

Chapter 1

Understanding the Supply Chain

Learning Objectives

- Discuss the goal of a supply chain, and explain the impact of supply chain decisions on the success of a firm.
- Identify the three key supply chain decision phases, and explain the significance of each one.
- Describe the cycle and push/pull views of a supply chain.
- Classify the supply chain macro processes in a firm.

What is a Supply Chain?

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

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What is a Supply Chain?

- Customer is an integral part of the supply chain
- Includes movement of products from suppliers to manufacturers to distributors, and information, funds, and products in both directions.
- May be more accurate to use the term “supply network” or “supply web”.
- Typical supply chain stages: customers, retailers, distributors, manufacturers, suppliers.
- All stages may not be present in all supply chains (e.g., no retailer or distributor for Dell).

What is a Supply Chain?

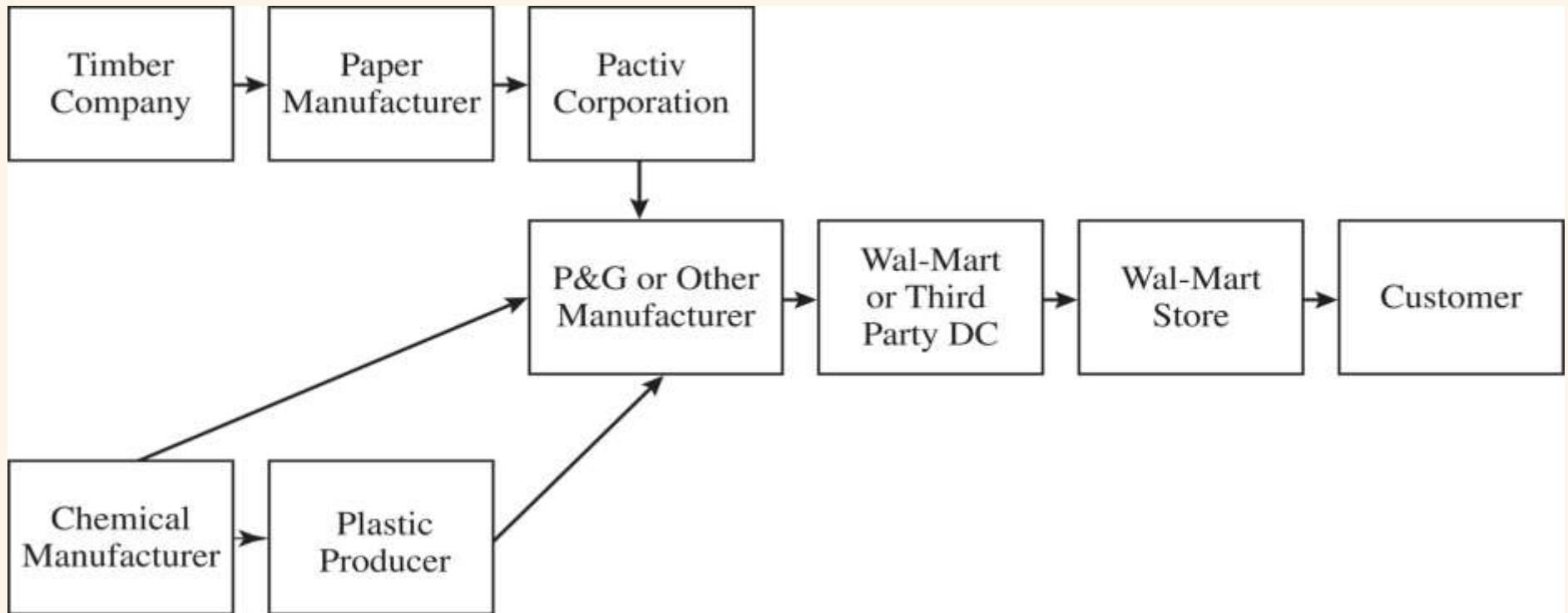


Figure 1-1

Flows in a Supply Chain

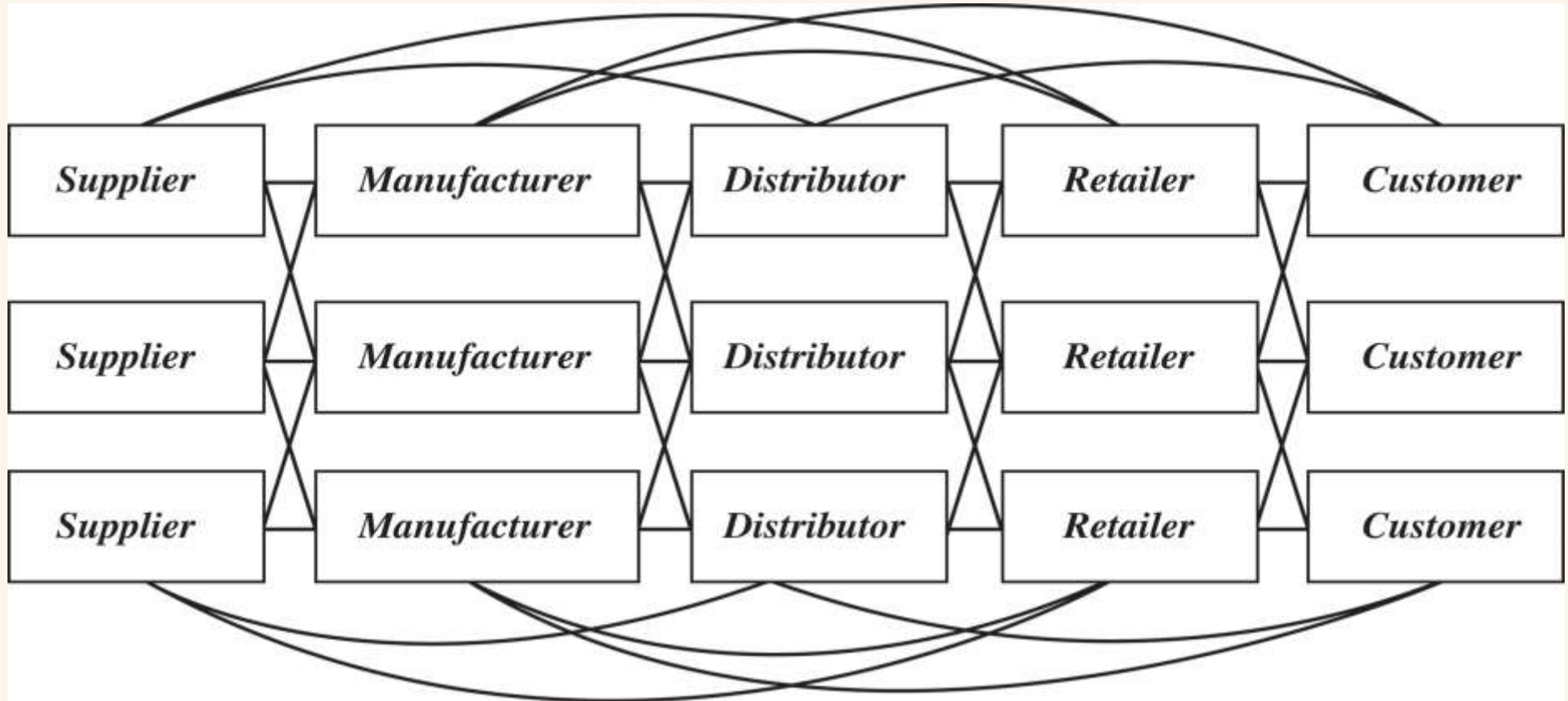


Figure 1-2

The Objective of a Supply Chain

- Maximize overall value created

↳ Supply chain surplus = Customer value – Supply chain cost

The Objective of a Supply Chain

- Example: A customer purchases a wireless router from Best Buy for \$60 (revenue).
- Supply chain incurs costs (information, storage, transportation, components, assembly, etc.).
- Difference between \$60 and the sum of all of these costs is the supply chain profit.
- Supply chain profitability is total profit to be shared across all stages of the supply chain.

