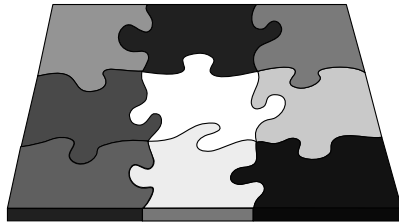
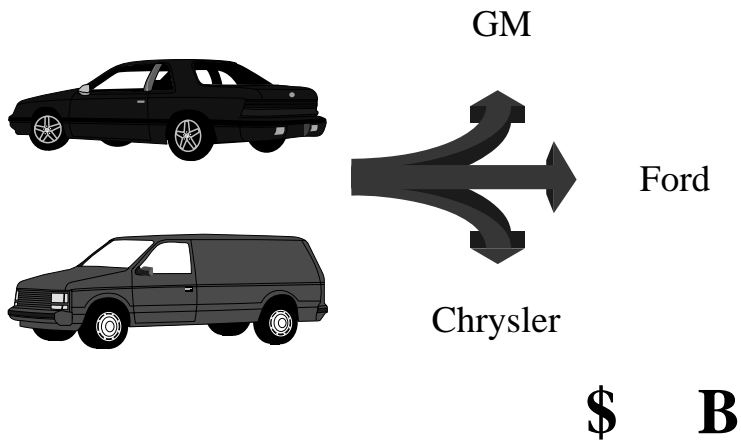


Chapter 2 Dimensions of Logistics



- Introduction
- The Macro Impact
- Logistics and the Firm
- Analyzing Logistics Systems

Major Transportation Costs



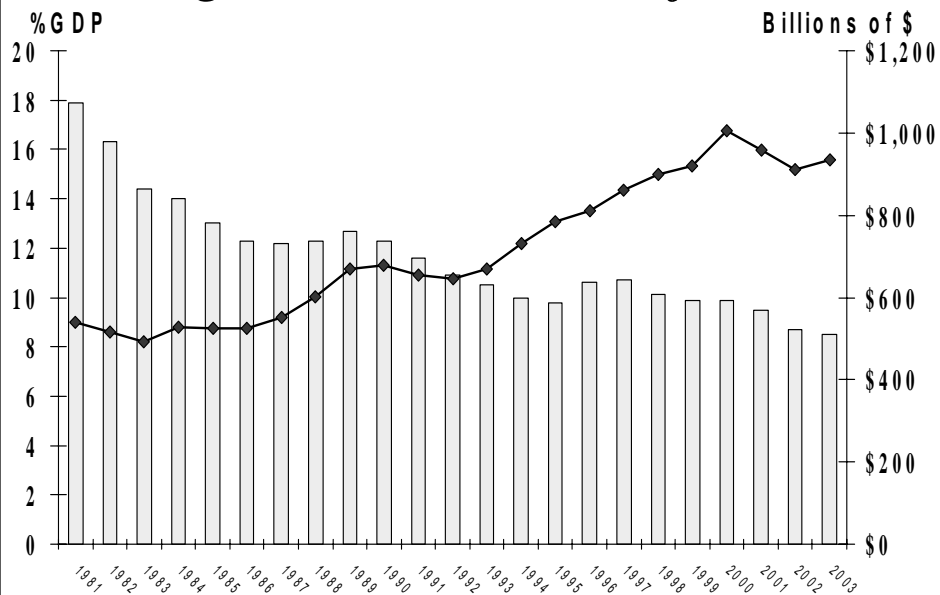
Source: *Purchasing*, Nov. 1994

U.S. Logistics Costs for 2005

(Billions of U.S. dollars)

Inventory Carrying Costs		
Interest	\$58	
Taxes, Obsolescence, Depreciation & Insurance	245	
Warehousing	<u>90</u>	
Total Inventory Costs		\$393
Transportation Costs		
Motor Carriers (Intercity \$394, Local \$189)	583	
Railroads	48	
Water Carriers (Int'l \$29, Domestic \$5)	34	
Oil Pipelines	9	
Air Carriers (Int'l \$15, Domestic \$25)	40	
Forwarders	<u>22</u>	
Total Transportation Costs		736
Shipper-Related Costs		8
Distribution Administration		<u>46</u>
TOTAL LOGISTICS COST	\$	Billion

Logistics Costs as Part of GDP



Source: Robert V. Delaney, Logistics State of The Nation Report, 2004

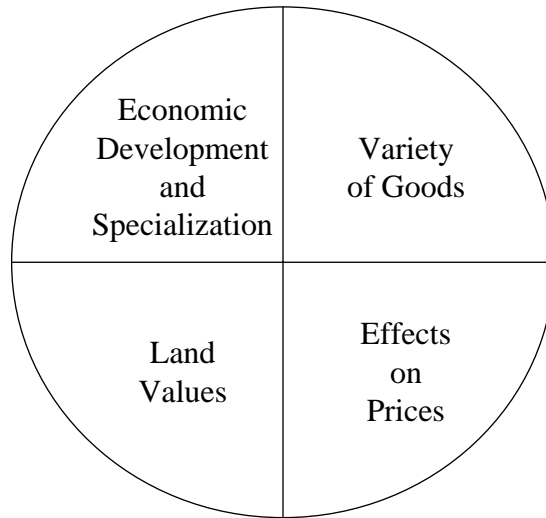
Factors for Lower % of GDP

- Improved Logistics Efficiencies
 - Increase of inventory velocity/turns
- Deregulation of Transportation
 - Reduced transportation costs per item
- Implementation of Information Technology
- “Downsizing” → 3rd Party Logistics
- Decline of Interest Rates

