  - Only information flows between manufacturers A & B
  - A & B act as virtual sites for each other

- Used by:
  - Synchronet Marine
  - Chemical Commodity Companies: Swaps
    - Time, location, …
    - Lower total cost for participating companies
    - Exchangeable products

LEVERAGED SHIPMENTS



- When is the cost of delivery justified?
  - If the order value is sufficiently large
  - If there is a high concentration of orders in one area
- Delivery value density (DVD)
- DVD = Avg. total dollar volume of shipment / Avg. travel distance per trip

IMPROVING DVD

- The **Streamline** method
  - Boston-based online grocer
  - Delivery to specified neighborhoods on specified days of the week
  - By accumulating deliveries, increased the total dollar volume of the shipment
  - By focusing on specific neighborhoods, reduced the trip distance

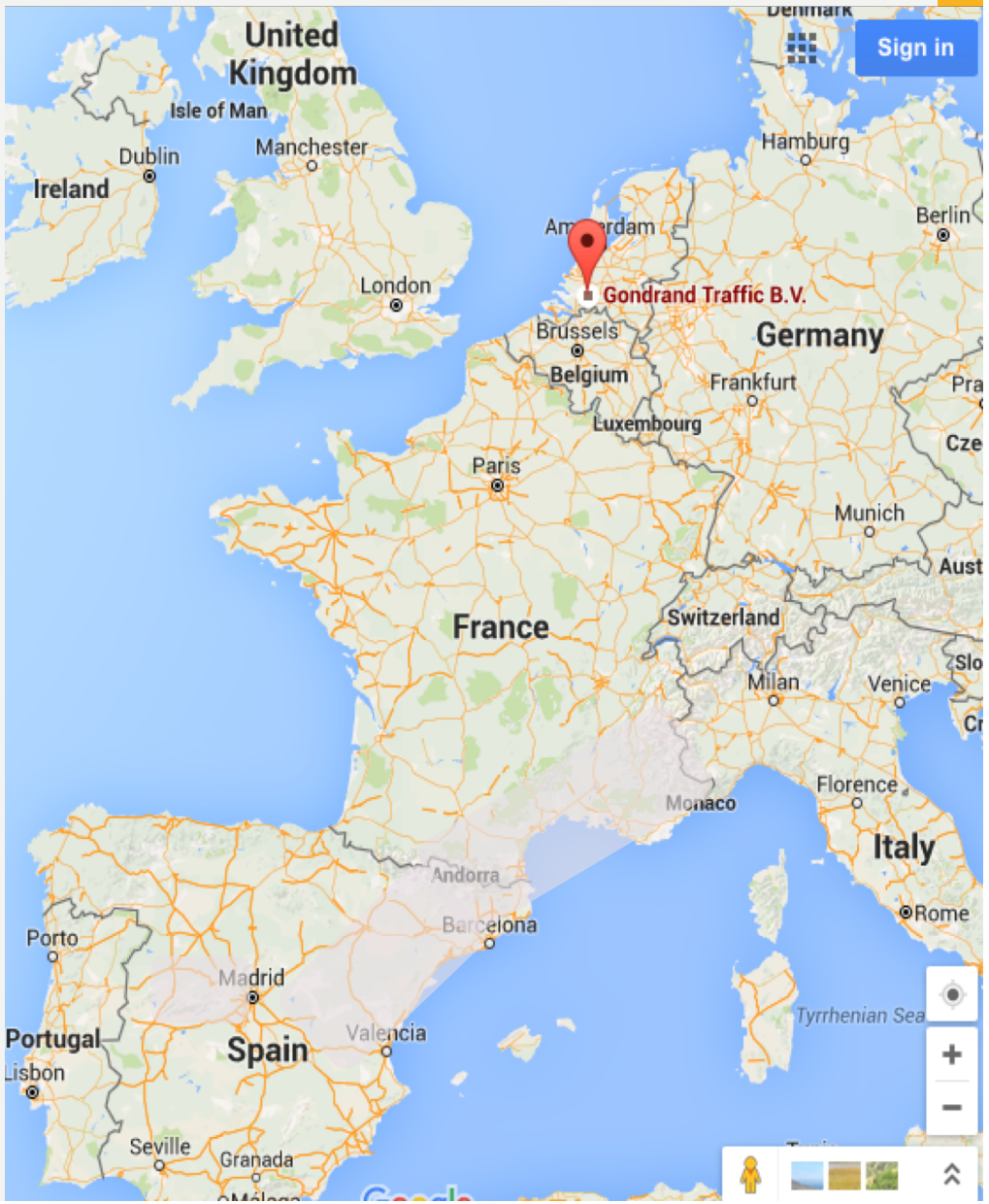
IMPROVING DVD (CONTD.)

- The ECLine model
  - Korean third-party LSP
  - Recruited highly localized home-delivery service providers or dealers
  - Dealers deliver multiple times daily (lower trip distance, because of localization)
  - Excellent service benchmarks
  - ECLine picks up items and drops off in bulk (lower DVD)

IMPROVING DVD:

Dow Electronic Materials

- EU warehouse in NL
- FR and ES customers concentrated in south
- Created 'MilkRun' Schedule: Limited Days of Delivery each week
- Surcharges for delivery outside schedule
- Result: lower costs with fewer but fuller trucks



CLICKS-AND-MORTAR MODEL

- Get the customer to cover the last mile
- Customer orders online, and picks up the product at the nearest store
- Negligible incremental cost for the shipment
- Used by many companies, including:

CVS Ford Walmart

THE RIGHT STRATEGY

Using the Right Strategy

Companies start by assessing products and environments.

Strategy	Suitable Products	Suitable Environment
Logistics postponement	High-value, bulky items with uncertain demand	Information-based logistics-service provider and timely order information are available.
Dematerialization	Information-content goods	Information infrastructure has sufficient capacity.
Resource exchange	Low-value, high-shipping-cost items	Distributed and substitutable stocks are available for pooling.
Leveraged shipments	Nonbulky items with stable demand	High delivery-value density (DVD) in an existing delivery network is available.
Clicks-and-mortar	Easy-to-carry items with higher value	High DVD to conveniently located physical outlets is available.

