
Supply Chain Management Introduction

Outline

- ◆ **What is supply chain management?**
- ◆ **Seven Eleven Japan**
- ◆ **A supply chain strategy framework**
- ◆ **Components of a SCM**
- ◆ **Major obstacles and common problems**

Traditional View: Supply Chains in the Economy (1990, 1996)

- ◆ **Freight Transportation** **\$352, \$455 B**
 - Transportation manager in charge
 - Transportation software
- ◆ **Inventory Expense** **\$221, \$311 B**
 - Inventory manager in charge
 - Inventory software
- ◆ **Administrative Expense** **\$27, \$31 B**
- ◆ **Logistics related activity** **11%, 10.5% of GNP**



Transportation and inventory managers

◆ **\$898 B spent domestically for SC activities in 1998**

Traditional View: Cost breakdown of a manufactured good

◆ Profit	10%
◆ Supply Chain Cost	20%
◆ Marketing Cost	25%
◆ Manufacturing Cost	45%

Profit
Supply Chain Cost
Marketing Cost
Manufacturing Cost

What can Supply Chain Management do?

- ◆ Estimated that the grocery industry could save \$30 billion (10% of operating cost) by using effective logistics and supply chain strategies
 - A typical box of cereal spends 104 days from factory to sale
 - A typical car spends 15 days from factory to dealership
 - Box of cereal more complex than a car?
- ◆ Laura Ashley turns its inventory 10 times a year, five times faster than 3 years ago
- ◆ National Semiconductor used air transportation and closed 6 warehouses, 34% increase in sales and 47% decrease in delivery lead time.

Magnitude of Supply Chain Management

- ◆ Compaq estimates it lost \$0.5 billion to \$1 billion in sales in 1995 because laptops were not available when and where needed
- ◆ When the 1 gig processor was introduced by AMD (Advanced Micro Devices), the price of the 800 meg processor dropped by 30%
- ◆ P&G (Proctor&Gamble) estimates it saved retail customers \$65 million (in 18 months) by collaboration resulting in a better match of supply and demand

Importance of SCM understood by some

◆ AMR Research:

- "The biggest issue enterprises face today is intelligent visibility of their supply chains-both upstream and down"

◆ Forrester Research:

- "Companies need to sense and proactively respond to unanticipated variations in supply and demand by adopting emerging technologies such as intelligent agents. To boost their operational agility, firms need to transform their static supply chains into adaptive supply networks"

◆ Gartner Group:

- "By 2004 90% of enterprises that fail to apply supply-chain management technology and processes to increase their agility will lose their status as preferred suppliers"

SCM Generated Value

Minimizing supply chain costs

while keeping a reasonable service level

customer satisfaction/quality/on time delivery, etc.

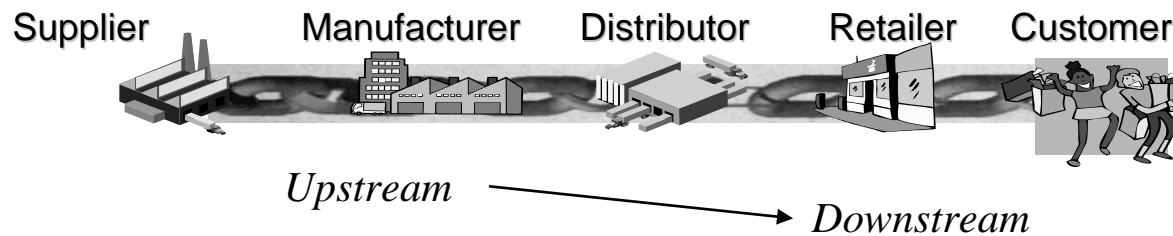
This is how SCM contributes to the bottom line

SCM is not strictly a cost reduction paradigm!

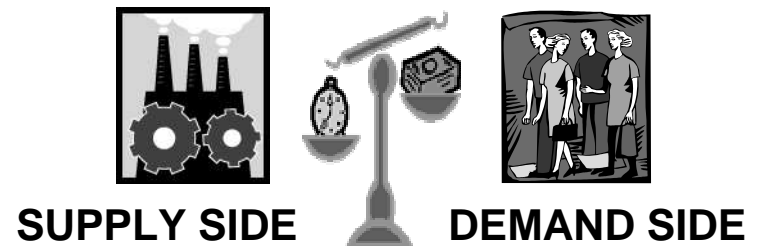
A picture is better than 1000 words!

How many words would be better than 3 pictures?

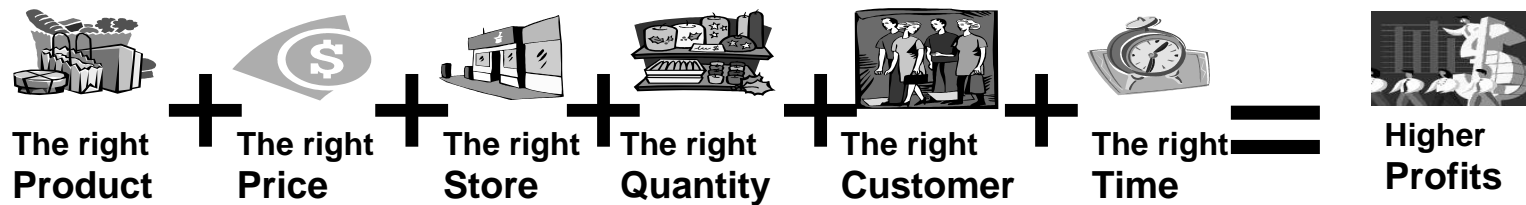
- A supply chain consists of



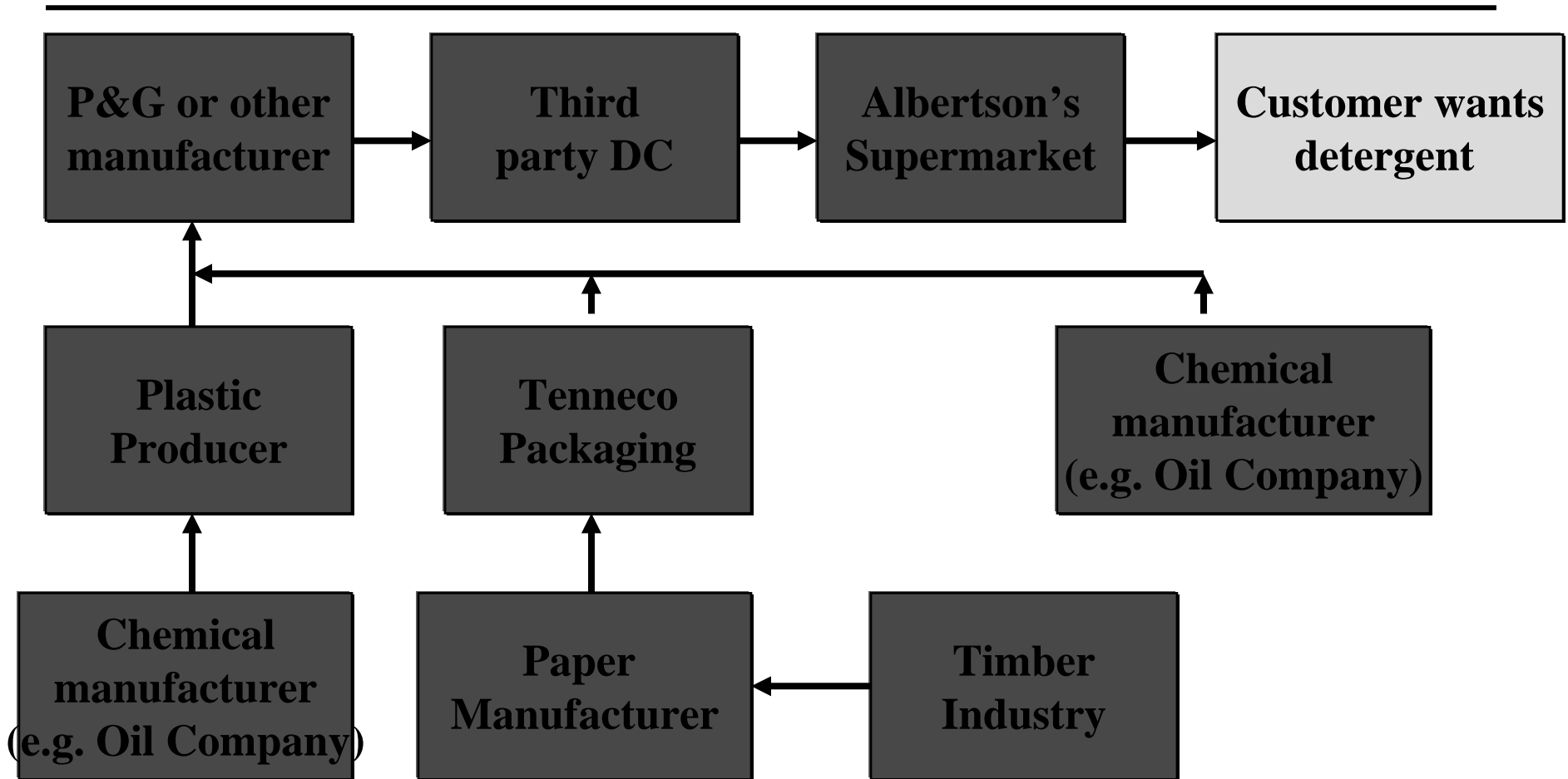
- aims to Match Supply and Demand, profitably for products and services



