

# **Supply Chain Management (2nd Edition)**

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## **Chapter 1 Understanding the Supply Chain**

# Helpful References (Print)

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1. Chopra, S. and Meindl, P., “Supply Chain Management: Strategy, Planning and Operation,” Prentice Hall, 2004
2. Chase, Aquilano and Jacobs, “Operations Management for Competitive Advantage,” 9<sup>th</sup> Edition, McGraw Hill, 2001
3. Handfield, R.B. and Nichols, E.L., “Introduction to Supply Chain Management,” Prentice Hall, 1999

# Helpful References (Internet)

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1. [www.apics.org](http://www.apics.org)
2. [www.supply-chain.org](http://www.supply-chain.org)

# Operations Management (OM)

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- OM: Design, operation & improvement of the production systems
- OM: Concerned with conversion of inputs to outputs

# OM Framework

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**INPUTS** → **TRANSFORMATION** → **OUTPUTS**

- People
- Plants
- Parts
- Processes
- Planning & control systems

- Assembly
- Blending
- Storing

- Tangible vs. Intangible
- Direct vs. Indirect

# OM: Transformation Types

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- Transformations can be:
  - Physical
  - Location
  - Physiological
  - Informational

# Characteristics of Manufacturing Environment

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- Increased product diversity
- Reduced product life cycles
- Increased awareness of the environment
  - impact of products & manufacturing systems
- Difficulties of estimating the costs and benefits
- Changing social expectations

# Manufacturing System Views

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## □ Closed System

- Manufacturing is seen as an internal function buffered from suppliers, customers, and other functions

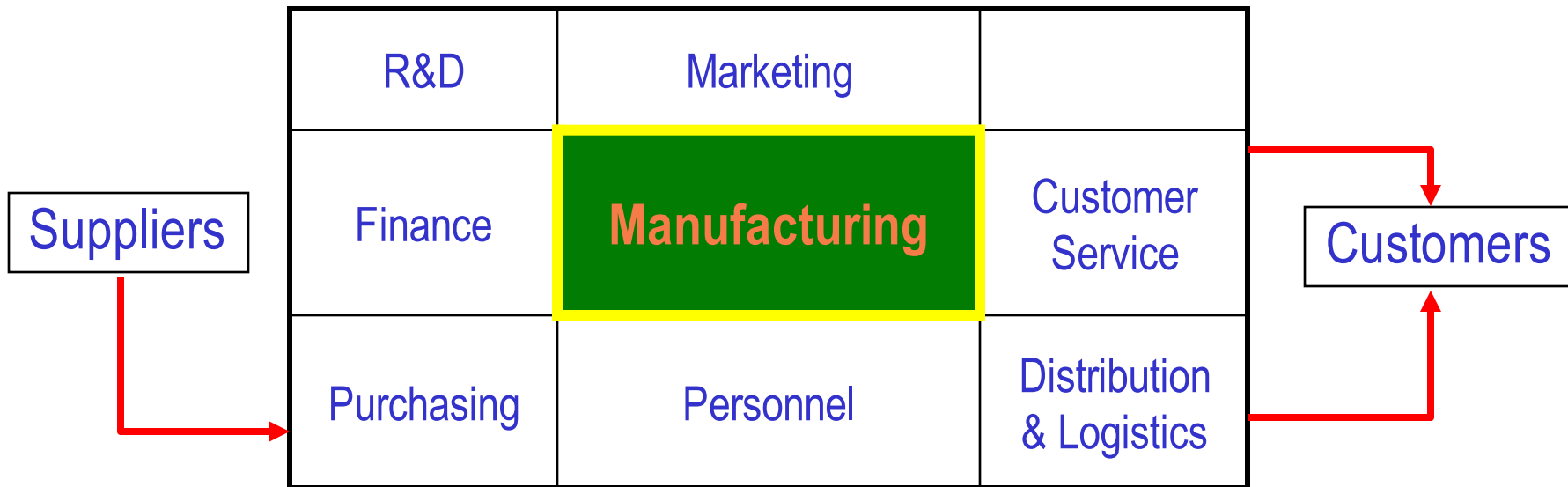
## □ Open Systems

- Manufacturing is seen as closely linked to suppliers, customers and other functions