LEARNING OBJECTIVES

- Understand the core eFulfillment principles
- Learn about various e-distribution strategies
- Designing Distribution Networks

FACTORS INFLUENCING DISTRIBUTION NETWORK DESIGN

- Distribution network performance evaluated along two high level dimensions:
  - Customer needs are met
  - Total Cost of meeting customer needs

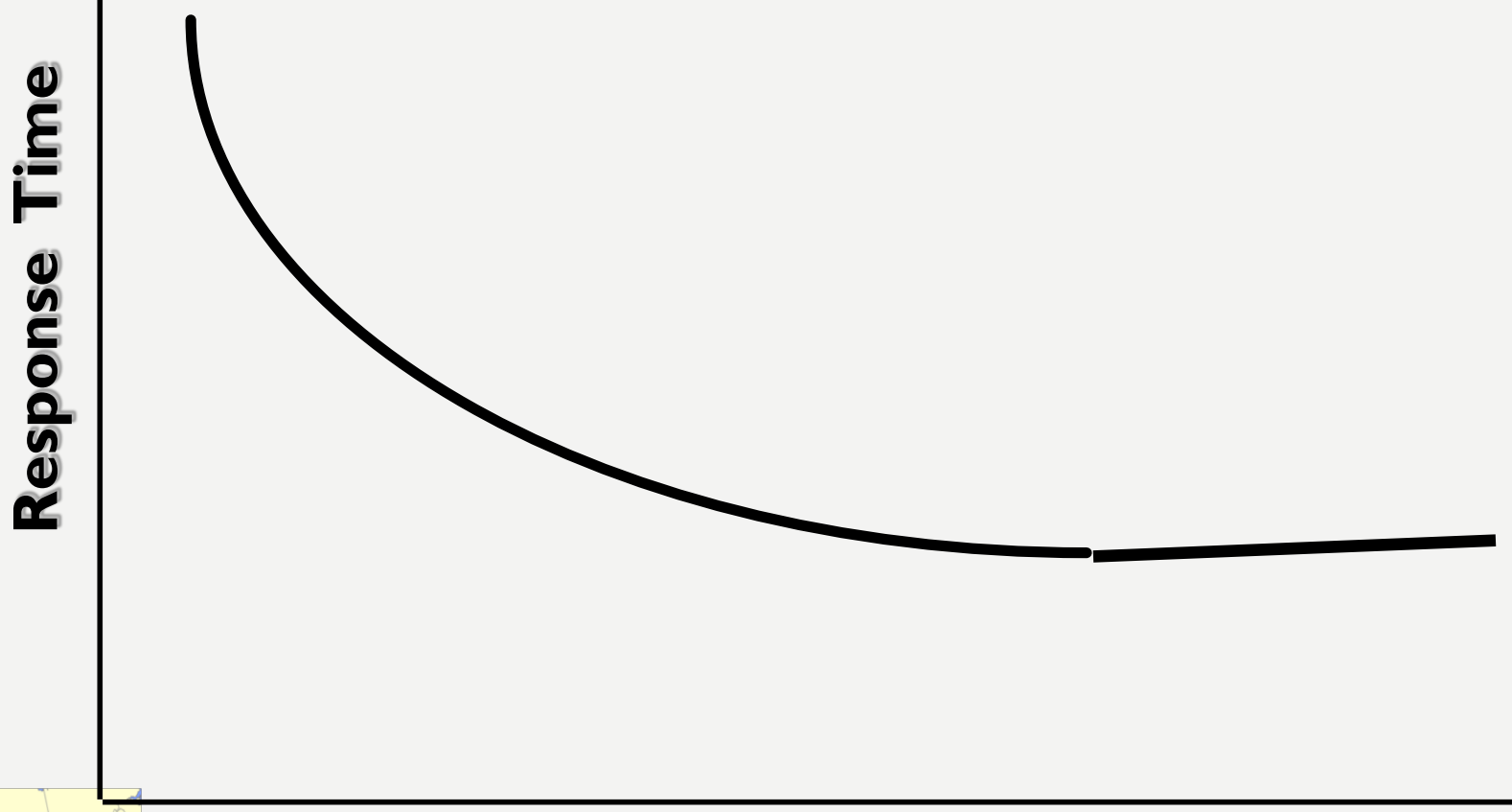
- Tradeoffs between these two dimensions

FACTORS INFLUENCING DISTRIBUTION NETWORK DESIGN

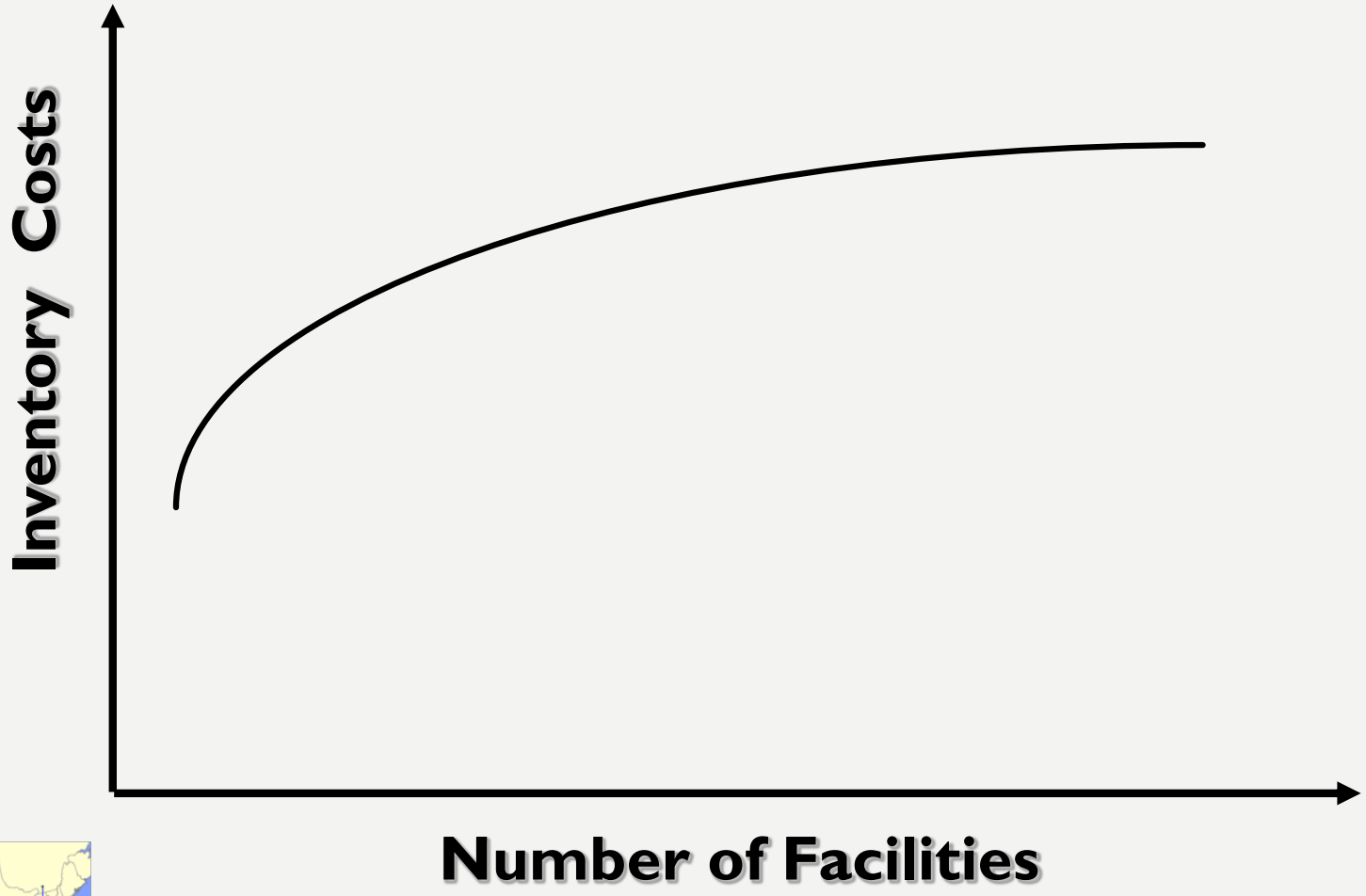
- Customer Service Elements influenced by network structure:
  - Response time
  - Product variety
  - Product availability
  - Customer experience (options, complexity, …)
  - Order visibility
  - Returnability

