

Chapter 2

Supply Chains as a System

From *Principles of Supply Chain Management*
Crandall, Crandall and Chen

Company Profile - Zara

- Inditex (Zara is their leading company) is a company that has built a supply chain system that is extremely successful. They were first listed in the Gartner Top 25 Supply Chains in 2012 when they were ranked No. 19. In 2013, they moved up to No. 15. (Gilmore 2013)
They have reached this level of recognition by developing a supply chain that emphasizes fast response times and agility in meeting variability in their marketplace – high fashion clothing. Their growth confirms their success. From their beginning in 1975, they have grown to over 6,000 stores throughout the world.

Learning Outcomes

- Describe the components of the input-transformation-output model
- Describe the three types of flows in a supply chain
- Provide examples of supply chains in different industries
- Identify the difference between internal and external customers
- Explain the difference between open and closed systems

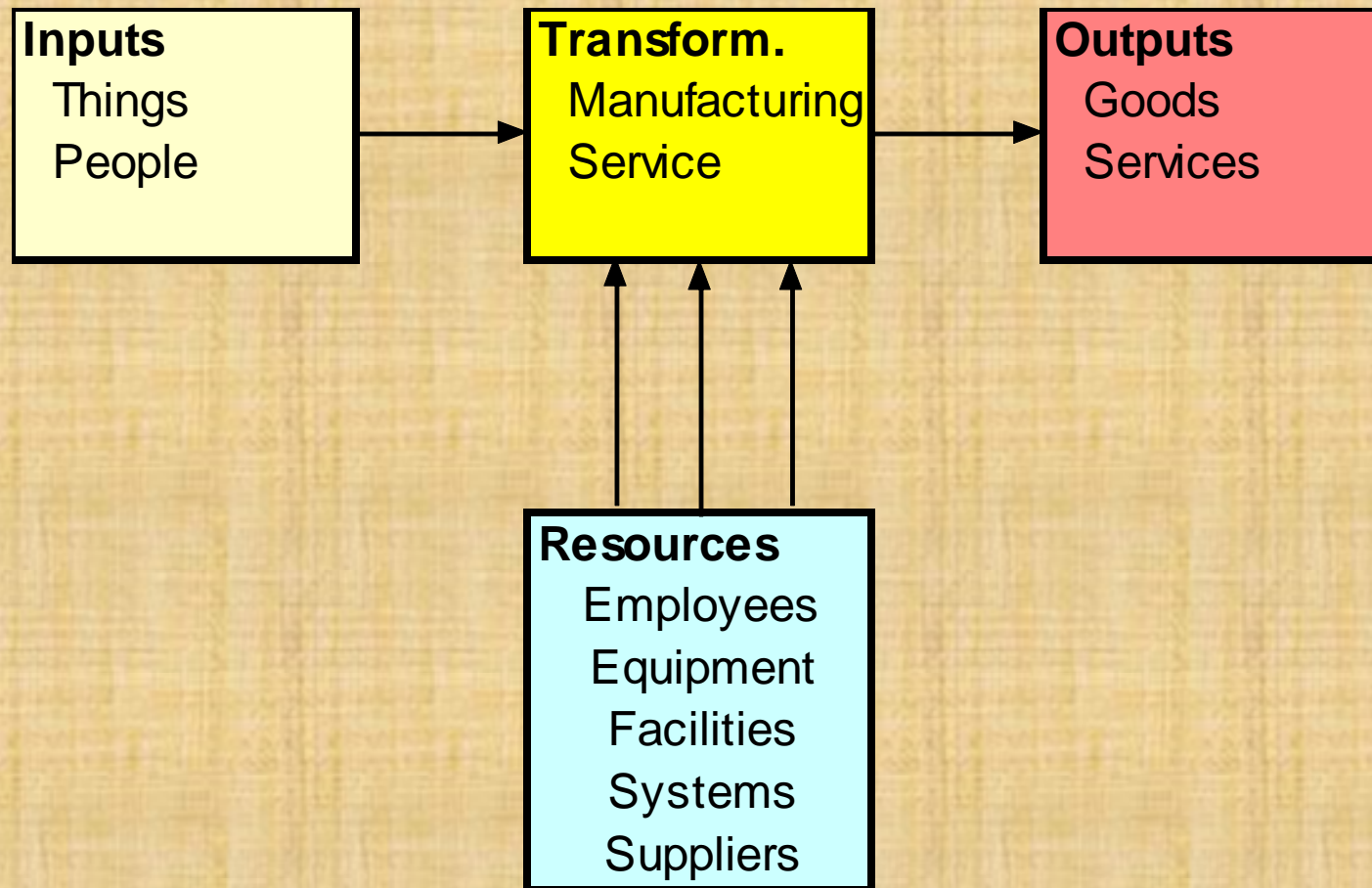
Learning Outcomes (cont.)

