Supply Chain Management (2nd Edition)

Chapter 1
Understanding the Supply Chain

Helpful References (Print)

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," 9th Edition, McGraw Hill, 2001
3. Handfield, R.B. and Nichols, E.L., "Introduction to Supply Chain Management," Prentice Hall, 1999

Helpful References (Internet)

1. www.apics.org
2. www.supply-chain.org

Operations Management (OM)

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

OM Framework

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

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

- Assembly
- Blending
- Storing

- Tangible vs. Intangible
- Direct vs. Indirect

OM: Transformation Types

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

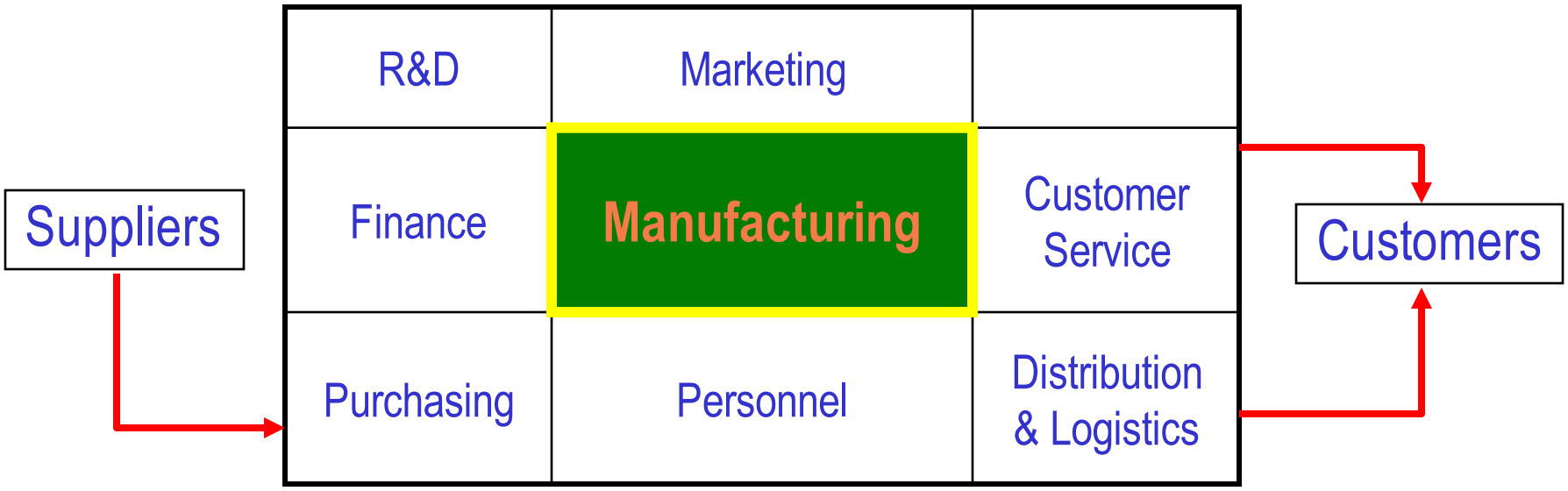
Characteristics of Manufacturing Environment