- Supply Chain Costs affected by network structure:
  - Inventories
  - Transportation
  - Facilities and handling
  - Information

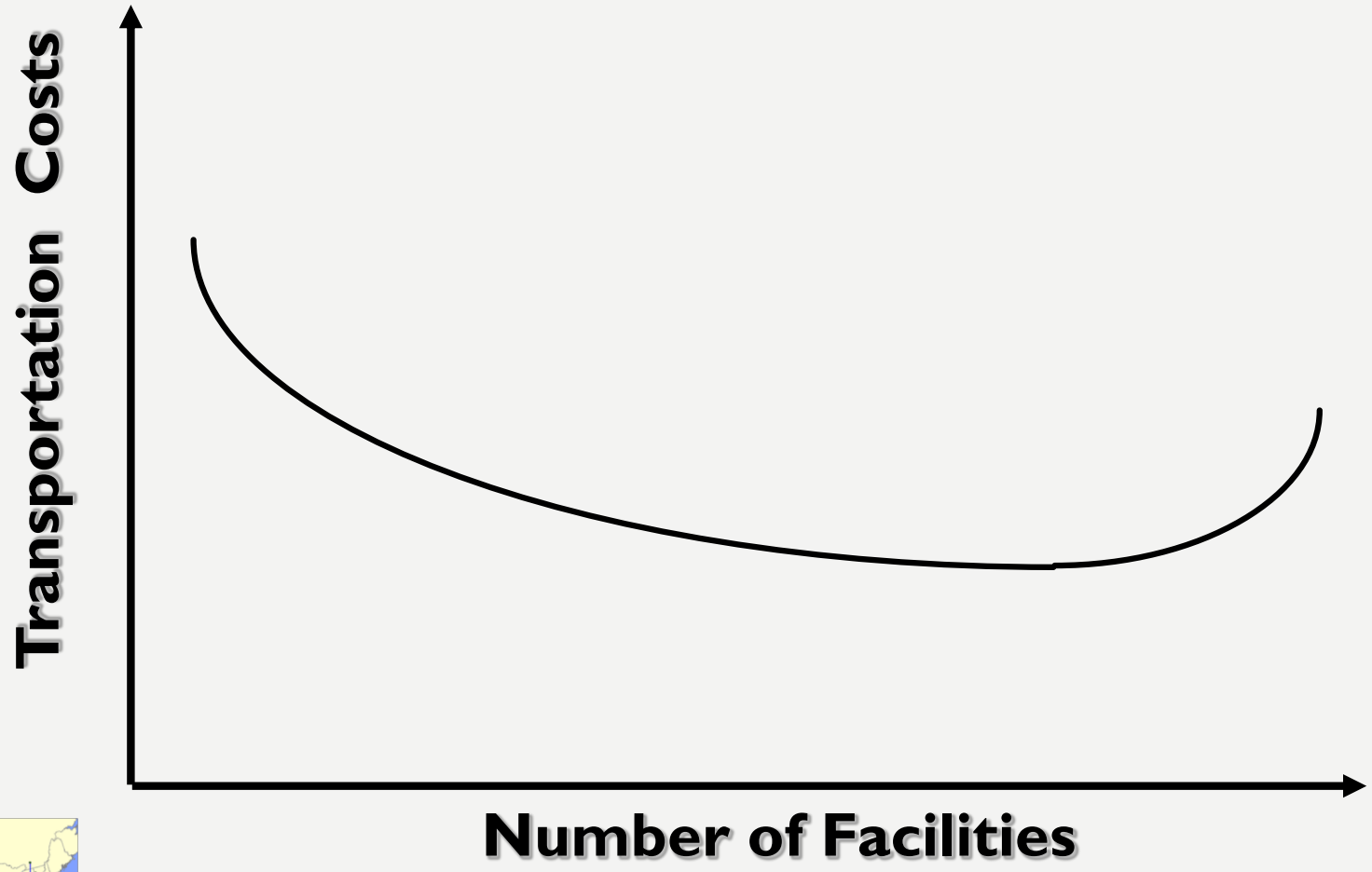