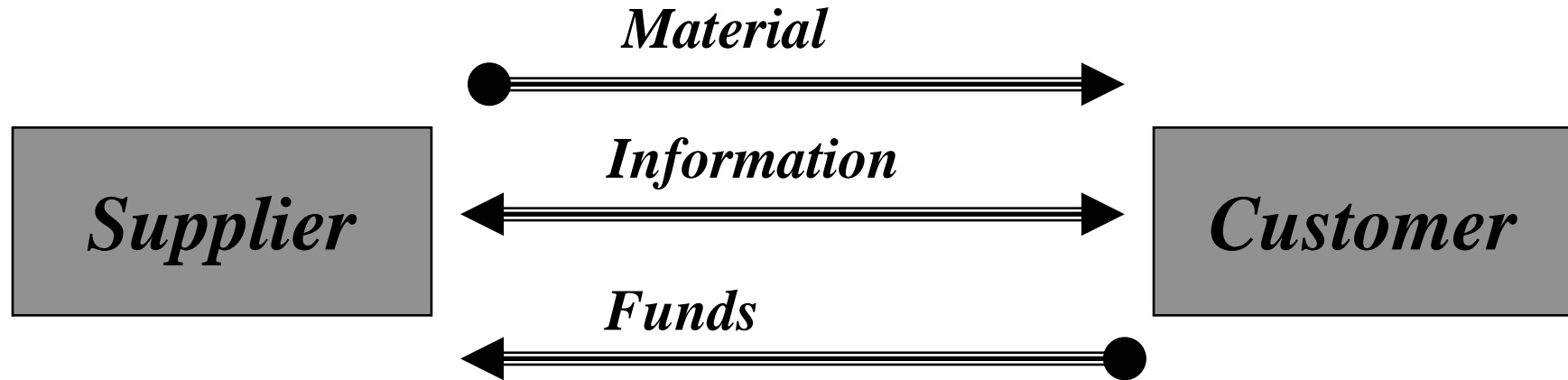
- achieves



Detergent supply chain:



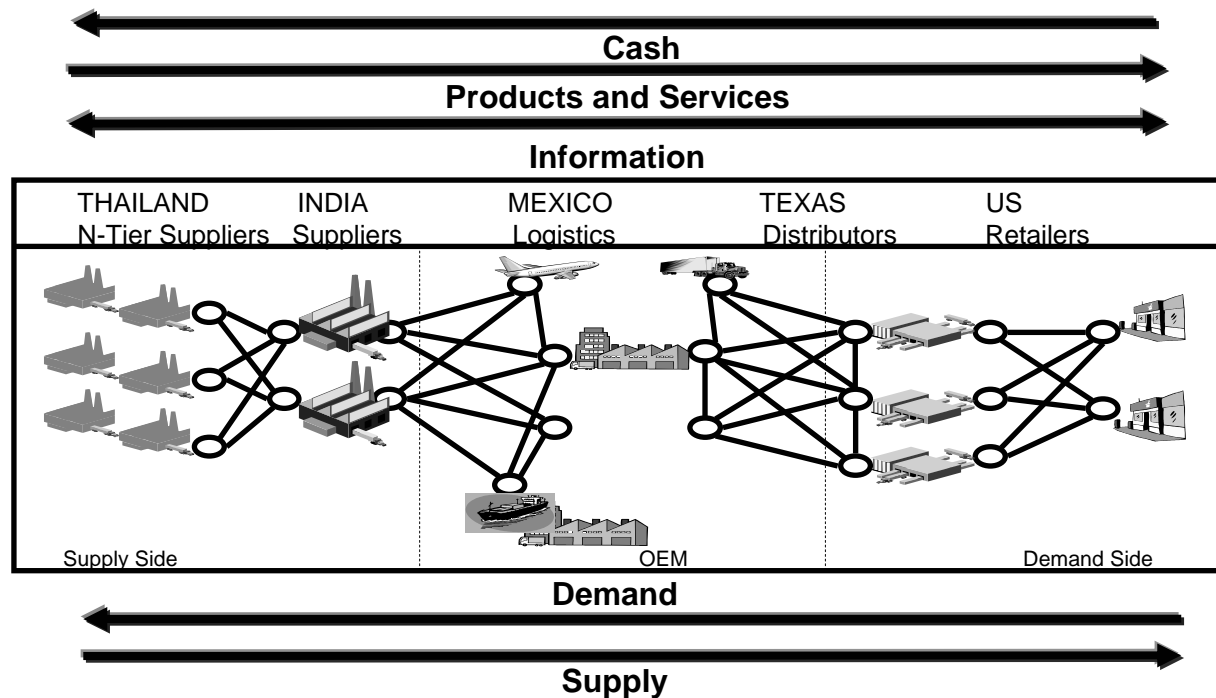
Flows in a Supply Chain



The flows resemble a chain reaction.

SCM in a Supply Network

- Supply Chain Management (SCM) is concerned with the management and control of the flows of material, information, and finances in supply chains.

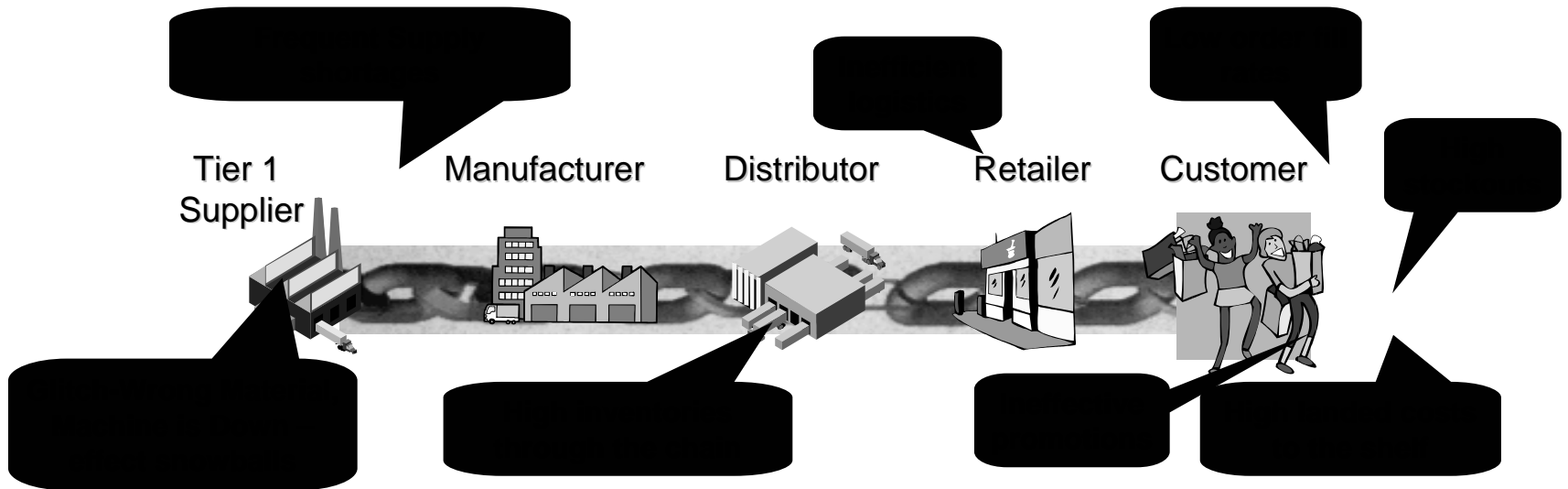


- The task of SCM is to design, plan, and execute the activities at the different stages so as to provide the desired levels of service to supply chain customers profitably

Importance of Supply Chain Management

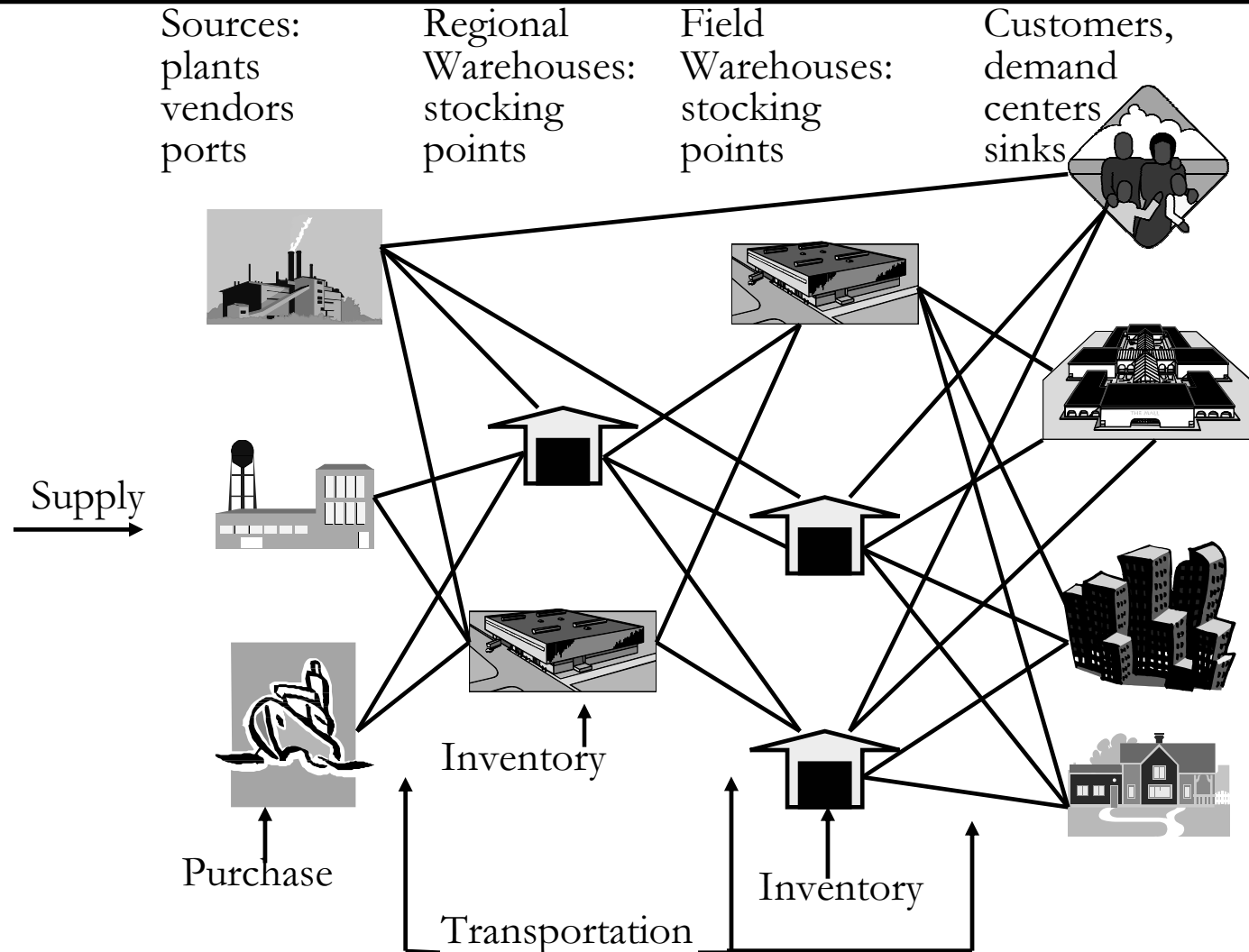
- **In 2000, the US companies spent \$1 trillion (10% of GNP) on supply-related activities (movement, storage, and control of products across supply chains).**