Essential Points to Remember About Logistics Costs

- May be greater variation in costs between companies in same industry than between different industries
- Logistics costs vary inversely with product value
- Smaller companies spend more on logistics as percent of sales than do larger companies

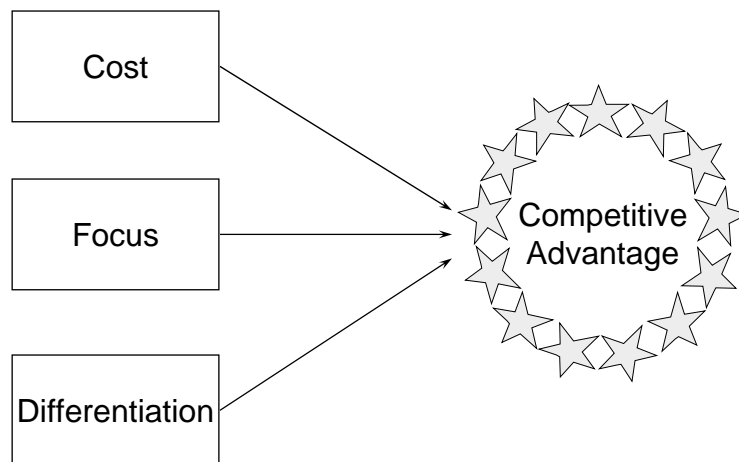
Economic Impacts



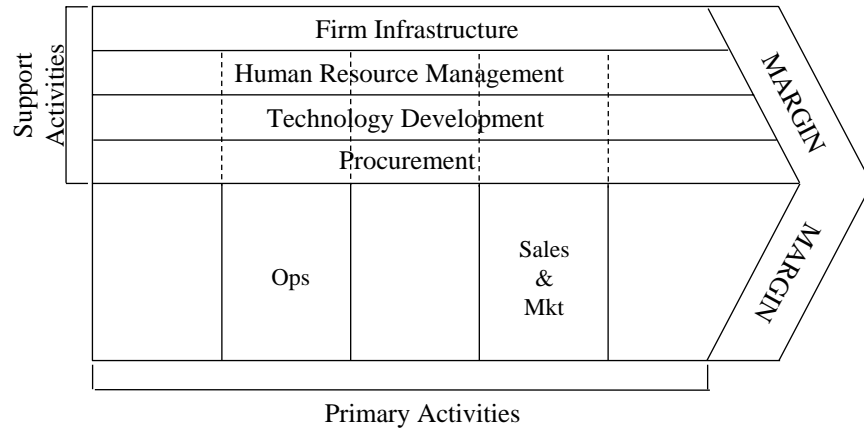
See - CBL, pp. 35-37

Strategies for Competitive Advantage

(Michael Porter)