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The Objective of a Supply Chain

- Success should be measured by total supply chain profitability, not by profits at an individual stage.
- Customer is the only source of revenue.
- Sources of cost includes flows of information, products, or funds between stages of the supply chain.
- Effective supply chain management is the management of flows between and among supply chain stages to maximize total supply chain surplus.

Importance of Supply Chain Decisions

- Wal-Mart, \$1 billion sales in 1980 to \$408 billion in 2010
- Seven-Eleven Japan, ¥1 billion sales in 1974 to ¥3 trillion in 2009
- Webvan folded in two years
- Borders, \$4 billion in 2004 to \$2.8 billion in 2009
- Dell, \$56 billion in 2006, adopted new supply chain strategies

Decision Phases of a Supply Chain

- Supply chain strategy or design
 - ↷ How to structure the supply chain over the next several years
- Supply chain planning
 - ↷ Decisions over the next quarter or year
- Supply chain operation
 - ↷ Daily or weekly operational decisions

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 Chain Processes

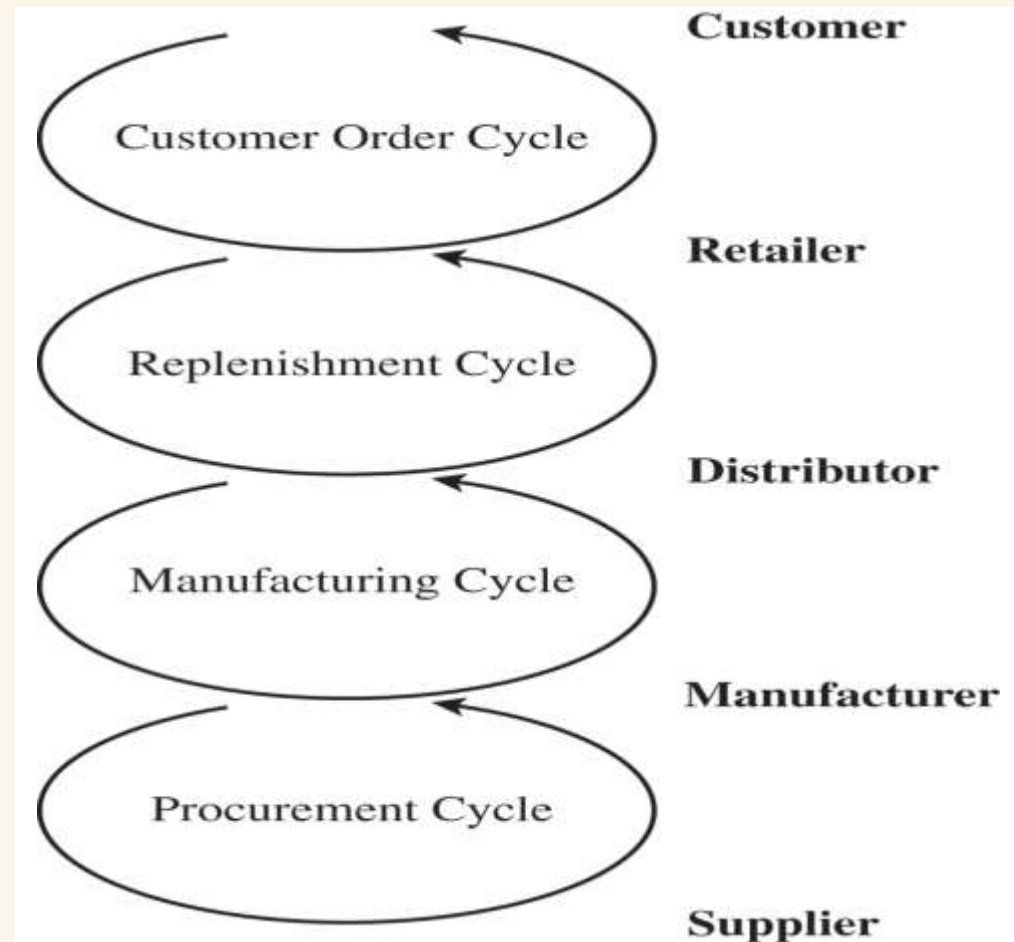


Figure 1-3

Cycle View of Supply Chain Processes

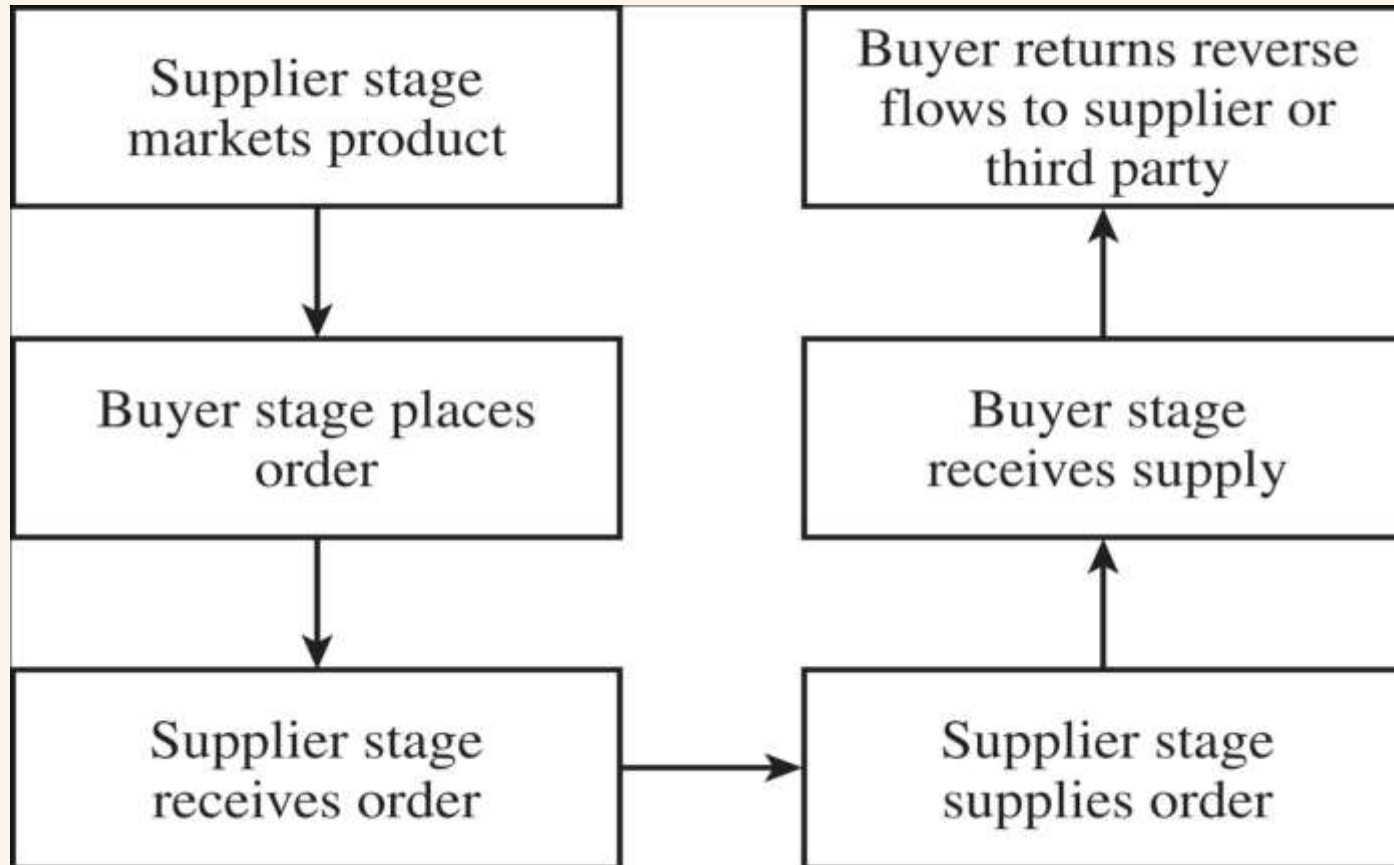


Figure 1-4

Push/Pull View of Supply Chains

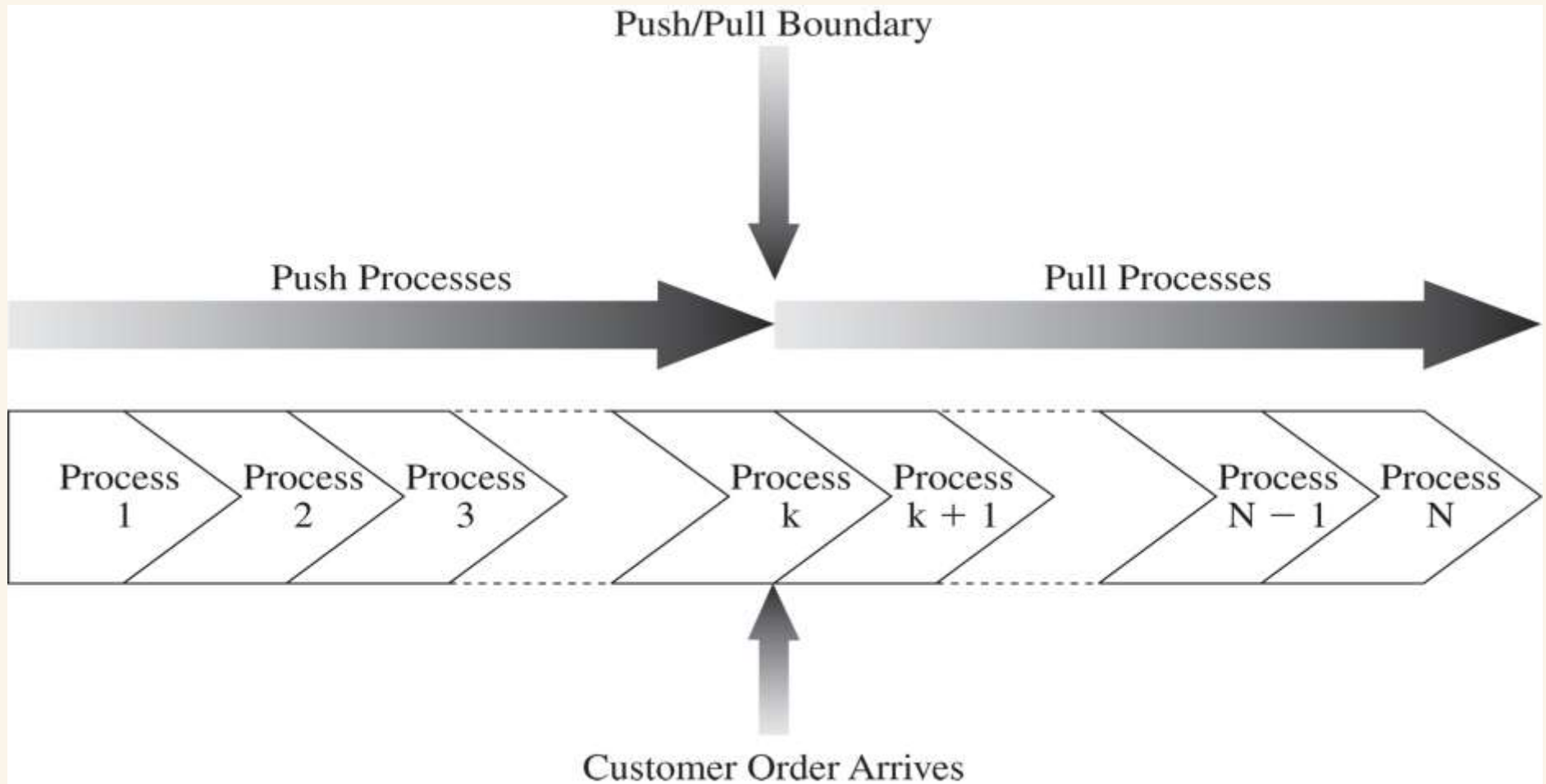


Figure 1-5

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:** Here execution is initiated in response to a customer order (reactive).
- **Push:** Here execution is initiated in anticipation of customer orders (speculative).
- Push/pull boundary separates push processes from pull processes.