SERVICE AND NUMBER OF FACILITIES



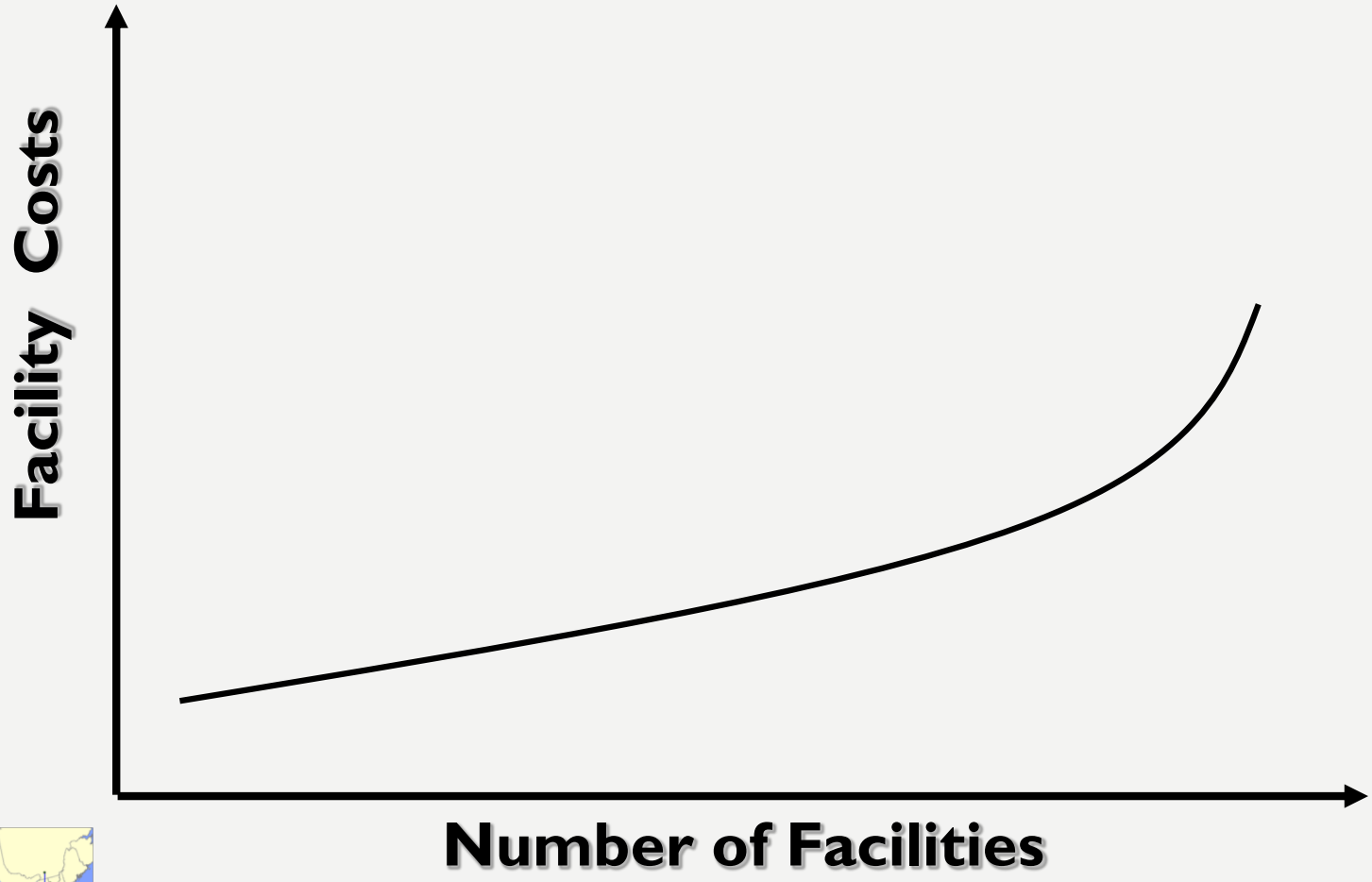
INVENTORY COSTS AND NUMBER OF FACILITIES



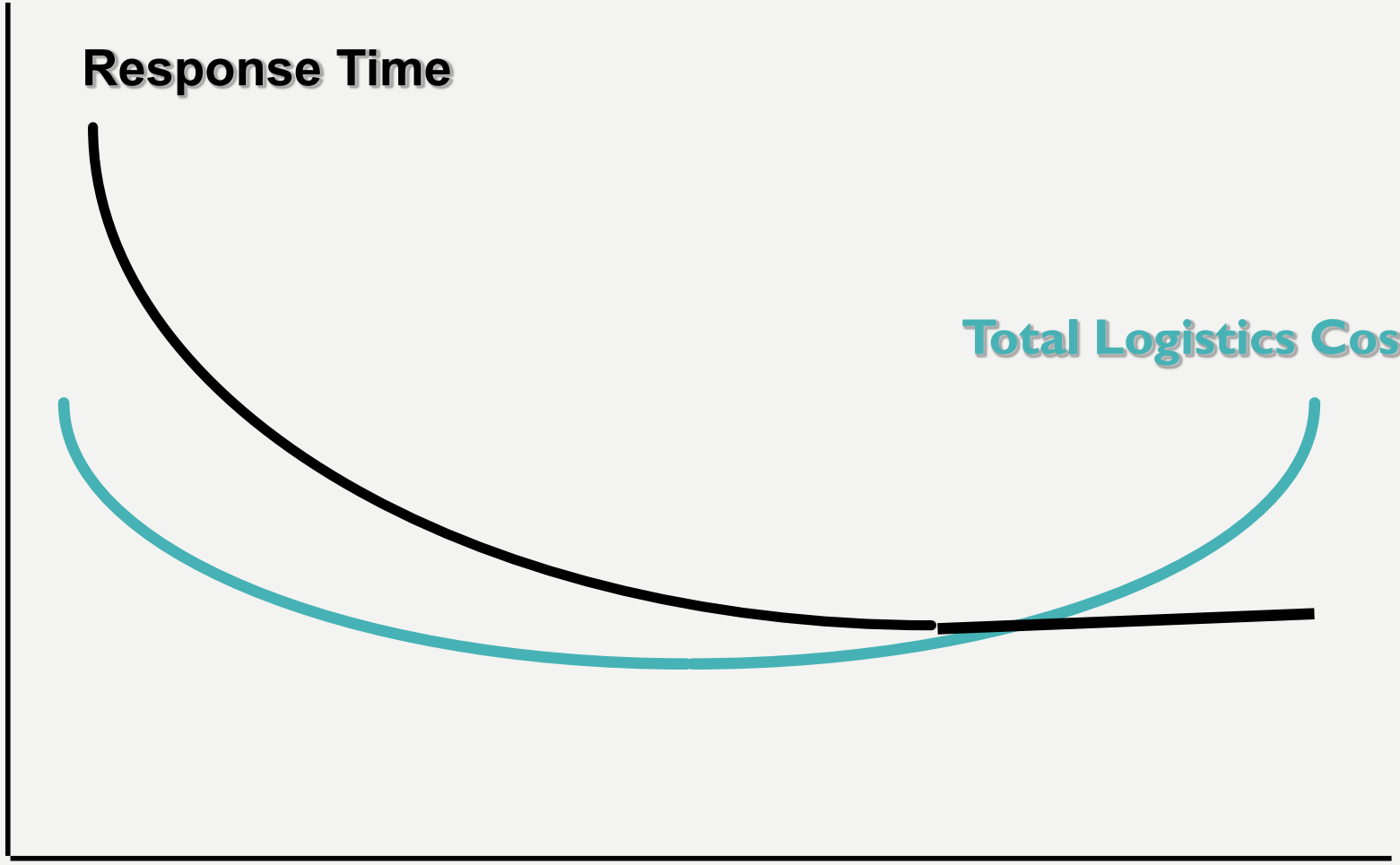
TRANSPORTATION COSTS AND NUMBER OF FACILITIES