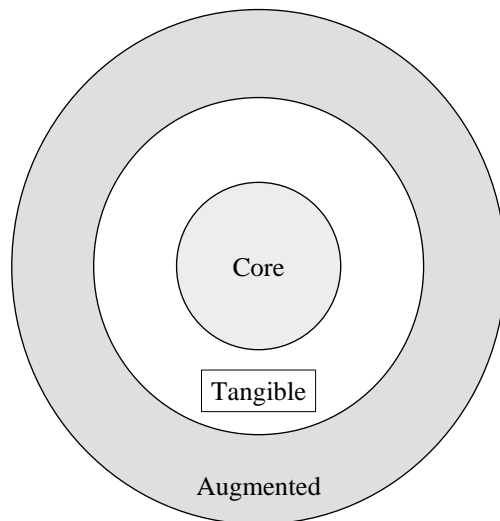


The Generic Value Chain

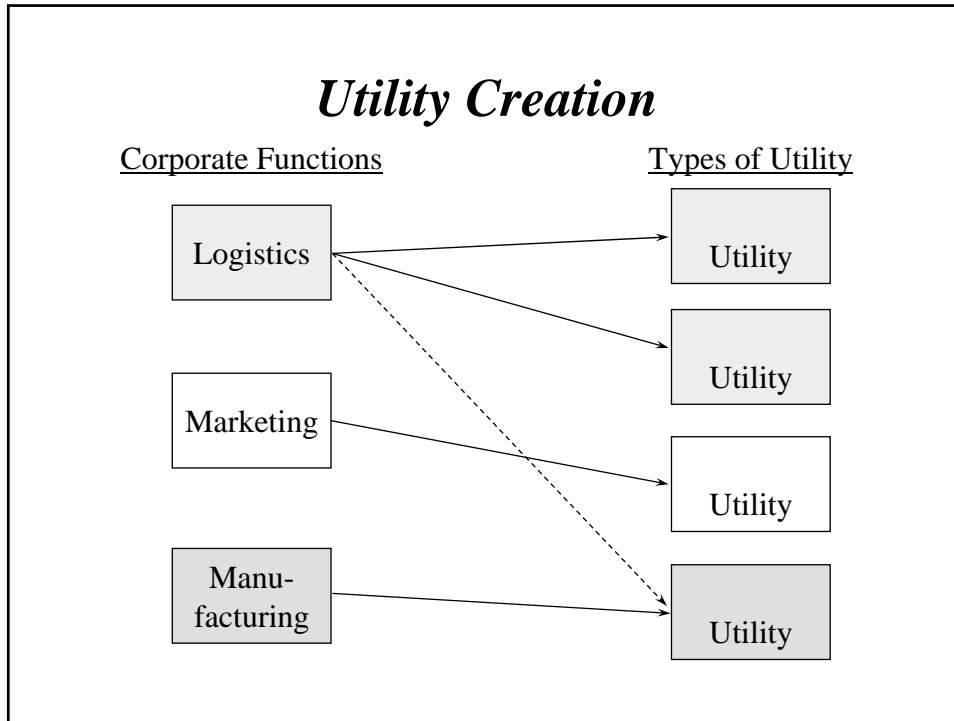


Source: Michael E. Porter, *Competitive Advantage* (NY: The Free Press, 1985), p.37.

Product Forms



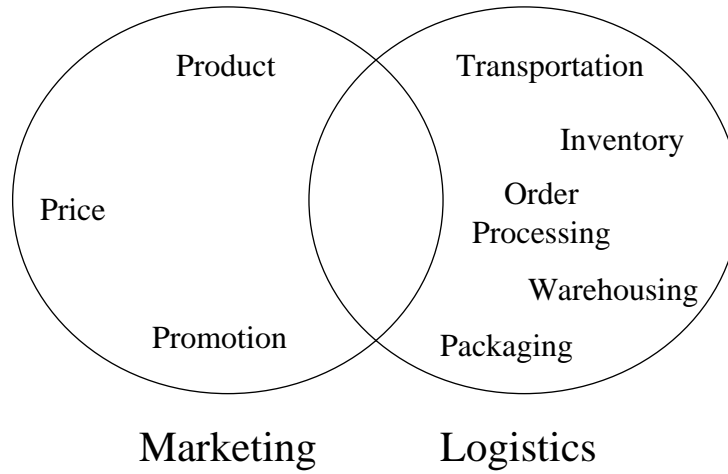
- Need for Transportation
- Automobile
- A/C, Radio



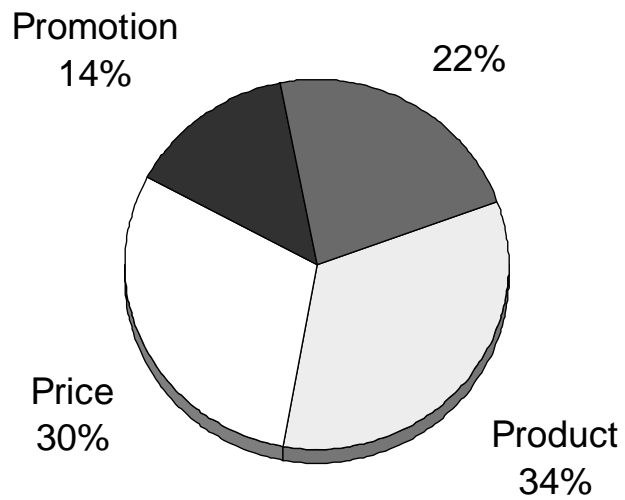
Traditional Locations of Logistics Activities in the Firm

Functional Areas and Activities		
<u>Marketing</u> Customer Service Demand forecasting Warehouse site selection Outbound traffic Warehousing	<u>Finance/Accounting</u> Order Processing Communications Procurement Inventory policy formulation Budgeting for warehouses and distribution	<u>Manufacturing</u> Inventory Control Materials handling Parts and service support Plant site selection Packaging Inbound traffic Production planning
Objectives		
High inventory levels Decentralized warehousing Frequent, short runs Quick response	Low inventory levels Less warehousing Concern for costs	Long production runs

Marketing and Logistics in the Customer Firm



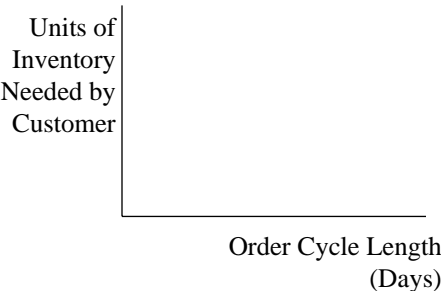
Importance of Marketing Variables



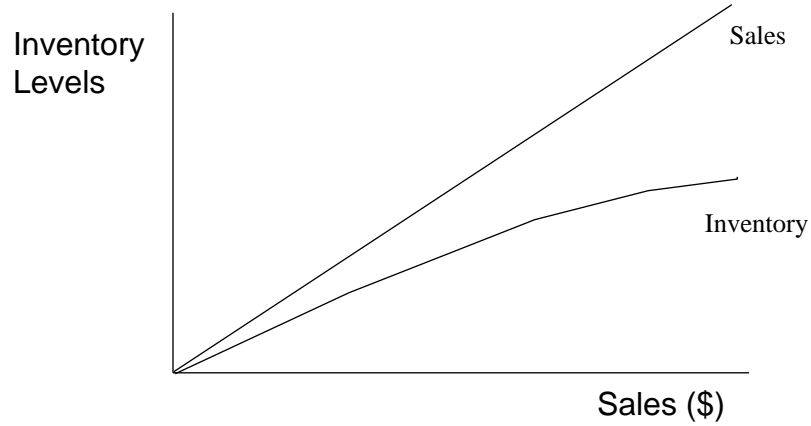
Analysis of Logistics Costs

- Mode Selection
 - Speed vs. cost, damage, accessibility, etc.
- Number of warehouses
 - COLS vs. Inventory levels
- Ownership
 - Public vs. private