Source: State of Logistics Report

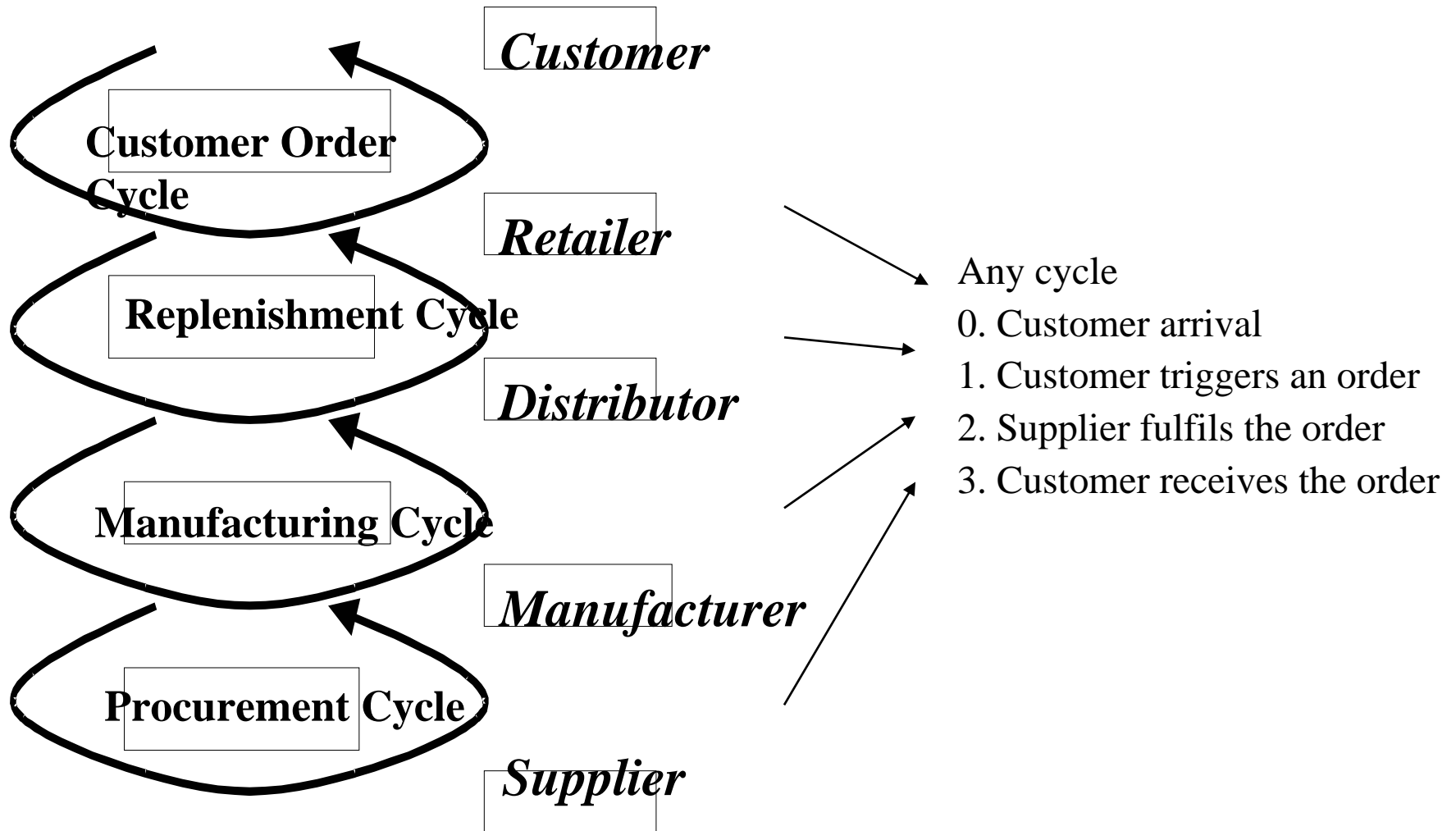


- **Eliminating inefficiencies in supply chains can save millions of \$.**

A Generic Supply Chain



Cycle View of Supply Chains



Push vs Pull System

What instigates the movement of the work in the system?

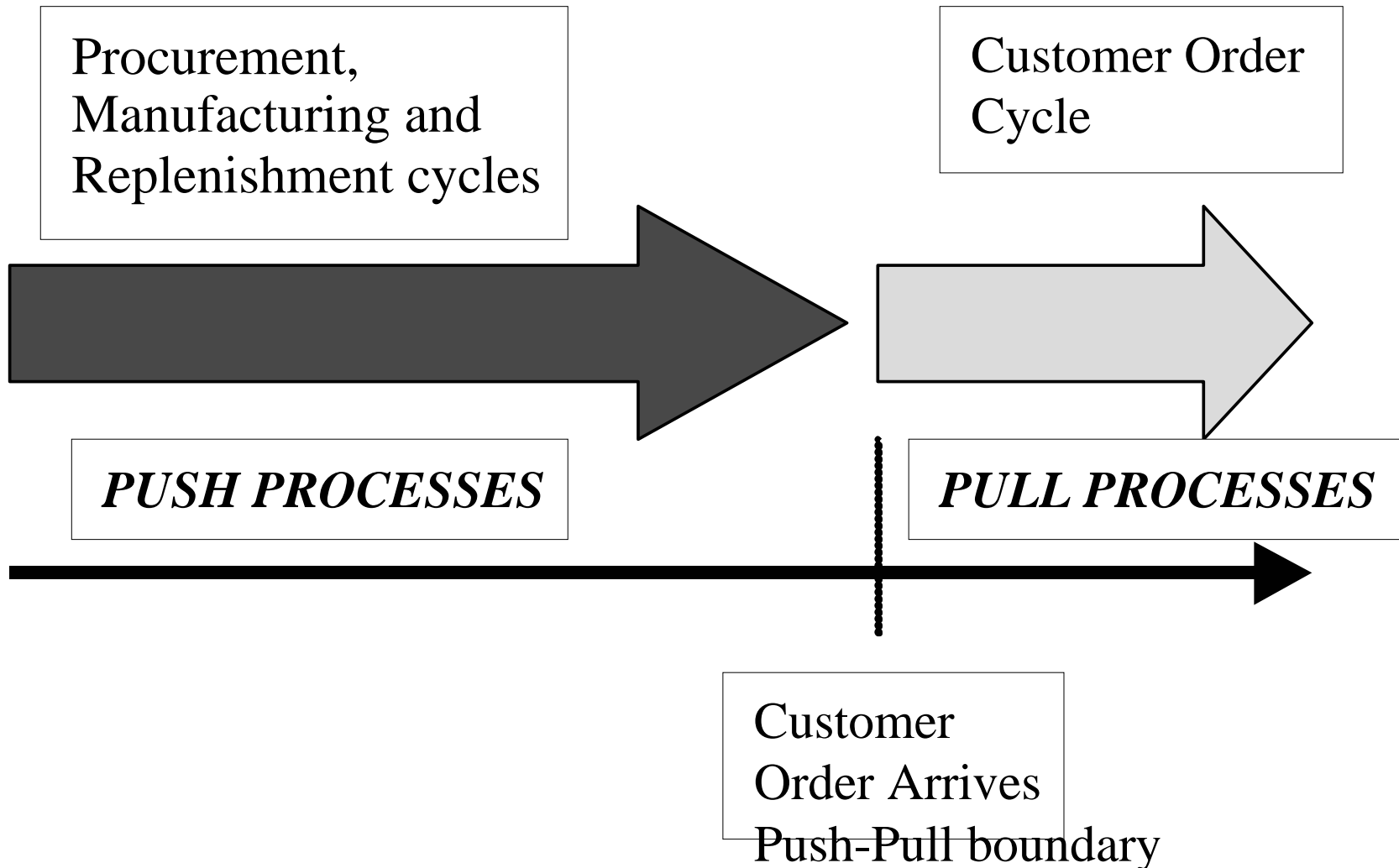
In Push systems, work release is based on downstream demand forecasts

- Keeps inventory to meet actual demand
- Acts proactively
 - » e.g. Making generic job application resumes today (e.g.: *exempli gratia*)

In Pull systems, work release is based on actual demand or the actual status of the downstream customers

- May cause long delivery lead times
- Acts reactively
 - » e.g. Making a specific resume for a company after talking to the recruiter

Push/Pull View of Supply Chains



Examples of Supply Chains

- ◆ Dell / Compaq
- ◆ Toyota / GM / Volkswagen, in the course notes
- ◆ McMaster Carr / W.W. Grainger, sell auto parts
- ◆ Amazon / Barnes and Noble
- ◆ Frozen food industry/Fast food industry/5 star restaurants
- ◆ Internet shopping: Webvan / Peapod

Seven Eleven Japan (SEJ)

A Case Study

Factual Information on Seven Eleven Japan (SEJ)

- ◆ Largest convenience store in Japan with market value of \$95 B. The third largest retail company in the world after Wal-Mart and Home Depot.
- ◆ Established in 1974.
- ◆ In 2000, total sales \$18,000 M, profit \$620 M.
- ◆ Average inventory turnover time 7-8.5 days.
- ◆ Stock value increased by 3000 times from 1974 to 2000.
- ◆ In 2000, there were 2000 stores in Japan, increasing by 400-500 per year.
- ◆ A SEJ store is about the half the size of a US 7-eleven store, that is about 110 m².
- ◆ Sales:
 - 32.9% Processed food: drinks, noodles, bread and snacks
 - 31.6% Fast food: rice ball, box lunch and hamburgers
 - 12.0% Fresh food: diary products
 - 25.3% Non-food: magazines, ladies stockings and batteries.