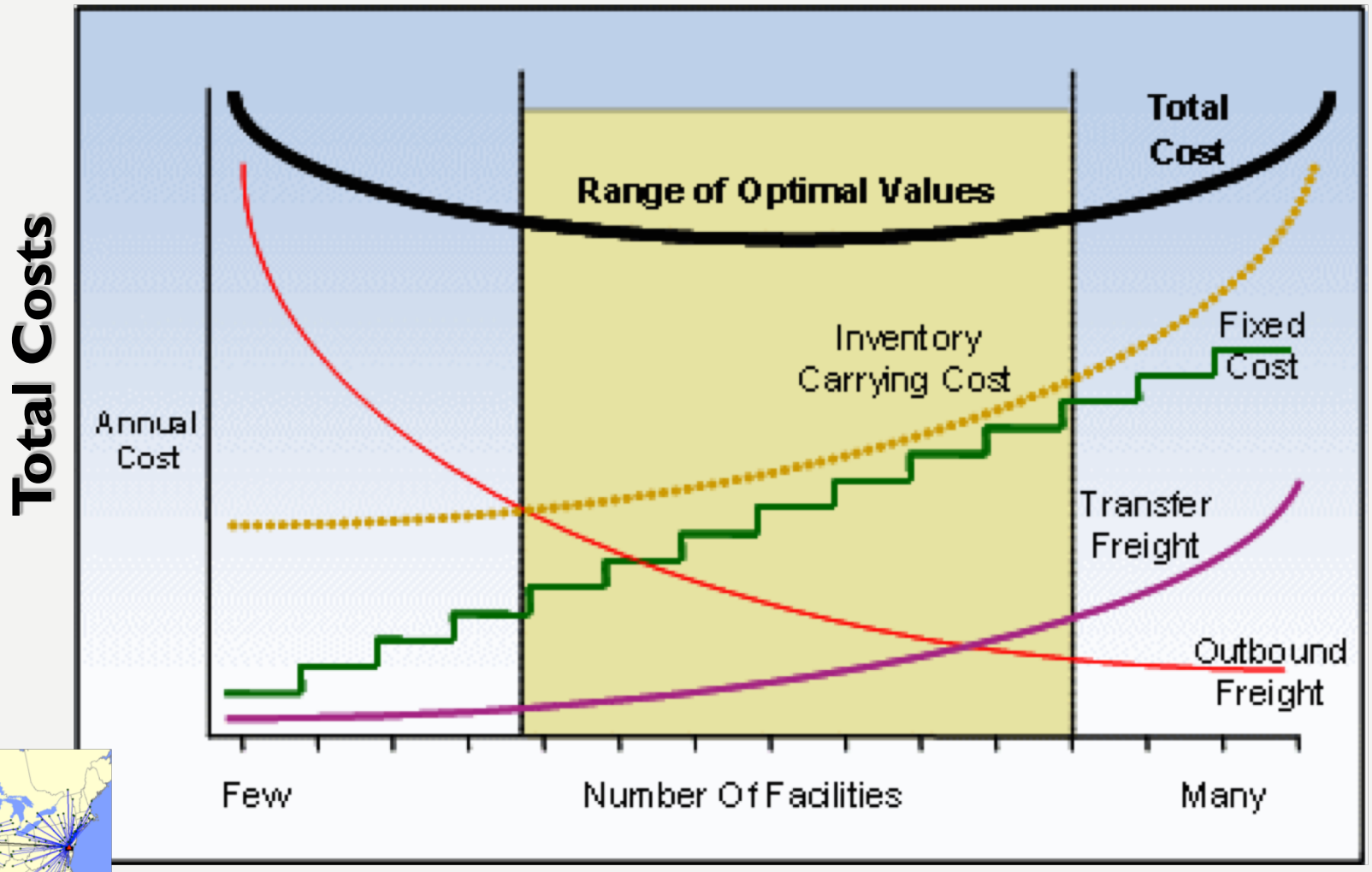
FACILITY COSTS AND NUMBER OF FACILITIES



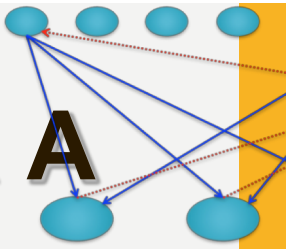
Logistics Costs and Response Time vs. Number of Facilities