Competitive Factors Affecting the Cost and Importance of Logistics

- Order Cycle
 - Substitutability
 - Inventory Effect
 - Transportation Effect
- 

Impacts of Sales Increases on Inventory Levels



Product Relationship

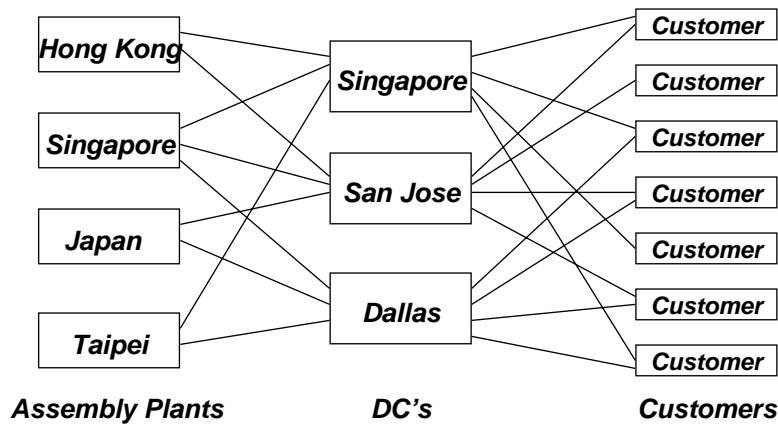
- Dollar Value
- Density
- Susceptibility to Damage
- Special Handling

Logistics Savings Can MAGNIFY Corporate Profitability

A Logistics Savings of: Equals a Product Sales
Increase of:

\$1	—————→	\$25
\$2	—————→	\$50
\$10	—————→	
\$100	—————→	\$2,500
\$5000	—————→	\$125,000
\$40,000	—————→	\$1,000,000

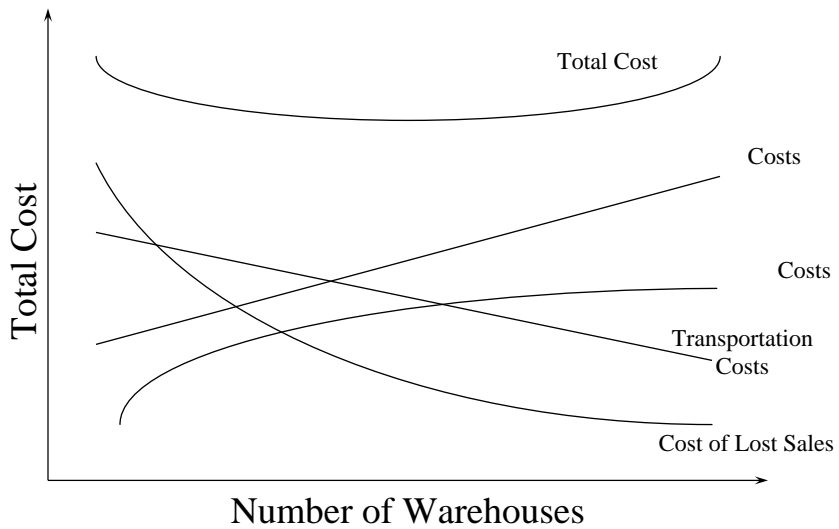
Semiconductor Industry Current Supply Chain Structure



***Example Analysis of Total Logistics Cost
Between Rail and Motor Shipments***

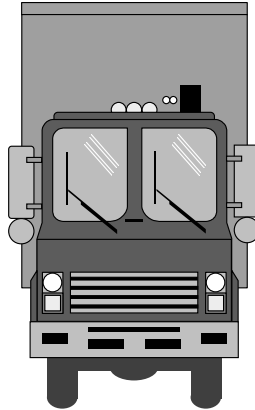
<u>Cost Centers</u>	<u>Rail</u>	<u>Motor</u>
Transportation	\$ 3.00	\$ 4.20
Inventory	5.00	3.75
Packaging	4.50	3.30
Warehousing	1.50	.75
Cost of Lost Sales	<u>2.00</u>	<u>1.00</u>
Total Cost	\$16.00	\$ 13.00