# A Closed System View

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# An Open System View

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# Evolution From OM to Supply Chain

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OM View	Supply Chain View
□ Closed System	□ Open System
□ Manufacturer Orientation	□ Customer Orientation
□ Local Optimization	□ Global Optimization
Technology (hardware, software, multimedia, etc.)	
□ Local System Capabilities	□ Enterprise System Capabilities

# Changing Basis of Competition

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Basis of Competition	
Yesterday	Manufacturing company versus Manufacturing company
Today	Manufacturing company and it's supply chain versus Manufacturing company and it's supply chain

# Customers

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- Consumers

- Pay for your company's final product

- External customers

- Receiving outputs from your company

- Internal customers

- Receiving outputs from you to others within the company

# Supply Chain: Definition

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- **Supply chain** is a network of interconnected **organizations** or organizational entities developed with the goal of getting **the right product to the right place at the right time**

# Supply Chain: Scope

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- **Supply chain** encompasses every effort involved in producing and delivering a final product, from the supplier's supplier to the customer's customer
  - Efforts include managing supply and demand, sourcing raw materials and parts, manufacturing and assembly, warehousing, information management, distribution and delivery to customers

# Supply Chain: Flows (1)

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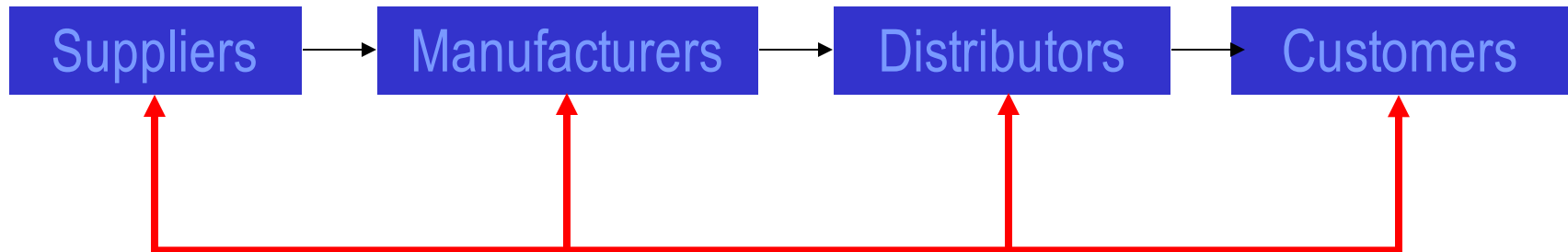
- The following flows have to be managed in a supply chain:
  - Materials
  - Information
  - Cash



# Supply Chain: Flows (2)

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Material, Information, Invoicing



After-sales support, Recycling, Order information, Payments

# Supply Chain: Elements

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- Supply chain consists of elements internal and external to the company
- These elements range from material producers to the customers
- All supply chain elements must be appropriately integrated for a company to be able to effectively compete in chosen markets

# What is a Supply Chain?

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- All stages involved, directly or indirectly, in fulfilling a customer request
- Includes manufacturers, suppliers, transporters, warehouses, retailers, customers
- Within each company, the supply chain includes all functions involved in fulfilling a customer request (product development, marketing, operations, distribution, finance, customer service)
- Examples: Fig. 1.1 (Wal-Mart), Dell