Total Costs Related to Number of Facilities

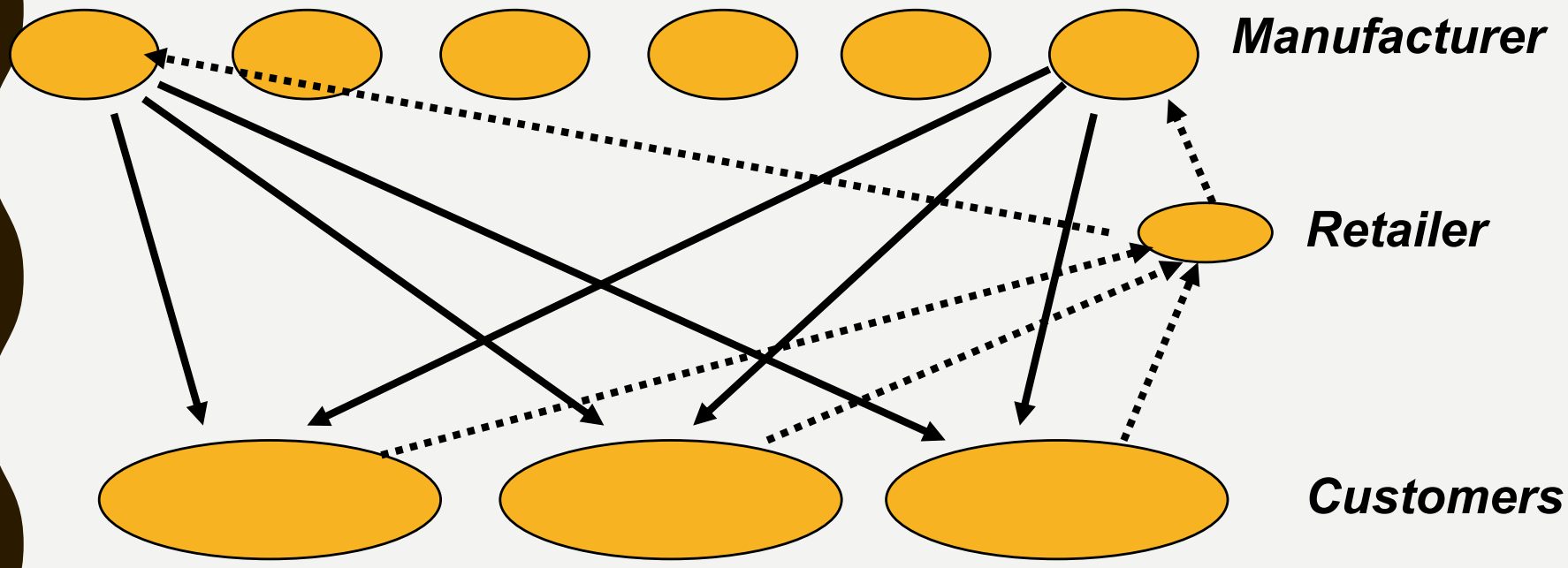


DESIGN OPTIONS (SOME) FOR A DISTRIBUTION NETWORK

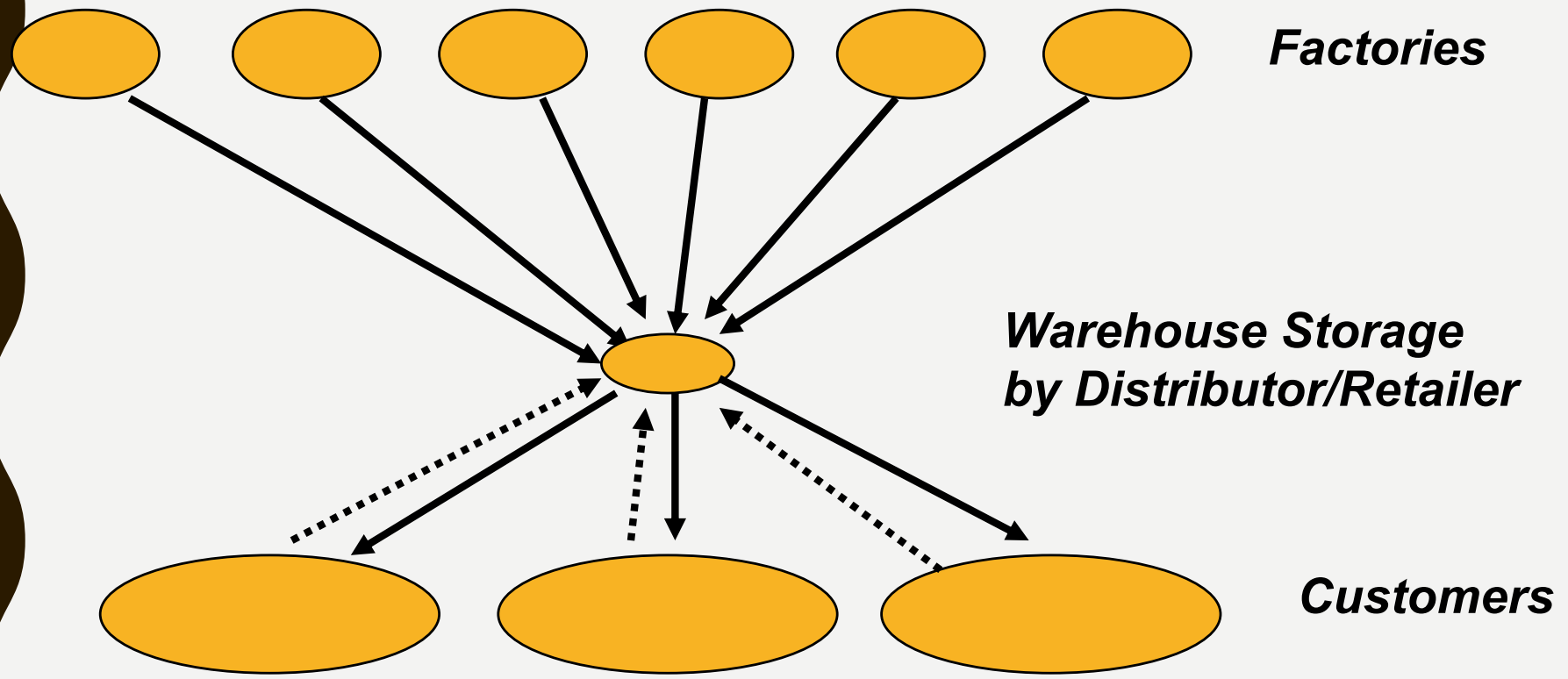


- Manufacturer Storage with Direct Shipping
- Distributor Storage with Carrier Delivery
- Distributor Storage with Last Mile Delivery
- Retail Storage with Consumer Pickup