Total Cost Decision Making



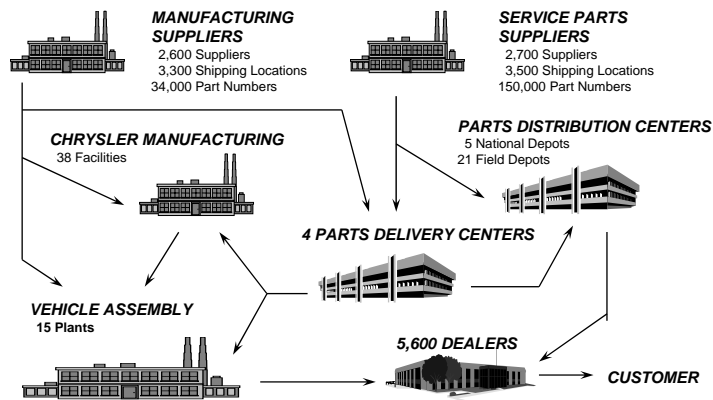
Chapter 3

The Inbound Logistics System



- Materials Management and Procurement Definitions and Process
- JIT
- MRP

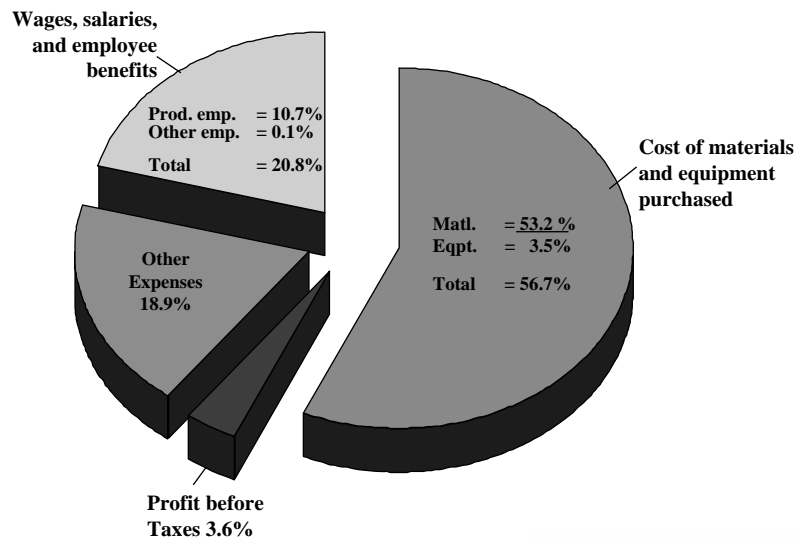
Chrysler North American Logistics Network



Source: *American Shipper*, February, 1994.

10
5

Importance of Purchasing



Source: Dobler and Burt, 1996

Materials Management

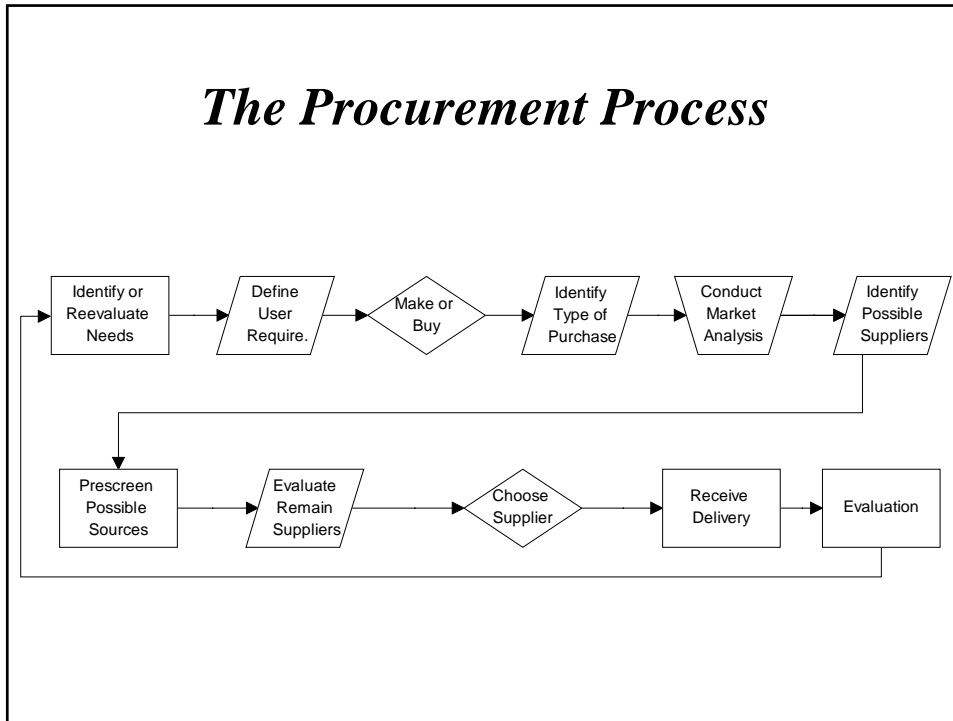
Definitions

- Process by which an organization is supplied with the goods and services that it needs to achieve its objectives
- Planning and control of all inbound materials into the firm including manufacturing supplies and finished goods
- Basically, it is the supply side of logistics
 - Link-node activities relating to inbound product movements
 - Similar in concept of customer service, only the customer is some form of manufacturing, processing, or retail company

Basic Functions

- Anticipating materials requirements
- Sourcing and obtaining materials/supplier selection and evaluation
- Introducing materials into the organization
- Monitoring the status of materials as a current asset

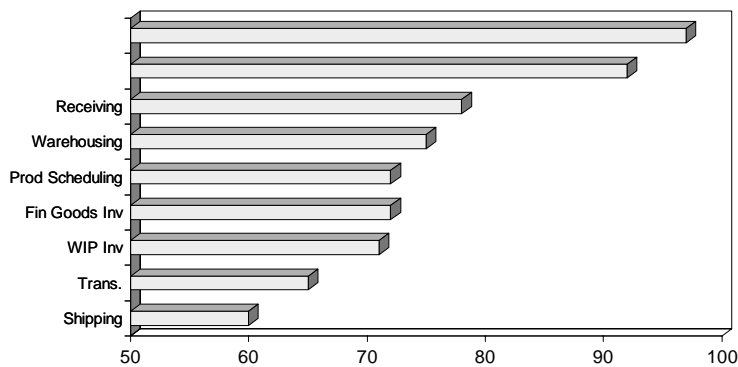
The Procurement Process



Materials Managers Wear Many Hats

Q: As Materials Manger, which functions are you responsible for?