More on SEJ

More factual info:

- ◆ Average sales about twice of an average US store
- ◆ SKU's offered in store: Over 3,000 (change by time of day, day of week, season)
- ◆ Virtually no storage space
- ◆ No food cooking at the stores

Japanese Images of Seven Eleven:

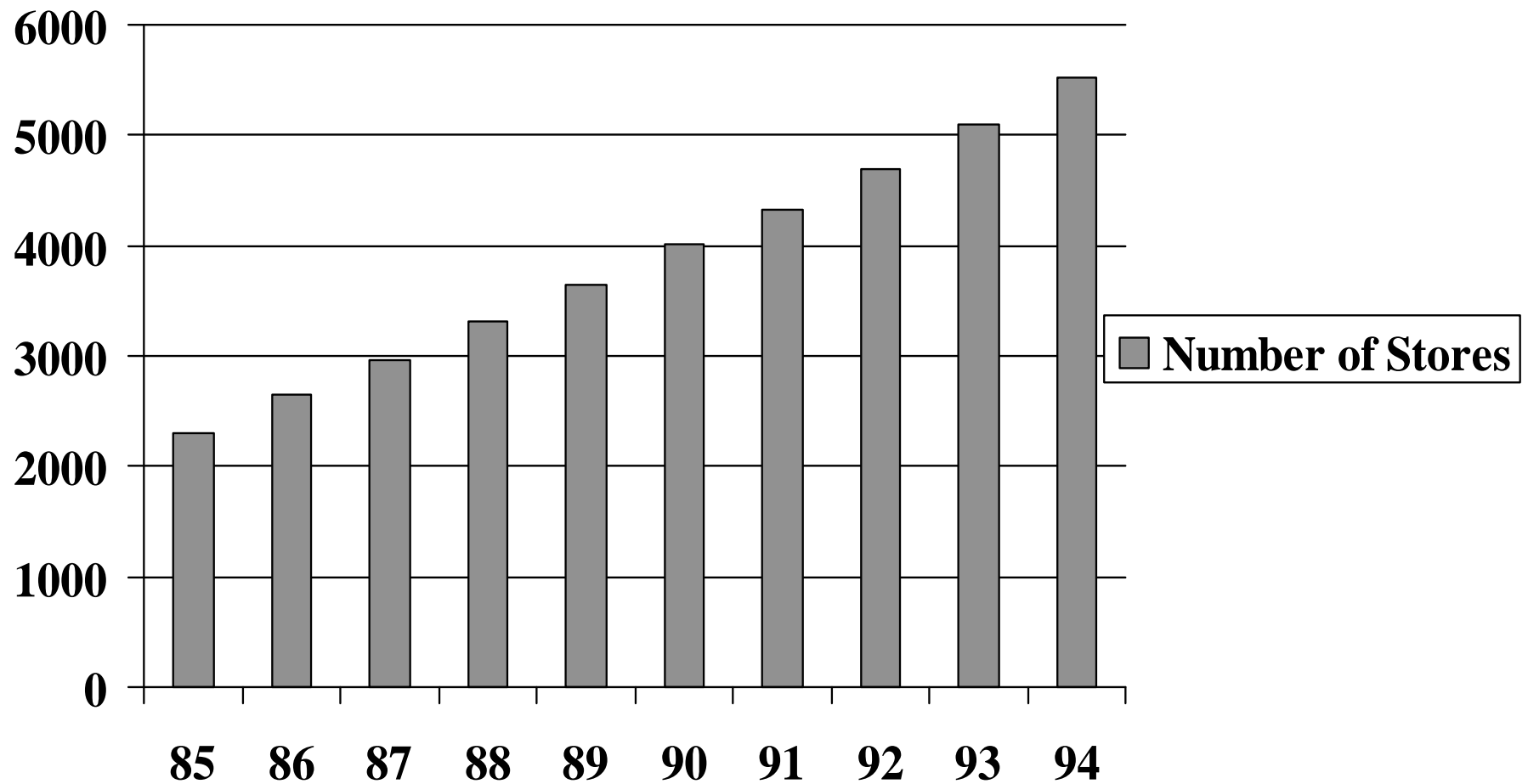
- ◆ Convenient
- ◆ Cheerful and lively stores
- ◆ Many ready made dinner items I buy
- ◆ Famous for its great boxed lunch and dinner
- ◆ On weekends, when I was single, I went to buy lunch and dinner

SC strategy:

Micro matching of supply and demand (by location, time of day, day of week, season)