# What is a Supply Chain?

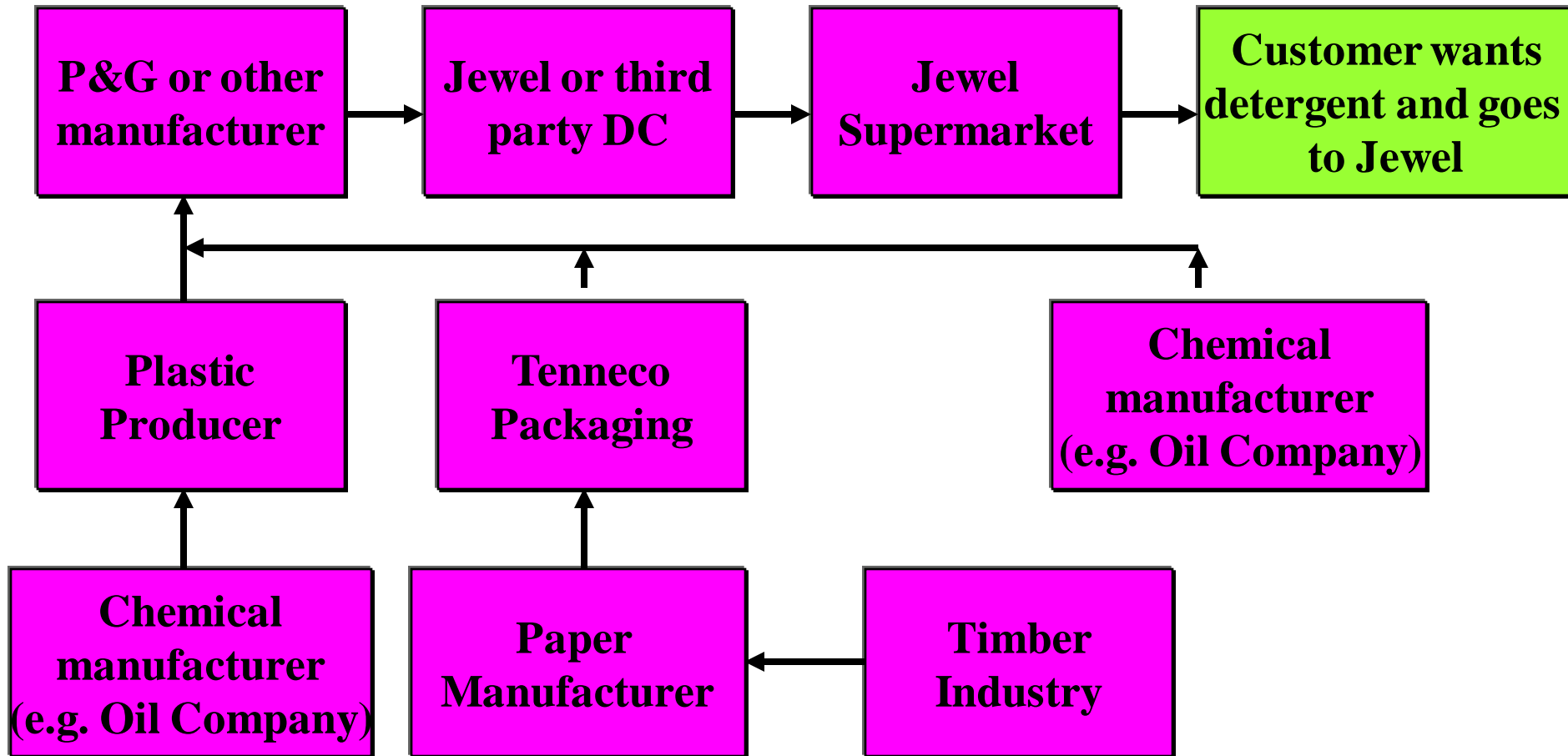
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- Customer is an integral part of the supply chain
- Includes movement of products from suppliers to manufacturers to distributors, but also includes movement of information, funds, and products in both directions

Typical supply chain stages: customers, retailers, distributors, manufacturers, suppliers (Fig. 1.2)

- All stages may not be present in all supply chains (e.g., no retailer or distributor for Dell)

# What is a Supply Chain?



# The Objective of a Supply Chain

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- Maximize overall value created
- Supply chain value: difference between what the final product is worth to the customer and the effort the supply chain expends in filling the customer's request
- Value is correlated to supply chain profitability (difference between revenue generated from the customer and the overall cost across the supply chain)