(% Respondents)



Purchasing vs. Procurement

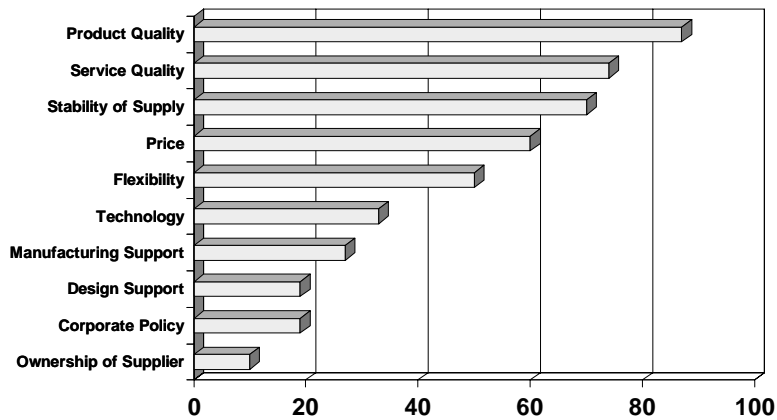
- Purchasing generally refers to the actual buying of materials and to those activities associated with the buying process.
- Procurement is broader in scope, and includes purchasing, traffic, warehousing, and receiving inbound materials.

Key Differences Between Materials Mgt and Physical Dist

- Demand is certain in MM
- Generally, shipment sizes in MM
- Different commodity characteristics
- MM channels are more than PD channels (PD channels generally more complex)
- Greater control over MM activities (due in part to the fact that MM channels are more direct

Vendor Selection Criteria

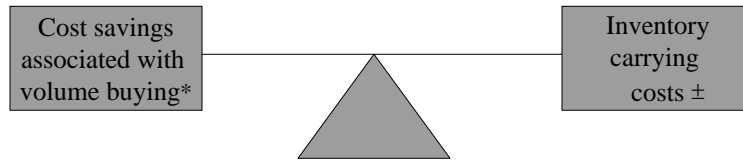
(% Critically Important)



Price Considerations

- Commodity Markets
 - Basic raw materials (grain, oil, sugar)
 - Natural resources (coal, lumber)
- Price Lists
 - Standardized products
 - Typically, discounts for volume purchases
- Price Quotation
 - Used for standard and specialty items
 - Involves use of RFP's, RFB's, RFQ's, etc.
- Negotiation
 - Frequently used when partnerships or strategic alliances exist
 - May also follow initial price quotations

Cost trade-offs to Be Considered by the Purchasing Executive



* The savings associated with volume buying include:

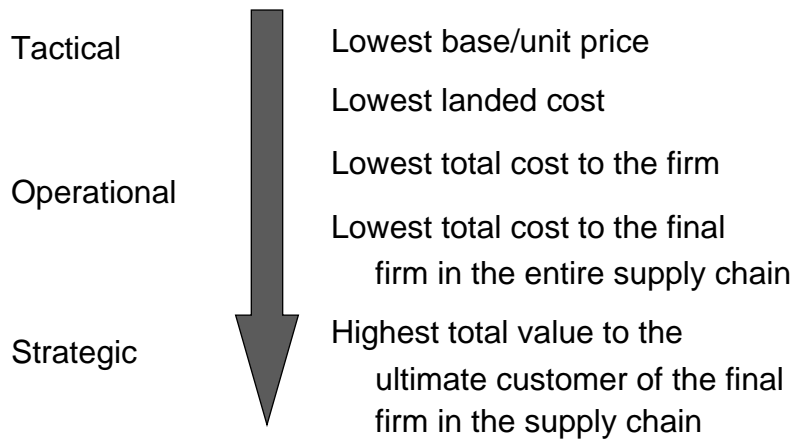
- Lower per-unit purchasing prices
- Lower transportation costs
- Lower warehouse handling costs
- Lower order-processing costs
- Lower production lot quantity costs
- Lower stockout costs

± The costs of carrying inventory include:

- Capital costs associated with the inventory investment
- Inventory service costs (insurance and taxes)
- Storage space costs
- Inventory risk costs

Source: Douglas M. Lambert and Jay U. Sterling, "Measuring Purchasing Performance," *Production and Inventory Management Review* 4, no.6 (June 1984), p. 52. Reprinted with permission from P&IM Review, June 1984. Copyright 1984 by T.D.A. Publications, Inc., Hollywood, FL.

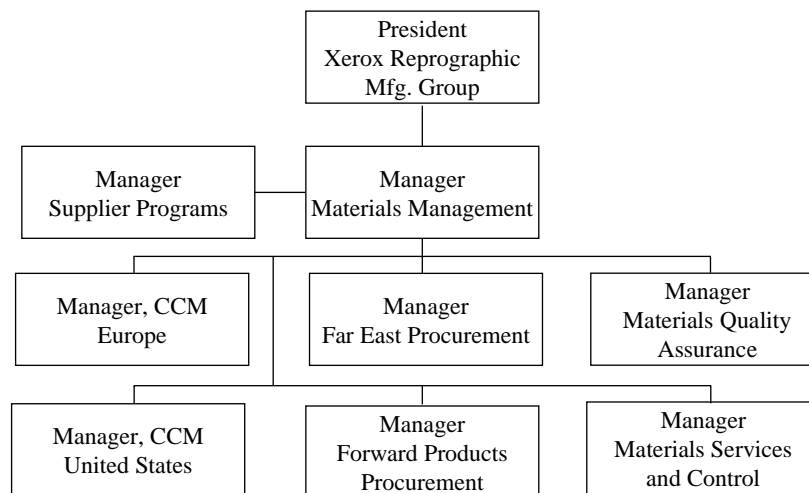
Hierarchy of Price Measurement Approaches