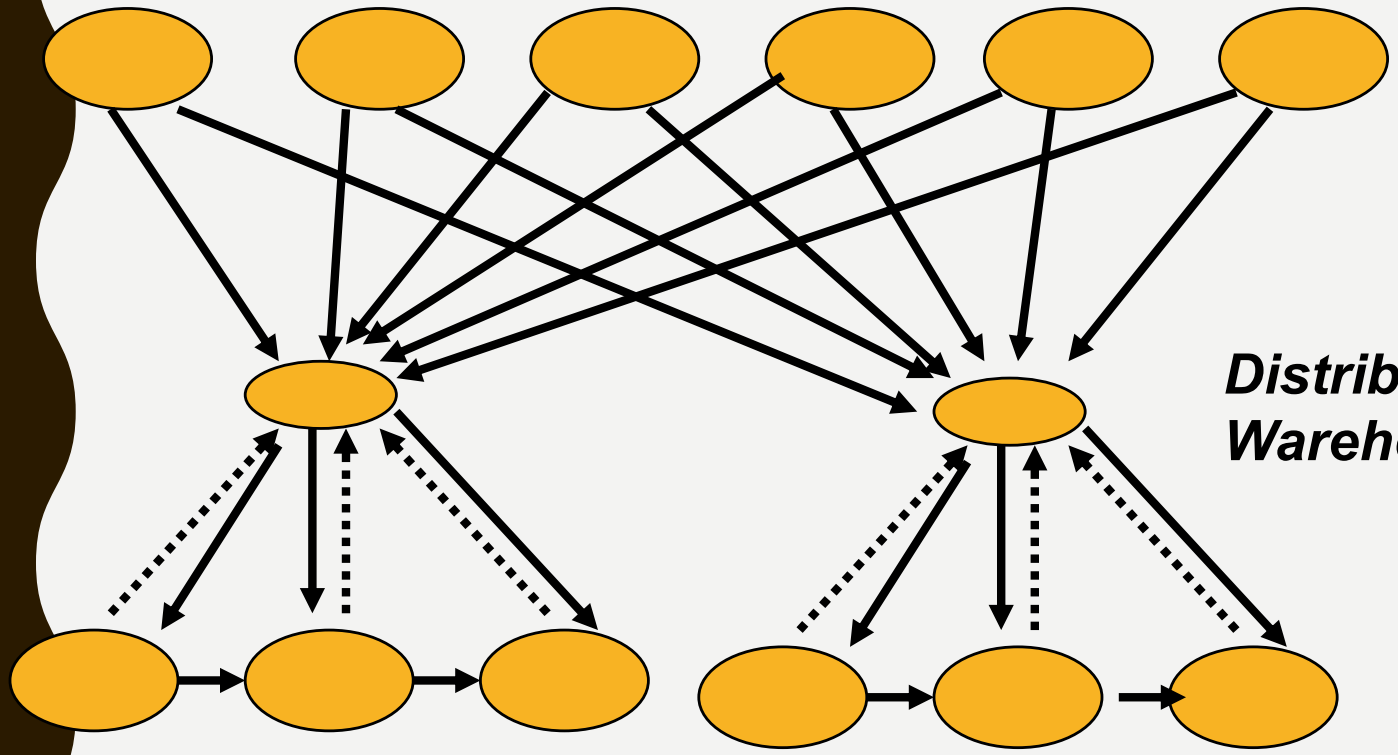
MANUFACTURER STORAGE WITH DIRECT SHIPPING



DISTRIBUTOR STORAGE WITH CARRIER DELIVERY



DISTRIBUTOR STORAGE WITH LAST MILE DELIVERY



Factories

Distributor/Retailer Warehouse

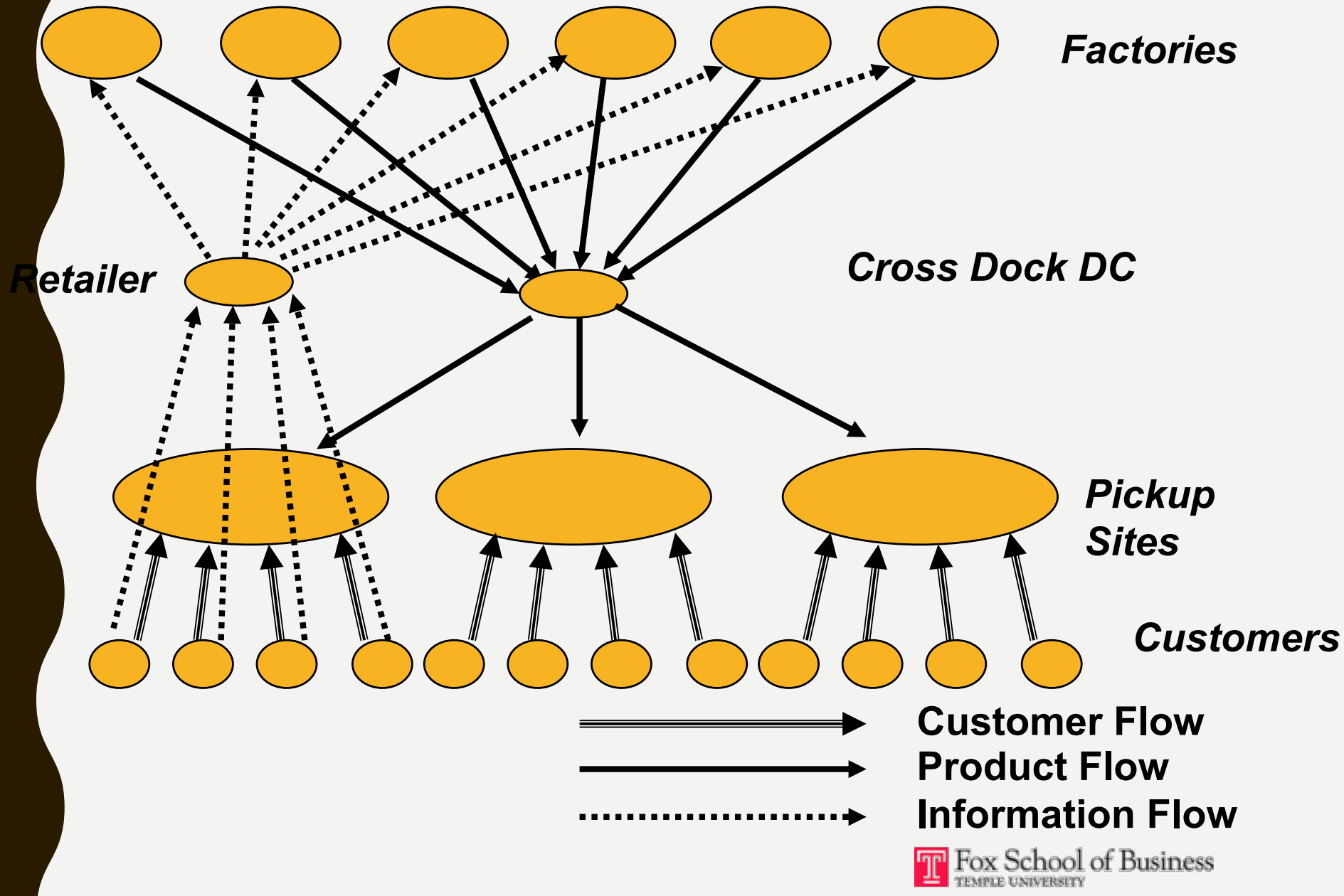
Customers

Product Flow

Information Flow

Fox School of Business
TEMPLE UNIVERSITY

RETAIL STORAGE WITH CUSTOMER PICKUP



Fox School of Business
TEMPLE UNIVERSITY

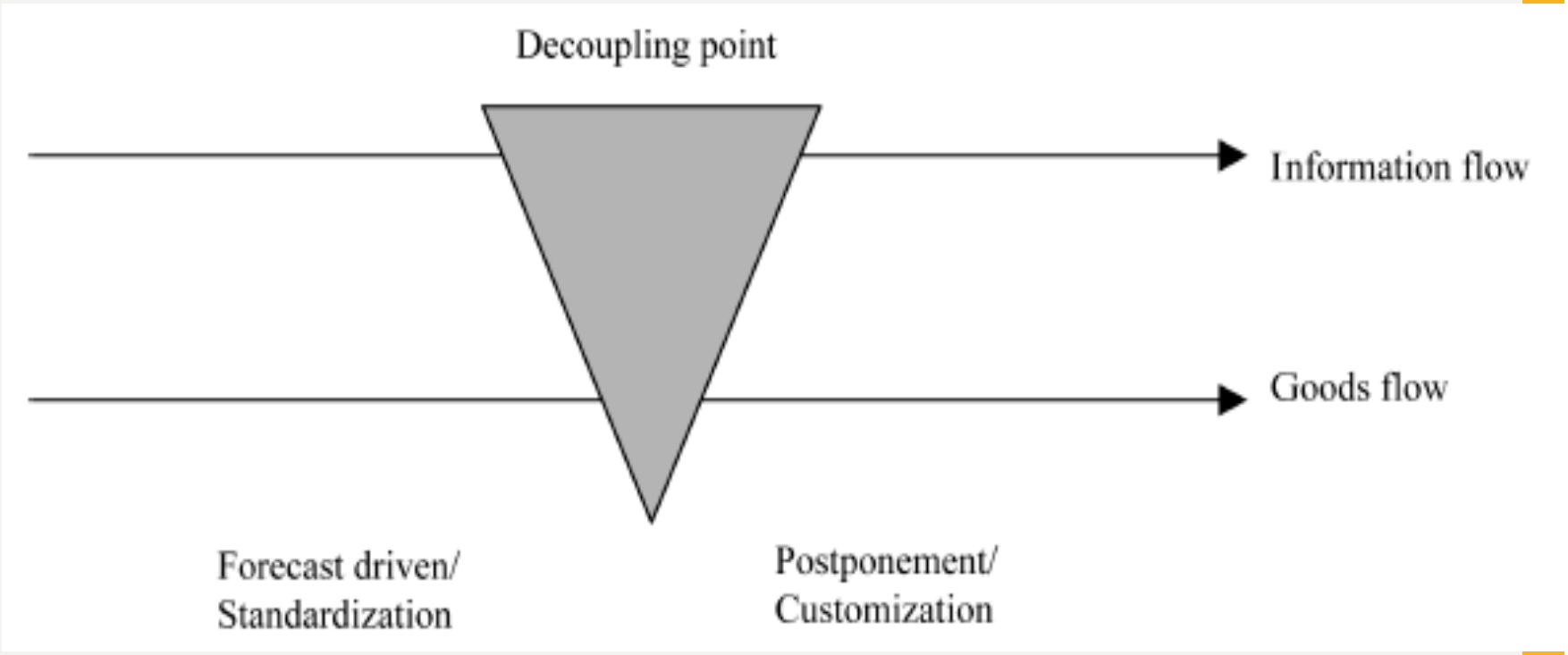
OPTIMAL DISTRIBUTION NETWORK

Strategy -> Scenario	Retail Storage with Customer Pickup	Manufacture Storage with Direct Shipping	Distributor Storage with Carrier Delivery	Distributor Storage with Last Mile Delivery
High Demand	√			
Medium Demand			√	
Low Demand		√		
High Product Value		√		
Low customer effort				√

DECOUPLING POINTS

- **"Decoupling Points": The locations in the product structure or distribution** network where inventory is placed to create *independence between processes or entities*.