# The Objective of a Supply Chain

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- Supply chain incurs costs (information, storage, transportation, components, assembly, etc.)
- Supply chain profitability is total profit to be shared across all stages of the supply chain
- Supply chain success should be measured by total supply chain profitability, not profits at an individual stage

# The Objective of a Supply Chain

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- Sources of supply chain revenue: the customer
- Sources of supply chain cost: flows of information, products, or funds between stages of the supply chain
- *Supply chain management is the management of flows between and among supply chain stages to maximize total supply chain profitability*



# Decision Phases of a Supply Chain

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- Supply chain strategy or design
- Supply chain planning
- Supply chain operation

# Supply Chain Strategy or Design

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- Decisions about the structure of the supply chain and what processes each stage will perform
- Strategic supply chain decisions
  - Locations and capacities of facilities
  - Products to be made or stored at various locations
  - Modes of transportation
  - Information systems
- Supply chain design must support strategic objectives
- Supply chain design decisions are long-term and expensive to reverse – must take into account market uncertainty

# Supply Chain Planning

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- Definition of a set of policies that govern short-term operations
- Fixed by the supply configuration from previous phase
- Starts with a forecast of demand in the coming year

# Supply Chain Planning

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- Planning decisions:
  - Which markets will be supplied from which locations
  - Planned buildup of inventories
  - Subcontracting, backup locations
  - Inventory policies
  - Timing and size of market promotions
- Must consider in planning decisions demand uncertainty, exchange rates, competition over the time horizon

# Supply Chain Operation

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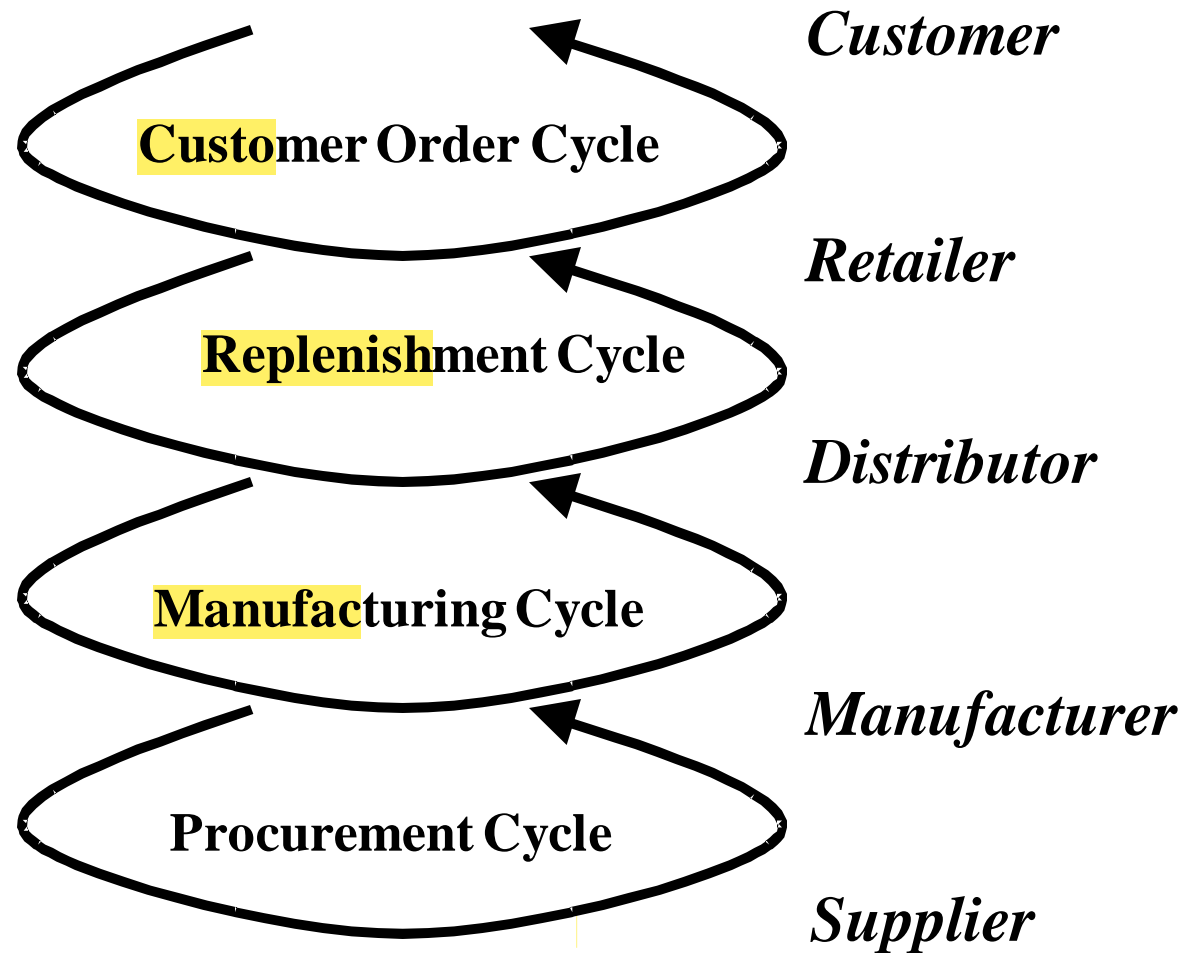
- Time horizon is weekly or daily
- Decisions regarding individual customer orders
- Supply chain configuration is fixed and operating policies are determined
- Goal is to implement the operating policies as effectively as possible
- Allocate orders to inventory or production, set order due dates, generate pick lists at a warehouse, allocate an order to a particular shipment, set delivery schedules, place replenishment orders
- Much less uncertainty (short time horizon)