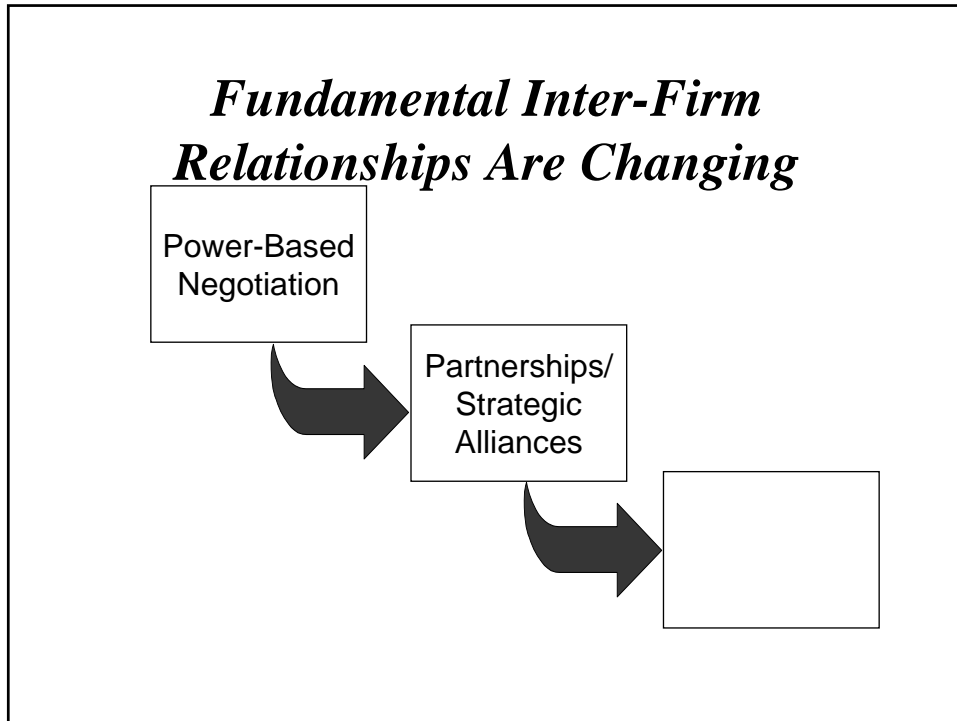


Price Considerations

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Materials Management at Xerox





Just-In-Time (JIT) Approach

- An operating concept based on the delivery of materials in the exact amount and at the same time as they are needed...thus keeping inventory costs to a minimum.
- An entirely new philosophy, a new way of doing business that is changing the way we plan, design, make, mark, store, and ship our products.
- Requirements of a JIT system
 - Zero inventories
 - Short lead times
 - Small, frequent replenishment quantities
 - High quality, zero defects

Toyota Production System - JIT Based

Three Production Rules:

- **Just-In-Time**
 - Kanban = communications tool
 - kan cards authorize production
 - ban cards requisition new materials
 - Andon system (light system) notifies plant personnel of problems
- **Heijunka** (leveled production) requirements include:
 - produce only to Kanban
 - no defectives
 - reduce production changeover/lead times
- **Continuous Flow Processing** (AUTONOMATION)
 - Processes checked for proper functioning
 - “balanced” lines
 - multi-process worker capabilities

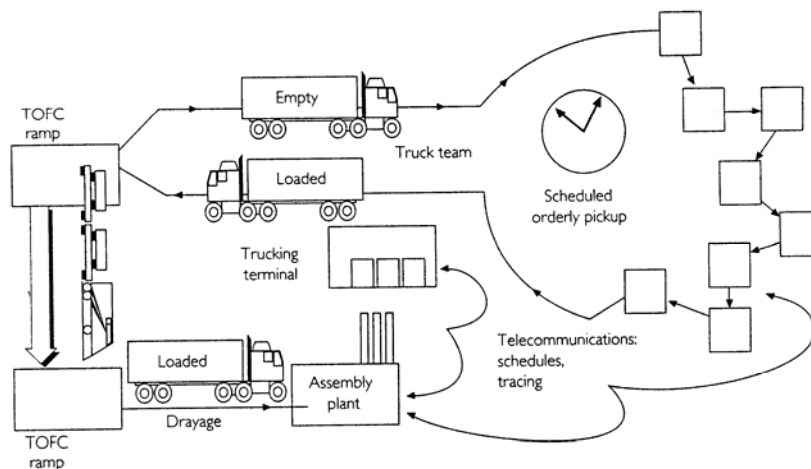
Traditional vs. JIT

FACTOR	TRADITIONAL	JIT
Inventory Safety Stock		
Production Runs Setup Times Lot Sizes	Longer / Larger	Shorter / Smaller
Queues		
Lead Times		
Quality Inspection	No or at end	Yes, everywhere
Suppliers/Customers Supply Sources Employees		