- Describe the effects of external influences on supply chains
- Discuss the obstacles and enablers of supply chain integration
- Explain how supply chain performance can be measured
- Explain why costs, resources and benefits must be fairly allocated along the supply chain
- Describe the ways companies create value along the supply chain

Introduction







- A supply chain is a series of coordinated steps to transform raw materials into products and services the customer needs or wants.
- The input-transformation-output (ITO) model is the DNA of the supply chain.
- Resources – employees, equipment, facilities, inventory, and systems – are required.
- The customer is important: their perceived value determines the actual value of the output
- A supply chain requires the collaboration among its participants – a systems approach.

Basic ITO Model



Manufacturing and Services

Table 2-1. Manufacturing and Service Businesses

SCM Process/ Industry	Supplying 	Manu- facturing 	Distributing 	Retailing 	Consuming 	Recycling 
Pharmaceuticals	<ul style="list-style-type: none"> • Plastics • Chemicals 	<ul style="list-style-type: none"> • Abbott Labs, • Bayer Pharma 	<ul style="list-style-type: none"> • HD Smith Wholesale Distribution center, on-site management, merchandising 	<ul style="list-style-type: none"> • CVS pharmacy, • Rite-Aid drugs, • Wal-Mart Pharma 	<ul style="list-style-type: none"> • Clinics, • Hospitals • Physician offices 	<ul style="list-style-type: none"> • Recalls
Automobile	<ul style="list-style-type: none"> • Steel banks, • Aluminum ingots, • Polymer pellets 	<ul style="list-style-type: none"> • Original equipment manufacturers (OEMs) 	<ul style="list-style-type: none"> • Regional Distribution centers, • Wholesalers 	<ul style="list-style-type: none"> • Car dealerships, • Auction markets • Online auto sellers 	<ul style="list-style-type: none"> • Individual and corporate users 	<ul style="list-style-type: none"> • Recalls • Salvage yards • Reverse engineering
Furniture	<ul style="list-style-type: none"> • Imported woods, • Unfinished parts, • Design roadmap 	<ul style="list-style-type: none"> • Cutting and assembly 	<ul style="list-style-type: none"> • UPS • Local furniture shipping firm 	<ul style="list-style-type: none"> • Thomasville • Broyhill 	<ul style="list-style-type: none"> • Home owners 	<ul style="list-style-type: none"> • Defects, Disintegrated furniture
Food	<ul style="list-style-type: none"> • Seed • Wheat • Animal livestock 	<ul style="list-style-type: none"> • Flour mills • Food processor 	<ul style="list-style-type: none"> • Regional distribution centers • General wholesaler 	<ul style="list-style-type: none"> • Grocery stores • Restaurants • Caterers 	<ul style="list-style-type: none"> • Individual consumers 	<ul style="list-style-type: none"> • Expired goods
Textiles	<ul style="list-style-type: none"> • Cotton • Wood 	<ul style="list-style-type: none"> • Spun Yarn • Greige Goods, • Dyed Cloth 	<ul style="list-style-type: none"> • Clothing middlemen 	<ul style="list-style-type: none"> • Retail clothing-Bell Sears, JC Penny 	<ul style="list-style-type: none"> • Worn Garments 	<ul style="list-style-type: none"> • Recycled Material