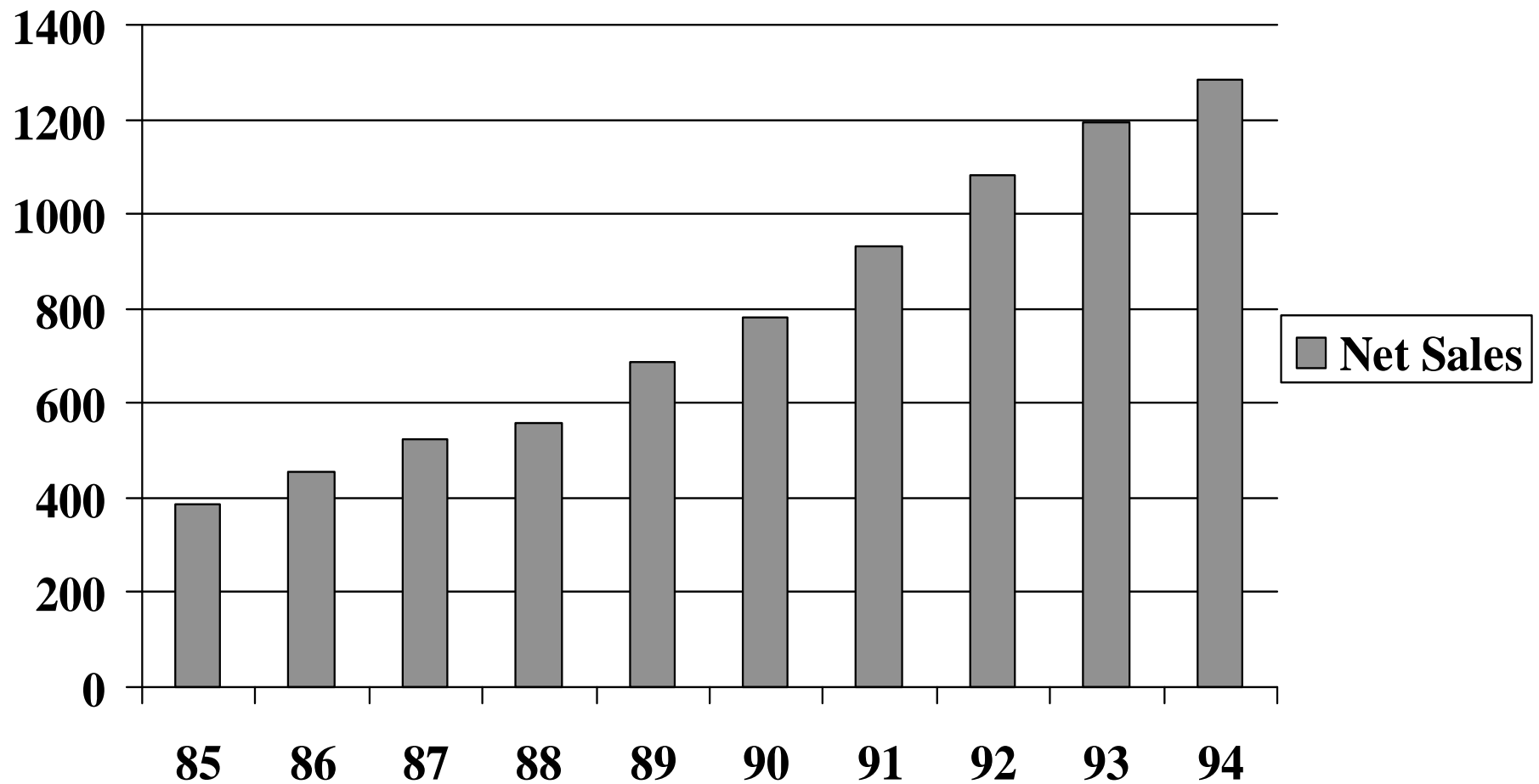
Seven Eleven - Number of Stores

1999: 8,027

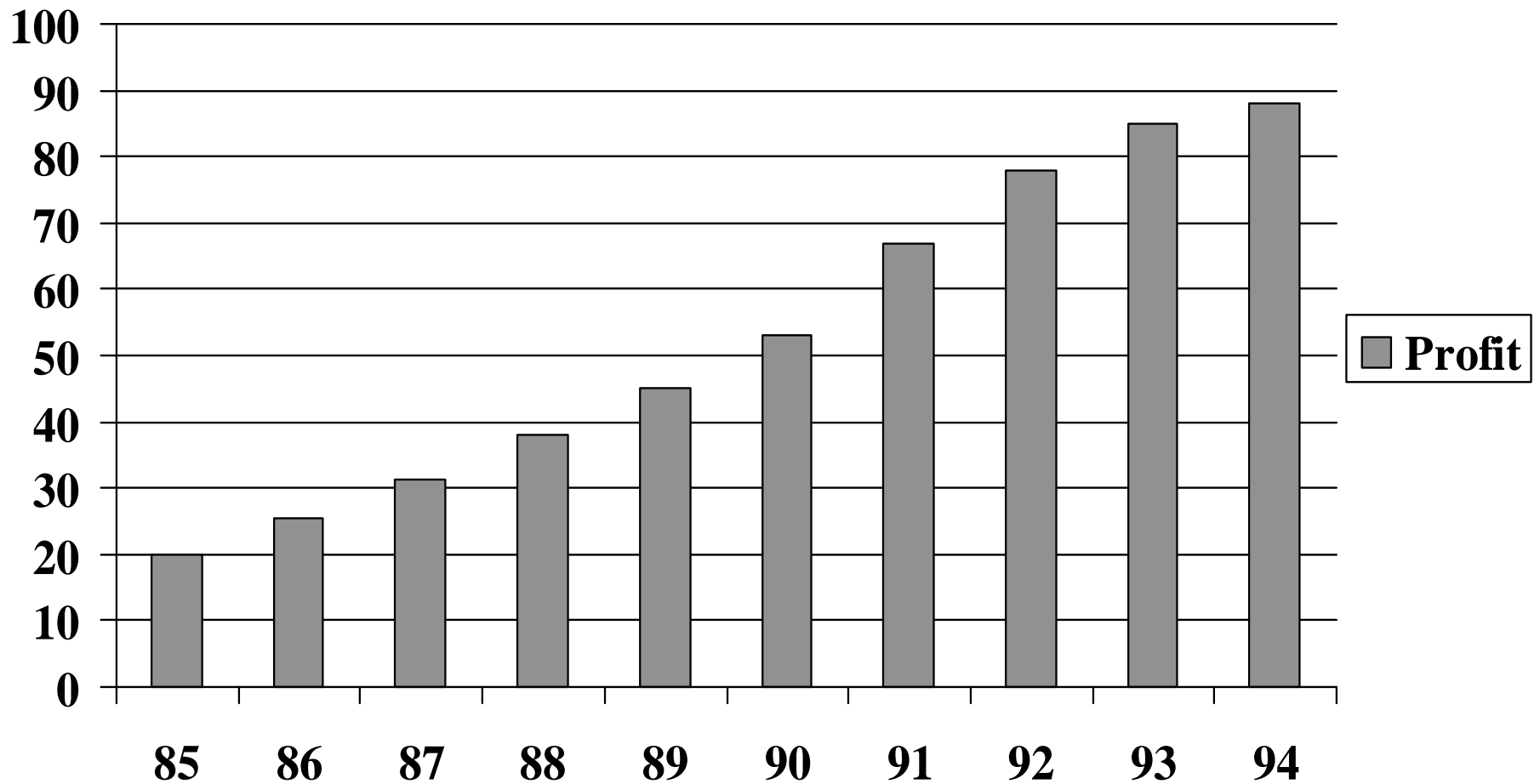


Seven Eleven - Net Sales (B Yen)

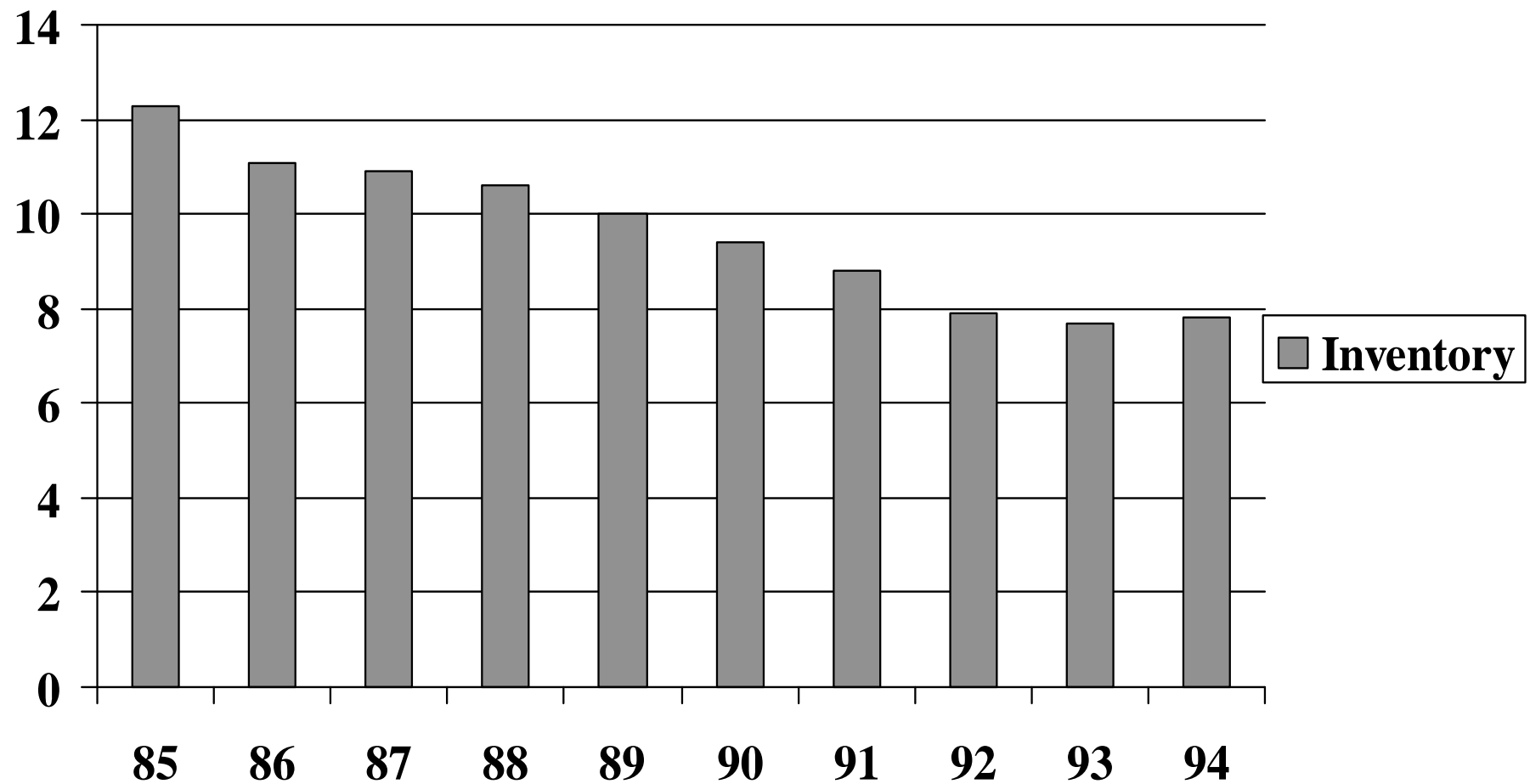
Sales 1,963 B Yen in 2000



Seven Eleven - Pre tax Profit (B Yen)



Seven Eleven - Inventory turnover (days)

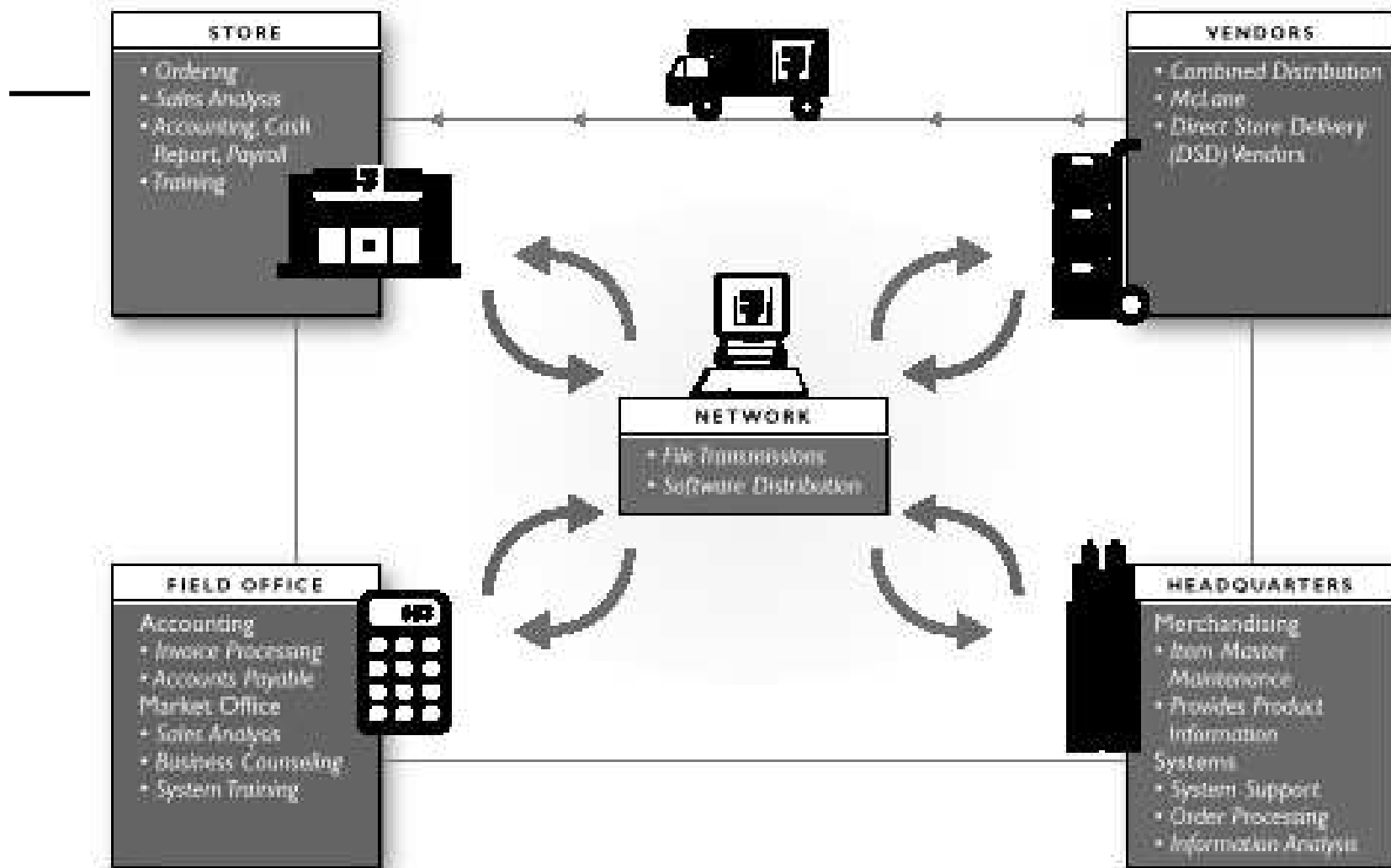


Information Strategy

Quick access to up to date information (as opposed to data):