- 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

- 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



An Open System View

Evolution From OM to Supply Chain

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

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

- 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

- 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

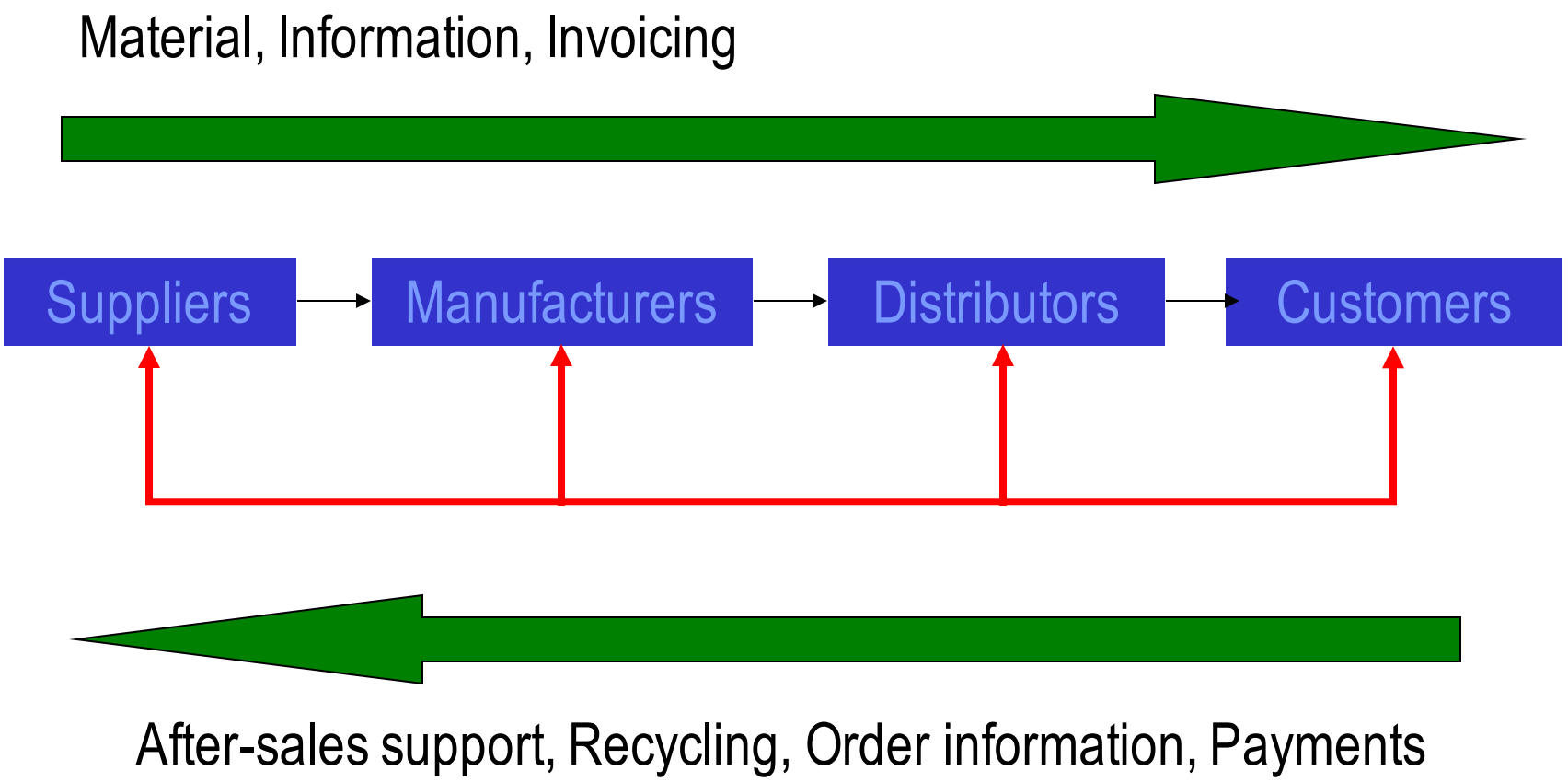
Supply Chain: Scope

- 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)

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

Supply Chain: Flows (2)



Supply Chain: Elements

- 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?

- 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

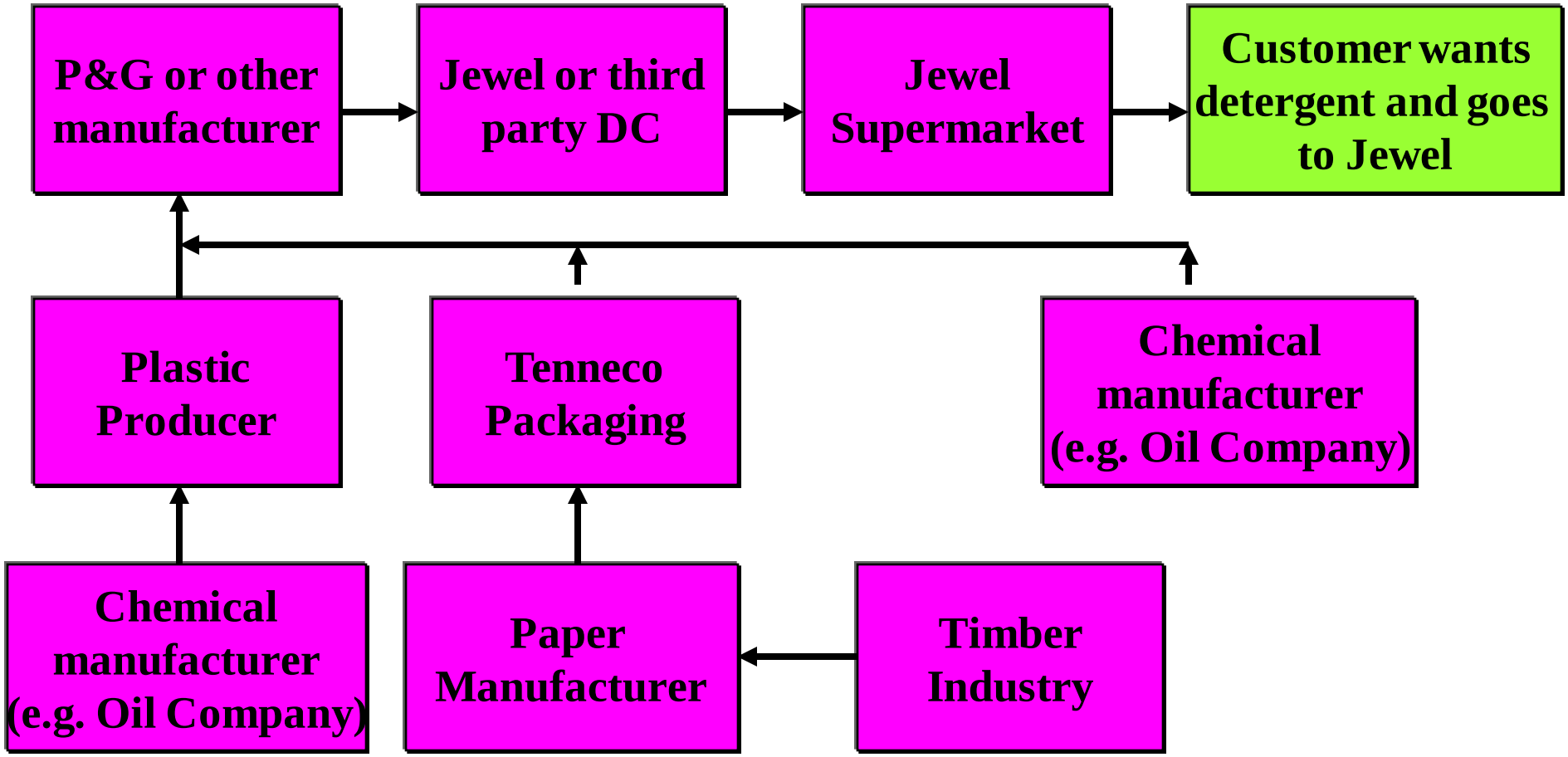
What is a Supply Chain?