Supply Chain Flows

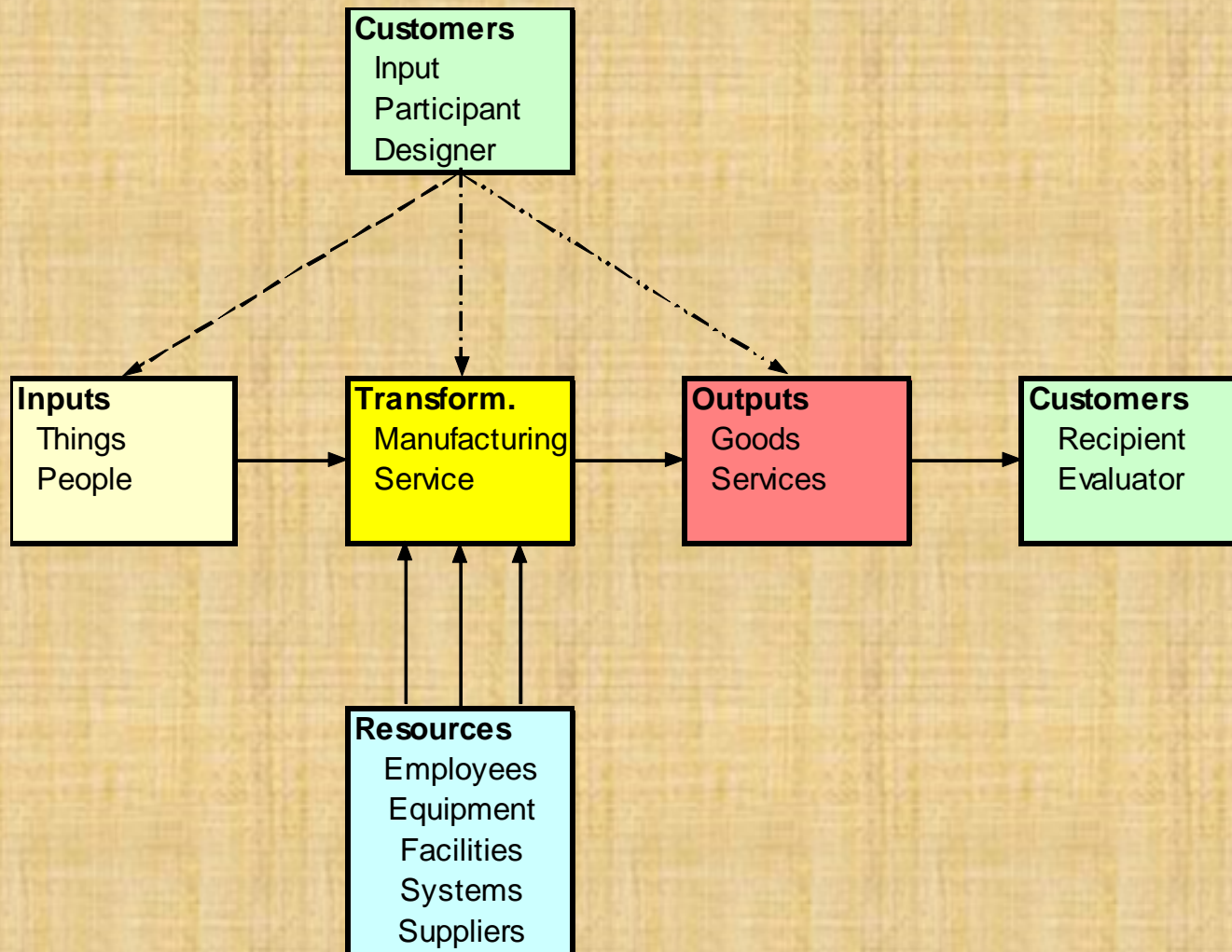
- Physical flow
- Information flow
- Funds flow
- Relational flow

Supply Chain Processes

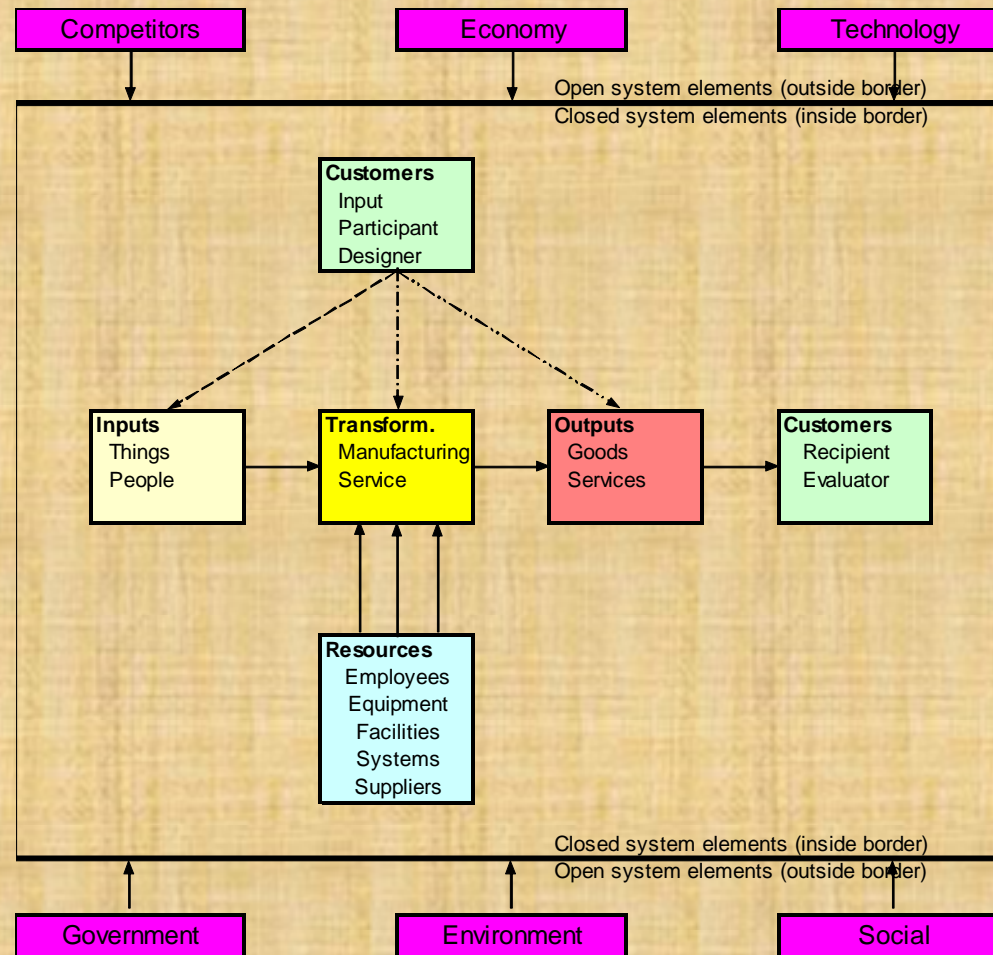
Table 2-1. Examples of supply chain processes in different industries