JIT Successes

- General Motors Corporation
 - GM-Canada
 - Conrail’s JIT “Automotive Express”
 - Overall inventory savings
- Saturn Corporation
 - Ryder Systems (direct materials)
 - Averitt Express (indirect materials)
- Philips Consumer Electronics Corporation
 - Assembly of television sets
 - World-class manufacturing operation
- Wal-Mart Stores
- Orderly Pickup Concept (next slide)

Orderly Pickup Concept



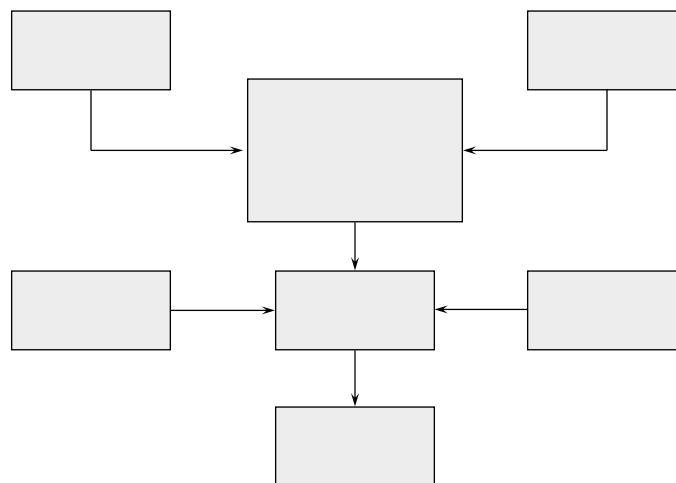
Source: Charles B. Lounsbury, Leaseway Transportation Corp.

Materials Requirements Planning (MRP II)

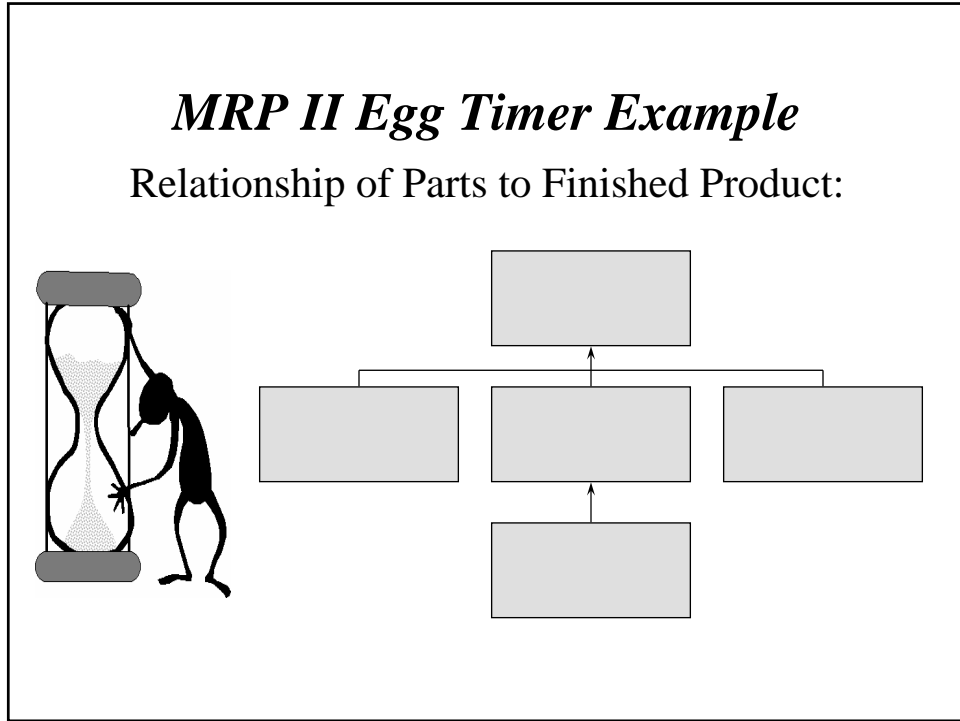
Objectives:

- Have materials delivered exactly to meet requirements of the master production schedule
- Minimize or eliminate inventory
- Planned manufacturing, purchasing, and delivery activities

MRP II System



Source: C. John Langley, Jr.



Egg Timer Required Parts

Part	# Needed	# On-Hand	Lead Time
Ends	2	0	5 weeks
Supports	3	2	1 week
Bulbs	1	0	1 week
Sand	1	0	4weeks

Master Schedule: MRPII Egg Timer Example

- Refer to Figure 3-7, CBL, page 95
- Illustration below provides MRPII example for ordering of “supports” -- receipt of supports must be timed to correspond with receipts of other materials

Supports (LT = 1)	1	2	3	4	5	6	7	8
Gross Requirements							3	
Inventory-on-hand	2	2	2	2	2	2	2	
Scheduled receipts							1	
Planned order releases						1		

An Evaluation of MRP II

Strengths

- Very useful for “batch” processes (in contrast to “continuous” processes)
- Excellent vehicle for “scheduling” and coordination based on actual demand
- Emphasis on all stages of manufacturing

Limitations

- Extremely computer and data intensive and complex
- Not as sensitive to short-term fluctuations in demand
- Does not optimize

Advances Beyond MRP

- **MRP II**
 - More comprehensive approach than MRP alone; integrates financial elements and elements of operations
- **MRP III**
 - MRP II and JIT are both used