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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
 - ~ Dell
- The relative proportion of push and pull processes can have an impact on supply chain performance.

Push/Pull View—L.L. Bean

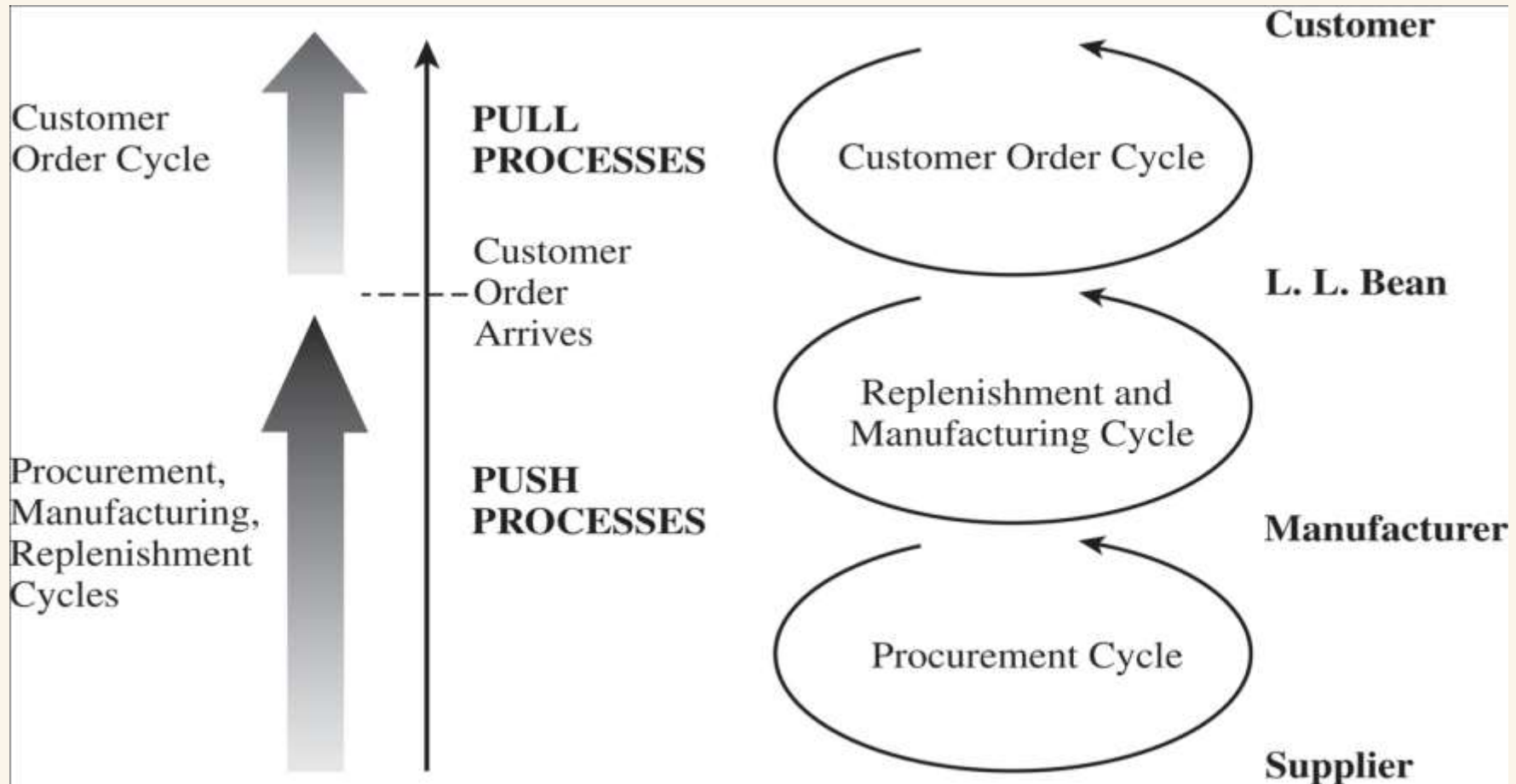


Figure 1-6

Push/Pull View—Dell

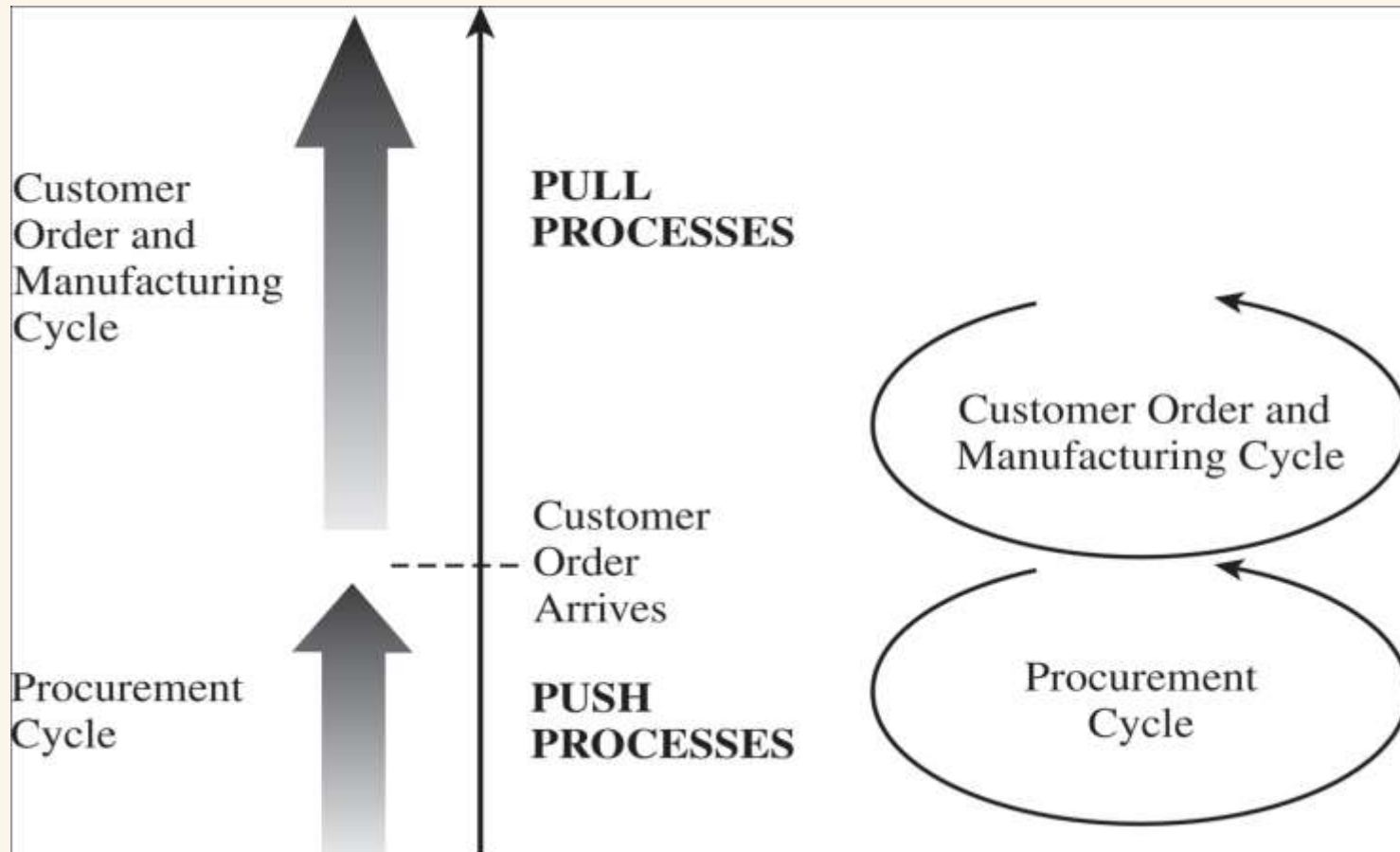


Figure 1-7

Supply Chain Macro Processes

- Supply chain processes discussed in the two views can be classified into:
 - Customer Relationship Management (CRM)
 - Internal Supply Chain Management (ISCM)
 - Supplier Relationship Management (SRM)
- Integration among the above three macro processes is critical for effective and successful supply chain management.

Supply Chain Macro Processes



Figure 1-8

Examples of Supply Chains

- Gateway and Apple
- Zara
- W.W. Grainger and McMaster-Carr
- Toyota
- Amazon

Gateway and Apple

- Why did Gateway choose not to carry any finished-product inventory at its retail stores? Why did Apple choose to carry inventory at its stores?
- Should a firm with an investment in retail stores carry any finished-goods inventory? What are the characteristics of products that are most suitable to be carried in finished-goods inventory? What characterizes products that are best manufactured to order?
- How does product variety affect the level of inventory that a retail store must carry?
- Is a direct selling supply chain without retail stores always less expensive than a supply chain with retail stores?
- What factors explain the success of Apple retail and the failure of Gateway country stores?

Zara

- What advantage does Zara gain against the competition by having a very responsive supply chain?