- ◆ In 1991, SEJ implemented Integrated Service Digital Network to link stores, headquarter, DCs and suppliers

- ◆ Customer checkout process
 - Clerk records the customer's gender, (estimated) age and purchased items. These Point of Sales (POS) data are transmitted to database at the headquarters.
- ◆ Daily use of the data
 - Headquarters aggregate the data by region, products and time and pass to suppliers and stores by next morning. Store managers deduce trend information.
- ◆ Weekly use of the data
 - Monday morning, the CEO chairs a weekly strategy formulation meeting attended by 100 corporate managers.
 - Tuesday morning, strategies are communicated to Operation Field Counselors who arrive in Tokyo on Monday night.
 - Tuesday afternoon, regional elements (e.g. weather, sport events) are factored into the strategy. Tuesday nights, field counselors return back to their regions.
- ◆ Store hardware: Store computer, POS registers linked to store computer, Graphic Order Terminals, Scanner terminals for receiving



Information Analysis of POS Data

- ◆ Sales analysis of product categories over time
- ◆ SKU analysis
- ◆ Analysis of waste or disposal
- ◆ Ten day (week) sales trend by SKU
- ◆ Sales trends for new product
 - In the early 1990s, half-prepared fresh noodle sales were going up, new fresh noodle products were developed
- ◆ Sales trend by time and day
 - Different sales patterns for different sizes of milk at different times of the day results in rearrangement of the milks in the fridge
- ◆ List of slow moving items
 - About half of 3000 SKUs are replaced by new ones every year

Facilities Strategy

- ◆ Limited storage space at stores
 - Frequent and small deliveries to stores
- ◆ Deliveries arrive from over 200 plants.
- ◆ Products are grouped by the cooling needs
 - Such product groups are cross-docked at distribution centers (DC). Food DCs store no inventory
 - Combined delivery system: frozen foods, chilled foods, room temperature and hot foods.
 - A single truck brings a group of products and visits several stores within a geographical region
 - Aggregation: No supplier (not even coke!) delivers direct
- ◆ The number of truck deliveries reduced from 70/day in 1974 to 10/day in 2000. Still, at least 3 fresh food deliveries per day.
- ◆ Have many outlets, at convenient locations, close to where customers can walk
- ◆ Focus on some territories, not all: When they locate in a place they blanket the area with stores; stores open in clusters with corresponding DC's.
- ◆ 844 stores in the Tokyo region; Seven Eleven has 5,523 stores in 25 out of 47 prefectures. No stores in Kobe.

The Present and the Future

- ◆ Is food preparation a good idea at 7-eleven locations?
 - e.g. Compare microwave heating vs. salad preparation.
- ◆ Why SEJ does not allow direct delivery from suppliers to retailers?
- ◆ Point out which of the following strategies can also be used in US
 - Information strategy
 - Facilities strategy
- ◆ Discuss the differences between the Japanese and US consumers with regard to
 - Frequency and amount of grocery purchase
 - Use of credit cards vs. cash for purchase
- ◆ 7-eleven growing rapidly in the US so it aims to be a web depot in both the US and Japan. Does this make sense from a supply chain perspective?
 - Cost vs. Responsiveness
 - Business strategy

SCM Strategy

Mission-Strategy-Tactics-Decisions

◆ Mission

- The reason for existence of an organization

◆ Mission Statement

- A clear statement of purpose

◆ Strategy

- A plan for achieving organizational goals

◆ Tactics

- The actions taken to accomplish strategies

◆ Operational decisions

- Day to day decisions to support tactics

Life Strategy for Ted

Ted is an undergrad. He would like to have a career in business, have a good job, and earn enough income to live comfortably

Mission:

Live a good life

- ◆ Goal: Successful career, good income
- ◆ Strategy: Obtain a master's degree
- ◆ Tactics: Select a college and a concentration
- ◆ Operations: Register, buy books, take courses, study, graduate, get job

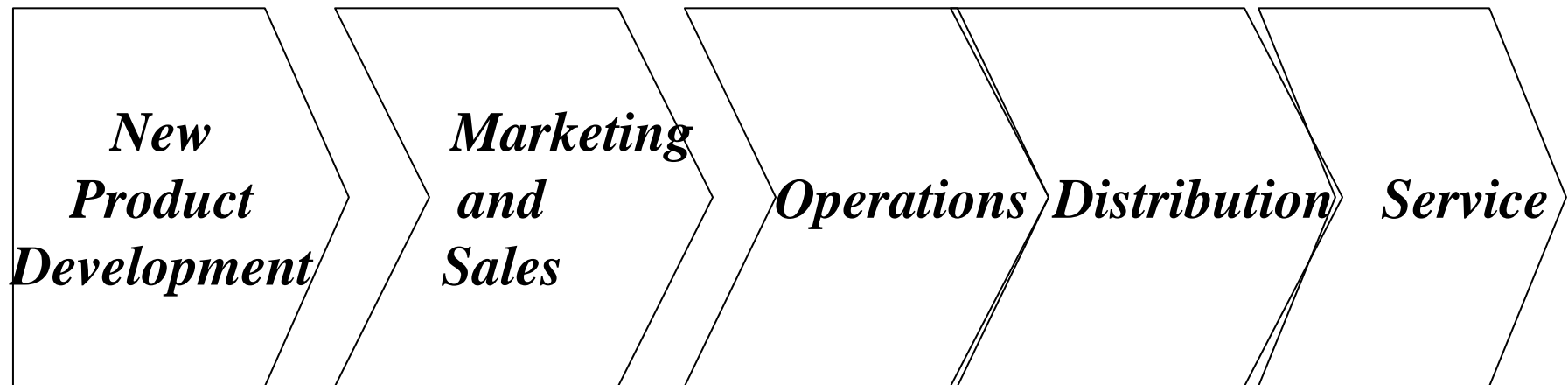
Linking SC and Business Strategy

Competitive (Business) Strategy

New Product Strategy

Marketing Strategy

Supply Chain Strategy



Finance, Accounting, Information Technology, Human Resources

Strategies

- ◆ Product development strategy relates to Set of products/services and technologies for future operations
 - e.g. Be the technology leader
 - e.g. Offer many products
- ◆ Marketing and sales strategy relates to positioning, pricing and promotion of products/services
 - e.g. Never offer more than 40% discount
 - e.g. EDLP = every day low price
 - e.g. Demand smoothing via coupons
- ◆ Supply chain management strategy relates to procurement, transportation, storage and delivery
 - e.g. Never use more than 1 supplier for every input
 - e.g. Never expedite orders just because they are late

Achieving Strategic Fit: Consistent SCM and Competitive strategies

◆ Fit SC to the customer

◆ Understanding the Customer

- Range of demand
- Production lot size
- Response time
- Service level
- Product variety
- Price sensitivity
- Innovation