- 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

- 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

- 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

- 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

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

Supply Chain Strategy or Design

- 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

- 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

- 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

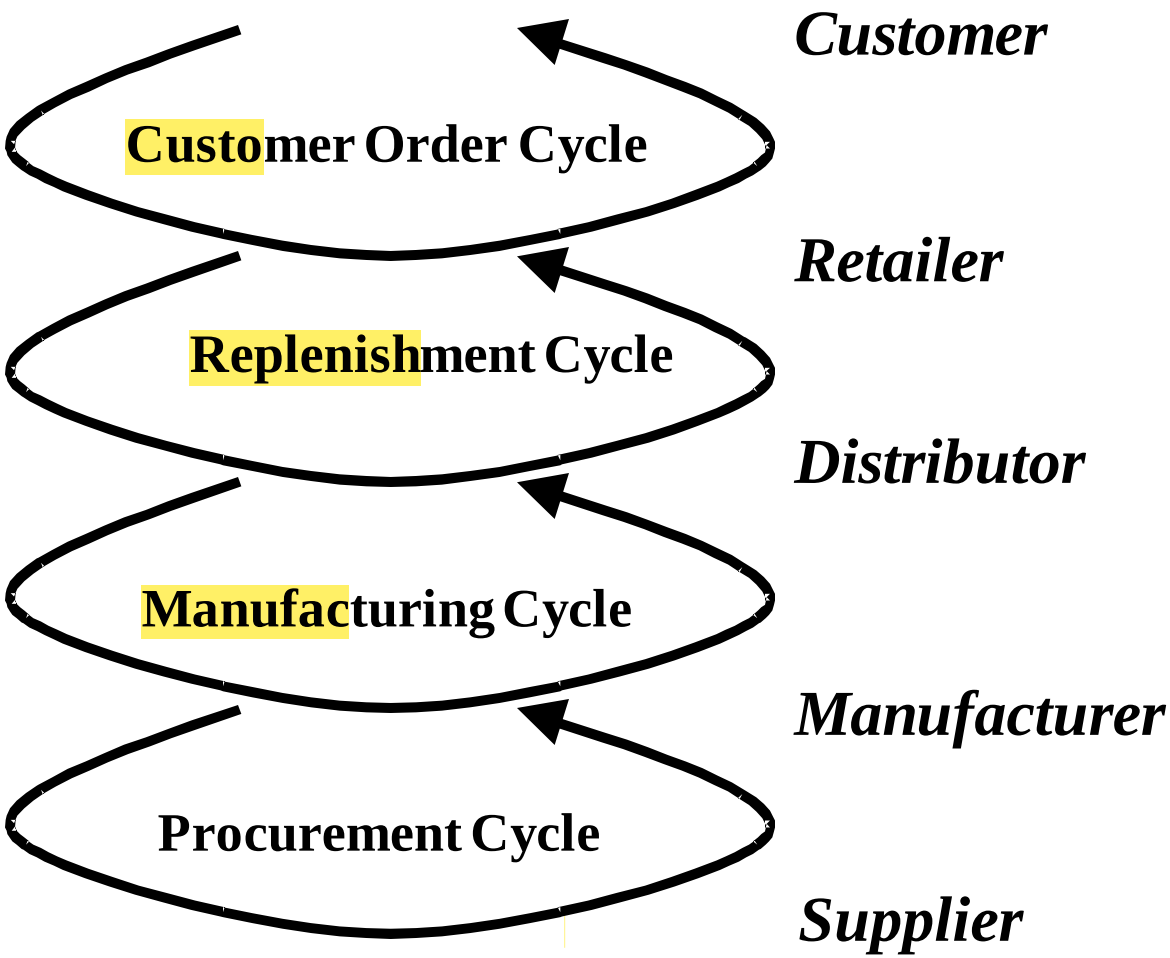
Supply Chain Operation

- 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

- 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

- 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

- 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

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

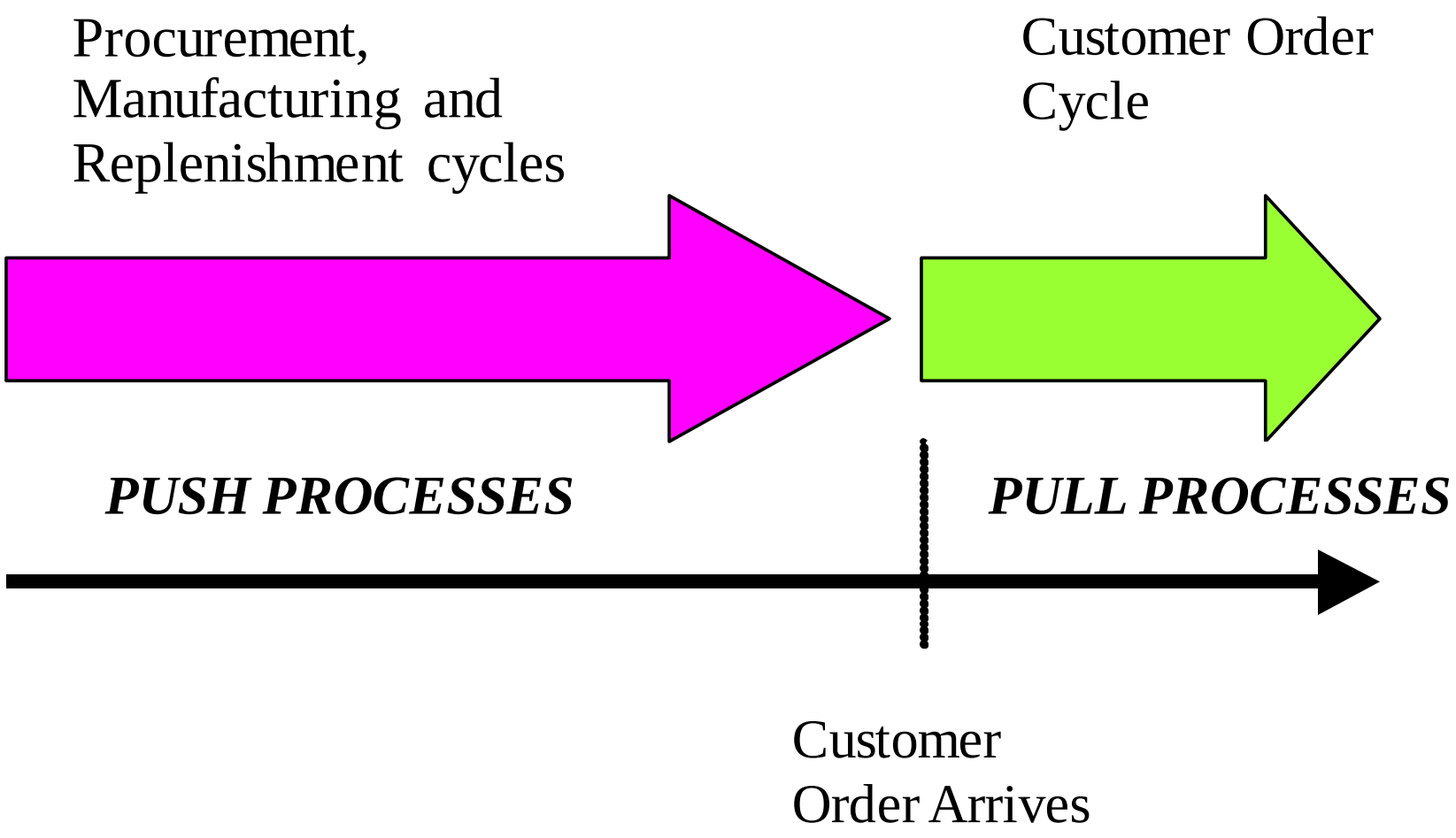
Manufacturing Cycle

- 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

- 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

- 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

- 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