- Why has Inditex chosen to have both in-house manufacturing and outsourced manufacturing? Why has Inditex maintained manufacturing capacity in Europe even though manufacturing in Asia is much cheaper?
- Why does Zara source products with uncertain demand from local manufacturers and products with predictable demand from Asian manufacturers?
- What advantage does Zara gain from replenishing its stores multiple times a week compared to a less frequent schedule? How does the frequency of replenishment affect the design of its distribution system?
- Do you think Zara's responsive replenishment infrastructure is better suited for online sales or retail sales?

W.W. Grainger and McMaster-Carr

- How many DCs should be built and where should they be located?
- How should product stocking be managed at the DCs? Should all DCs carry all products?
- What products should be carried in inventory and what products should be left with the supplier to be shipped directly in response to a customer order?
- What products should W.W. Grainger carry at a store?
- How should markets be allocated to DCs in terms of order fulfillment? What should be done if an order cannot be completely filled from a DC? Should there be specified backup locations? How should they be selected?

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W.W. Grainger and McMaster-Carr

- How should replenishment of inventory be managed at the various stocking locations?
- How should Web orders be handled relative to the existing business? Is it better to integrate the Web business with the existing business or to set up separate distribution?
- What transportation modes should be used for order fulfillment and stock replenishment?

Toyota

- Where should plants be located, what degree of flexibility and what capacity should each have?
- Should plants be able to produce for all markets?
- How should markets be allocated to plants?
- What kind of flexibility should be built into the distribution system?
- How should this flexible investment be valued?
- What actions may be taken during product design to facilitate this flexibility?

Amazon.com

- Why is Amazon building more warehouses as it grows? How many warehouses should it have and where should they be located?
- What advantages does selling books via the Internet provide over a traditional bookstore? Are there any disadvantages to selling via the Internet?
- Should Amazon stock every product it sells?
- What advantage can bricks-and-mortar players derive from setting up an online channel? How should they use the two channels to gain maximum advantage?
- What advantages/disadvantages does the online channel enjoy in the sale of shoes (diapers) relative to a retail store?
- For what products does the online channel offer the greater advantage relative to retail stores? What characterizes these products?

Gopaljee

- How can Gopaljee's supply and distribution model be extended to other business lines in the Indian and South Asian context?
- What all socio-economic features of South Asian societies can be identified as the foundations for building sustainable supply chains?
- How can the existing distribution channels in the South Asian region be transformed to maximize the value delivered to the customer?
- How can such indigenously developed SCM models integrate with and expand into global supply chains?

Summary of Learning Objectives

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