  Selection of decoupling points is a strategic decision that determines customer lead times and inventory investment.

DECOUPLING POINT

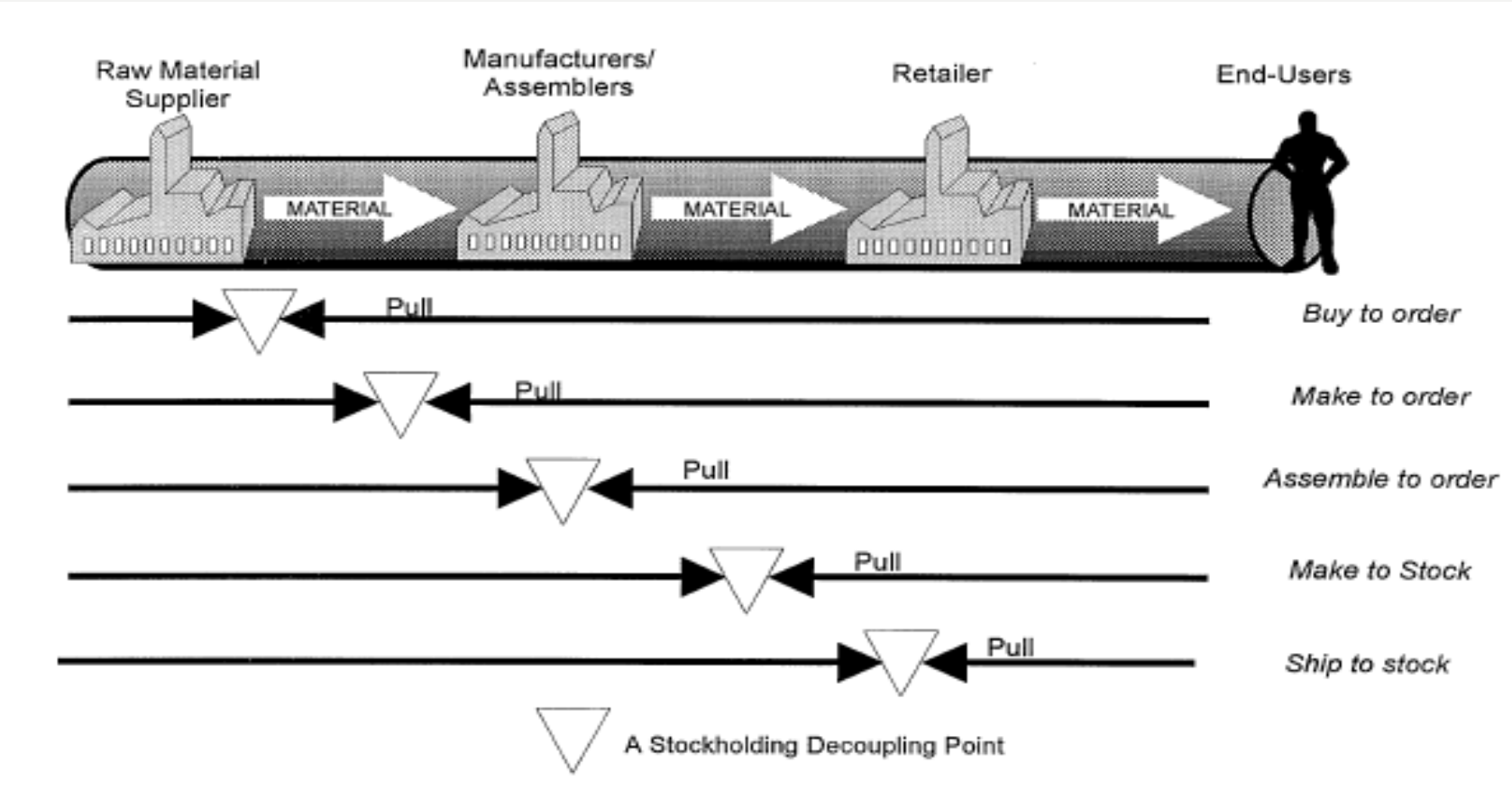


Upstream: Supply chains should be lean
Downstream: Supply Chains should be agile

MATERIAL DECOUPLING POINT

- Strategic point for buffer stock
- Position changes depending on the variability in demand and product mix
  - Increase in product mix and fluctuating volume decoupling point move upstream -> supply chain more agile
  - Reduced variability in demand or product mix decoupling point move downstream -> supply chain leaner
- Product differentiation must occur at or beyond the decoupling point

UNDERSTANDING SCM STRATEGIES



- Information and Systems critical to effectively managing chosen strategy.

Questions!

Fox School of Business
TEMPLE UNIVERSITY