***Implied
(Demand)
Uncertainty
for SC
Implied
trouble
for SC***

Contributors to Implied Demand Uncertainty

Detergent

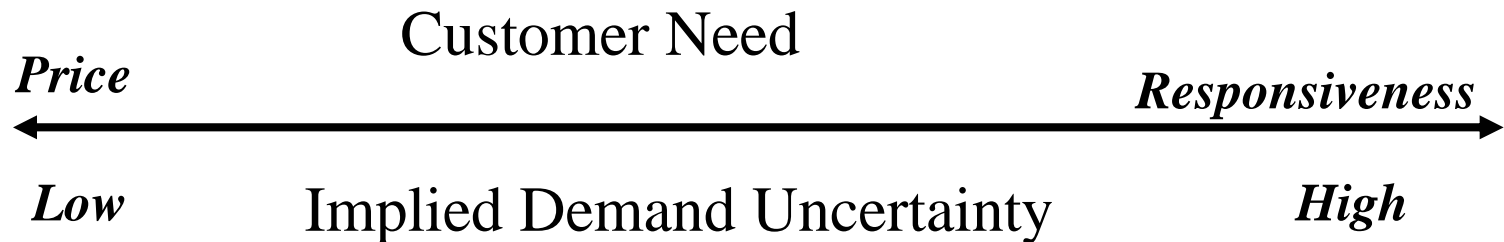
Commodities

Long lead time steel

High Fashion

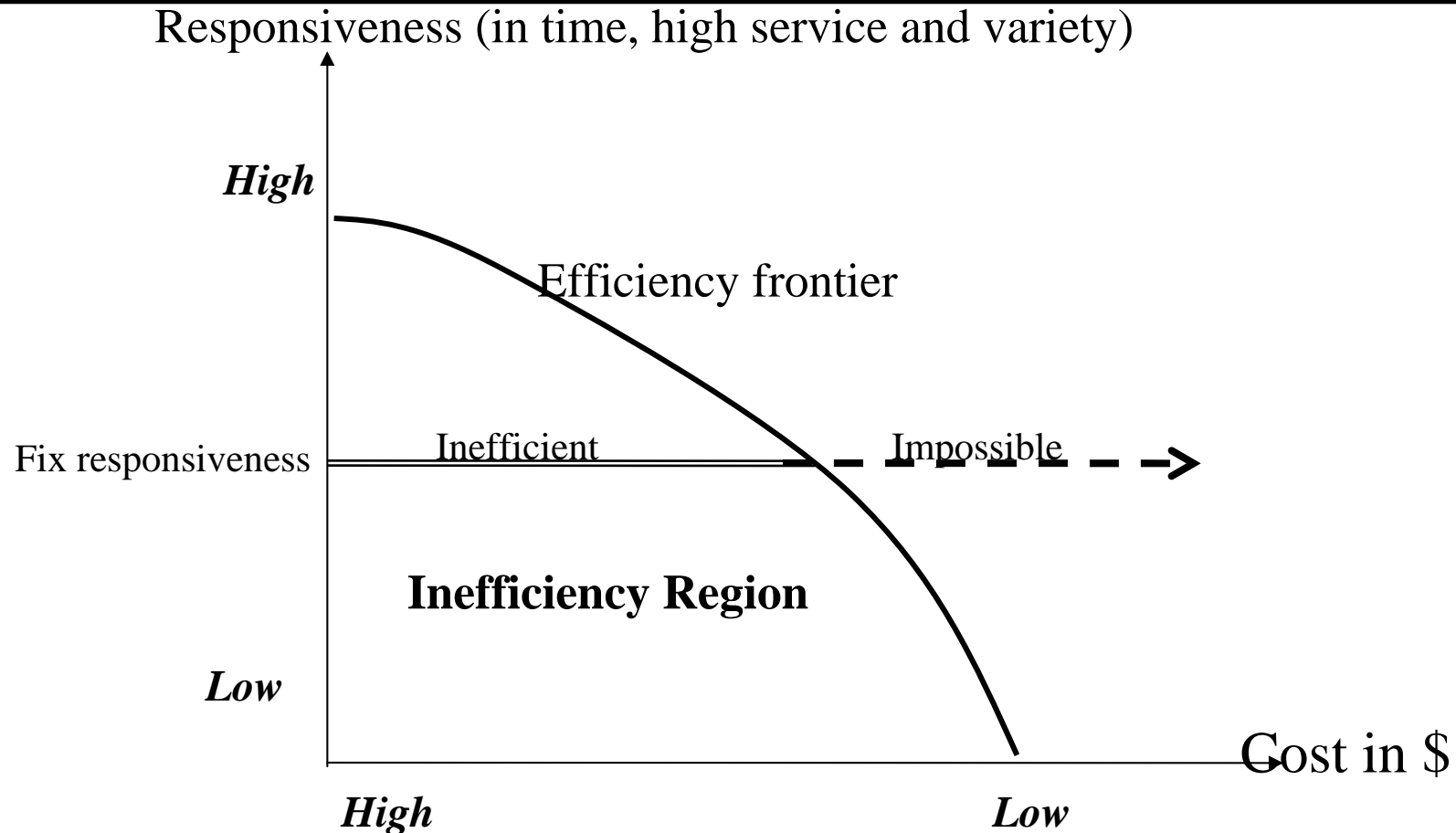
Customized products

Emergency steel



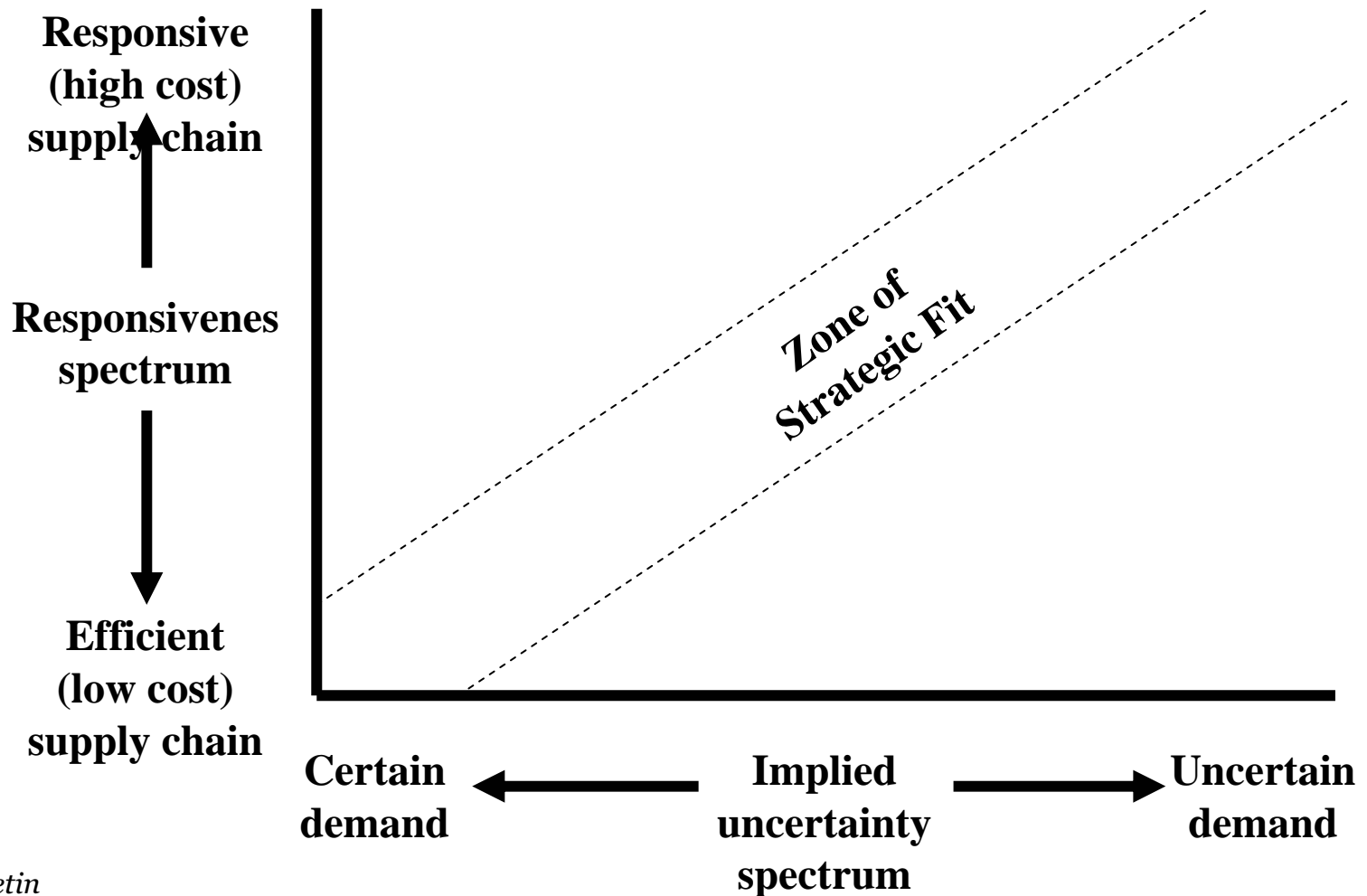
Small production lot sizes, short lead times, product variety, distribution channel variety, high rate of innovation and high customer service levels all increase the Implied Demand Uncertainty

Understanding the Supply Chain: Cost-Responsiveness Tradeoff



Why decreasing slope for the efficiency frontier?

Achieving Strategic Fit



Loosing the strategic fit: Webvan

- ◆ Webvan started a merger with HomeGrocer in Sept 2000 and completed in May 2001.
- ◆ Declared bankruptcy in July 2001. Why?
 - “Webvan was so behemoth that could deliver anything to anyone anywhere that it lost sight of a more mundane task: pleasing grocery customers day after day”.
 - Short to midterm cash mismanagement. Venture capital of \$1.2 B run out.
 - Merger costs: duplicated work force, integration of technology, realignment of facilities.
- ◆ Peapod has the same business model but more focused in terms of service and locations. It actually survives with its parent company Royal Ahold’s (Dutch Retailer) cash.

Big retailers' Strategy

- ◆ Wal-Mart: Efficiency
- ◆ Target: More quality and service
- ◆ Carrefour: International, ambiance

- ◆ K-Mart: Confused.
 - Squeezed between Target and Wal-Mart
 - Reliance on coupon sales
 - Do coupons stabilize or destabilize a Supply chain?

Other Factors

- ◆ Multiple products. Multiple customers for a given product
 - Separate supply chains or Tailored supply chains
 - » e.g. Compaq
 - Product and/or customer classes
 - » e.g. UTD library loans books for 6 months (2 weeks) to faculty (students)
- ◆ Product life cycle (shortening)
 - SCM strategy moves toward efficient chain and low implied uncertainty as products age
 - » e.g. Air travel is becoming more efficient
 - Macroeconomic factors for visibility
 - » Forecasting Home Depot sales from S&P 500 price index.
- ◆ Competitors: more, faster and global
 - » E.g. Southwest airlines lead the drive for efficiency

Integration

- ◆ Integration is the central theme in SCM
- ◆ Building synergies by integrating business functions, departments and companies