# Process View of a Supply Chain

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- **Cycle view:** processes in a supply chain are divided into a series of cycles, each performed at the interfaces between two successive supply chain stages
- **Push/pull view:** processes in a supply chain are divided into two categories depending on whether they are executed in response to a customer order (pull) or in anticipation of a customer order (push)

# Cycle View of Supply Chains



# Cycle View of a Supply Chain

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- Each cycle occurs at the interface between two successive stages
- Customer order cycle (customer-retailer)
- Replenishment cycle (retailer-distributor)
- Manufacturing cycle (distributor-manufacturer)
- Procurement cycle (manufacturer-supplier)
- Figure (see previous power point)
- Cycle view clearly defines processes involved and the owners of each process. Specifies the roles and responsibilities of each member and the desired outcome of each process.



# Customer Order Cycle

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- Involves all processes directly involved in receiving and filling the customer's order
- Customer arrival
- Customer order entry
- Customer order fulfillment
- Customer order receiving

# Replenishment Cycle

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- All processes involved in replenishing retailer inventories (retailer is now the customer)
- Retail order trigger
- Retail order entry
- Retail order fulfillment
- Retail order receiving

# Manufacturing Cycle

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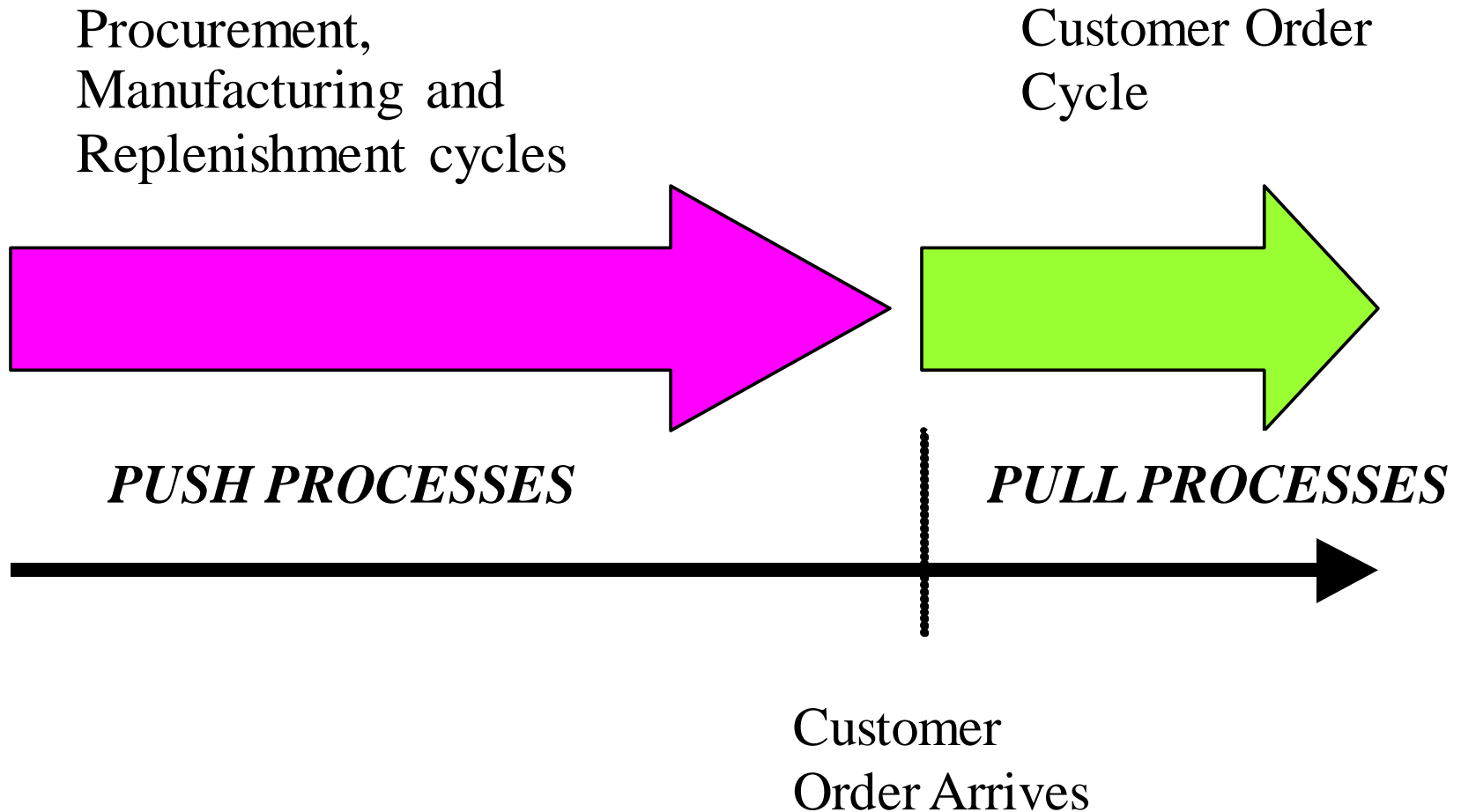
- All processes involved in replenishing distributor (or retailer) inventory
- Order arrival from the distributor, retailer, or customer
- Production scheduling
- Manufacturing and shipping
- Receiving at the distributor, retailer, or customer

# Procurement Cycle

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- All processes necessary to ensure that materials are available for manufacturing to occur according to schedule
- Manufacturer orders components from suppliers to replenish component inventories
- However, component orders can be determined precisely from production schedules (different from retailer/distributor orders that are based on uncertain customer demand)
- Important that suppliers be linked to the manufacturer's production schedule

# Push/Pull View of Supply Chains



# Push/Pull View of Supply Chain Processes

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- Supply chain processes fall into one of two categories depending on the timing of their execution relative to customer demand
- Pull: execution is initiated in response to a customer order (reactive)
- Push: execution is initiated in anticipation of customer orders (speculative)
- Push/pull boundary separates push processes from pull processes

# Push/Pull View of Supply Chain Processes

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- Useful in considering strategic decisions relating to supply chain design – more global view of how supply chain processes relate to customer orders
- Can combine the push/pull and cycle views
  - L.L. Bean (Figure 1.8)
  - Dell (Figures 1.9 and 1.10)
- The relative proportion of push and pull processes can have an impact on supply chain performance

# The End

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