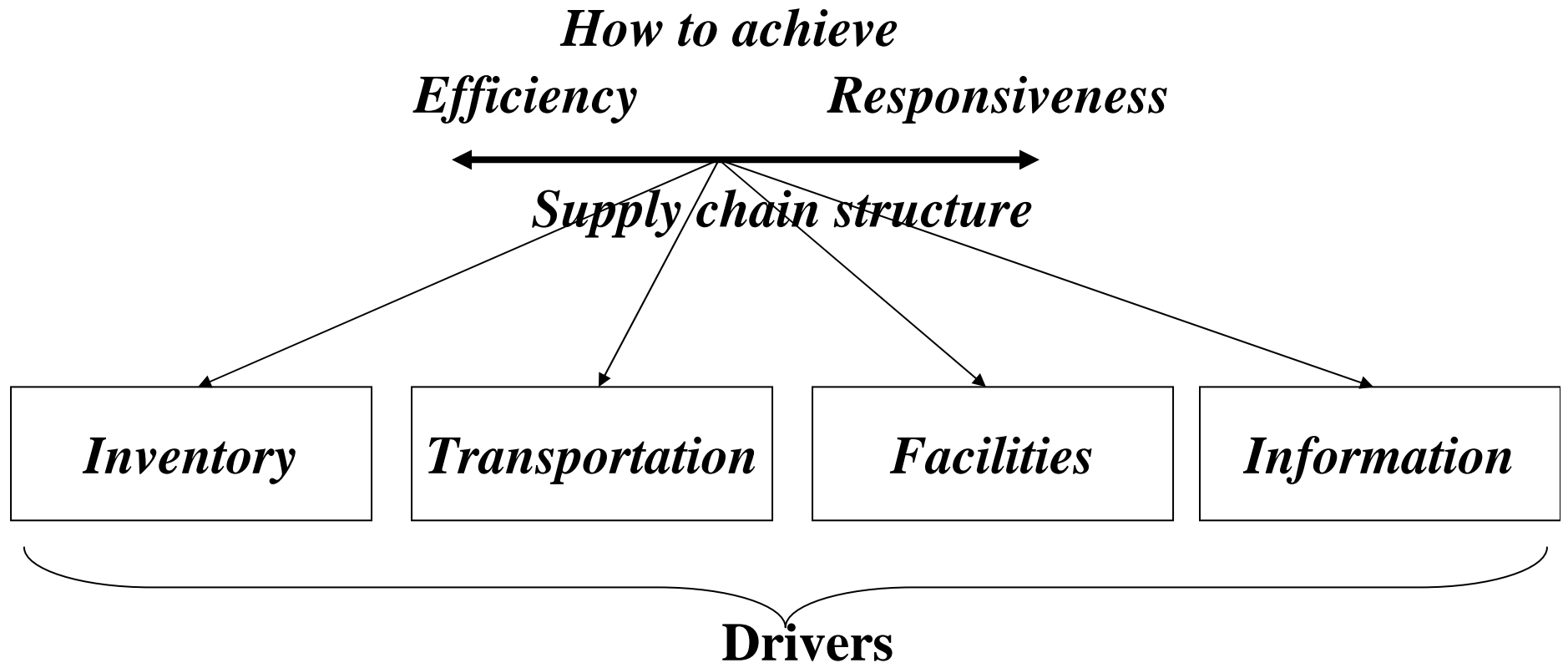


Strategic Scope

	Suppliers	Manufacturer	Distributor	Retailer	Customer
Competitive Strategy					
Product Dev. Strategy					
Supply Chain Strategy					
Marketing Strategy					

Supply Chain Drivers and Obstacles

Drivers of Supply Chain Performance



1. Inventory

- ◆ Convenience: Cycle inventory
 - No customer buys eggs one by one
- ◆ Unstable demand: Seasonal inventory
 - Bathing suits
- ◆ Randomness: Safety inventory
 - Compaq's loss in 95
- ◆ Pipeline inventory
 - Work in process or transit

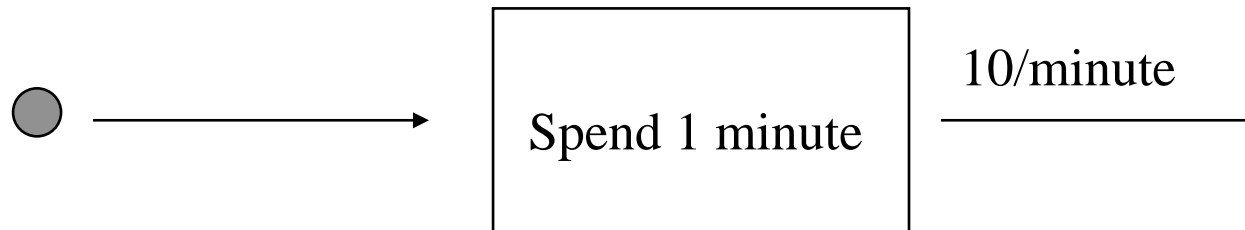
Little's law

For Long run averages = Expected values

$$I = R \cdot T$$

I=Pipeline inventory; R=output per time=throughput;

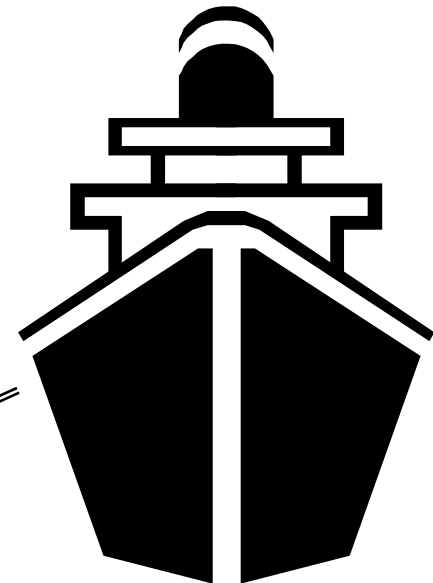
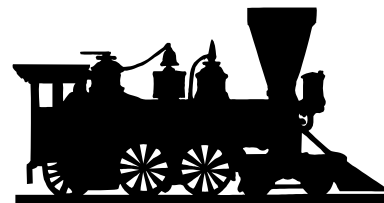
T=delay time=flow time



Flow time? Thruput? Inventory?

2. Transportation

- ◆ Air
- ◆ Truck
- ◆ Rail
- ◆ Ship
- ◆ Pipeline
- ◆ Electronic



3. Facilities

◆ Production

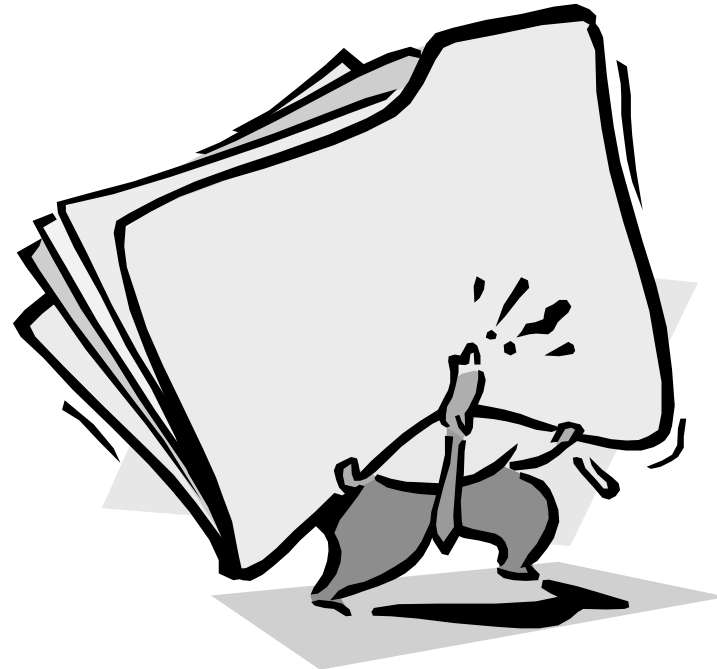
- Flexible vs. Dedicated
- Flexibility costs
 - » Remember BMW: “a sports car disguised as a sedan”

◆ Inventory-like operations: Receiving, Prepackaging, Storing, Picking, Packaging, Sorting, Accumulating, Shipping

- Job Lot Storage: Need more space. Reticle storage in fabs.
- Crossdocking: Wal-Mart

Information

- ◆ Information drives the decisions:
 - Good information means good decisions
- ◆ IT helps: MRP, ERP, SAP, EDI
- ◆ Relevant information?
- ◆ How to use information?



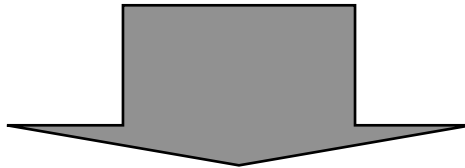
Considerations for Supply Chain Drivers

<i>Driver</i>	<i>Efficiency</i>	<i>Responsiveness</i>
Inventory	Cost of holding	Availability
Transportation	Consolidation	Speed
Facilities	Consolidation / Dedicated	Proximity / Flexibility
Information	Low cost/slow/no duplication	High cost/ streamlined/reliable

Major Obstacles to Achieving Fit

◆ SC is big:

- Variety of products/services
- Spoiled customer
- Multiple owners (Procurement, Production, Inventory, Marketing) / multiple objectives
- Globalization



Local optimization and lack of global fit

Dealing with Multiple Owners / Local Optimization

◆ Information Coordination

- Information sharing / Shyness / Legal and ethical issues

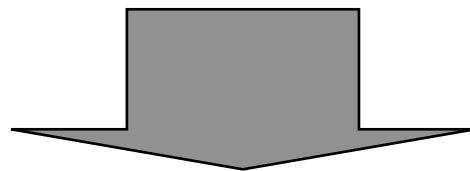
◆ Contractual Coordination

- Mechanisms to align local objectives with global ones

Major obstacles to achieving fit

◆ **Instability and Randomness:**

- Increasing product variety
- Shrinking product life cycles
- Customer fragmentation: Push for customization
- Fragmentation of Supply Chain ownership: Globalization



Increasing implied uncertainty

Common problems

- ◆ Lack of SCM metrics: How to measure responsiveness?
 - » How to measure efficiency, costs, etc?
- ◆ Poor IT design
 - » Unreliable, duplicate data
- ◆ Poor delivery status information
 - » Not knowing the order status
- ◆ Ignoring uncertainties
- ◆ Internal customer discrimination
 - » Giving lower priority to internal customers than external customers
- ◆ Poor integration
- ◆ Elusive inventory costs
- ◆ SC-insensitive product design

Summary

- ◆ Supply Chain Introduction
- ◆ Competitiveness / Business strategy / SCM strategy
- ◆ Components
 - Inventory, Transportation, Facilities, Information
- ◆ Challenges