Manufacturing Sectors			
Business types	Inputs	Transformation Process	Outputs
Electric utility	Coal, oil	Power generation and distribution	Low voltage power for residential house
Building construction	Lands, Steel, Concrete	Architecture design and construction	An office building
Toy Firms	Plastic, chemical and water	Sandbox, pliable plastic, chemical	Toys
Service Sectors			
Business types	Inputs	Transformation Process	Outputs
Restaurant	Hungry customers	Customer order and food preparation of chef	Satisfied customer
Hotel	Arriving customers	Room preparation and recreational services	Satisfied customers
Hospital	Untreated patients	Diagnosis, treatment and prescription	Treated patients
Public accounting firm	Unaudited companies	Professional accounting services	Audited company

Role of Customers



Open System Influences



Impact of External Factors

External Factors	Potential Impact on Disrupting Supply Chain Systems
Offshore Outsourcing	Short-term, flexible contractual relationships may create distrust between supply chain participants
New government legislation	Plant operations in other countries may have to change to meet new government requirements. Such legislation could originate in the home or host country
Rising of emerging economies	Reliance on multi-layer suppliers cause difficulty in controlling quality (e.g. Mattel's lead-contained toys case)
Competitive opportunities	Establishment of foreign subsidiaries in emerging economies creates communication problems.
Public interests	Increase of public awareness of information privacy disallows the information distribution across continents (e.g. Europe's Safe Harbor Act; Greenhouse emission standards)
Advance in information systems	Enterprise systems cause integration issues; RFID technology creates information overload problems
Proliferation of e-business	Open systems involving B2B trading exchanges replace closed system of characterized by long-term contractual relationships
Innovative business models	Mass customization strategy increases coordination costs

Obstacles to SC Integration

Supply Chain Activities	Major Obstacles
Upstream: R&D	Shorter product life span creates problems for late movers, including high inventory costs, small order sizes, higher order frequency and liquidation pressure
Operations: Production Schedule	Independent scheduling between supply chain participants can create excess inventory holding costs and a high frequency of schedule revisions
Logistics: Logistics Friendliness	A global supply chain is faced with uneven logistics-friendliness in different countries
Sales & Marketing: Customer Relationships Management (CRM)	CRM effectiveness requires corresponding changes to organizational policies, procedures, performance measurement and information visibility
Reverse Logistics: After-sales Service	Business process transformation is indispensable for the success of customer relationship management applications

Enablers

- Web technology
- Customer relationship management (CRM)
 - 24/7/365 operation
 - Individualized service
 - Improved information sharing
 - Planning integration
 - Customer satisfaction
 - Enhanced product development

Performance Measurement

- **Direct and measurable benefits** – reduced production costs, increased number of customers served, lowered inventories, higher quality, faster response times, fewer stockouts, and higher on-time deliveries.
- **Indirect benefits** – business process transformation, organizational learning, process consistency, innovation capacity, market share, customer satisfaction, customer retention, and overall competitive position.

Allocation of Benefits and Costs

- Participants need to be willing to share
- Difficult to measure overall benefits and costs
- May need to consider incremental benefits and costs
- Some possible measures – inventory investment, profit/loss, forecast accuracy, lead time and unplanned orders.

Value Creation as Objective

- Complexity is increasing
- Examples
 - Wal-Mart – everyday low price
 - Kia Motors – 10 years, 100,000 miles warranty
 - Dell – assemble to order
 - Toyota – shorter time to make
 - Southwest Airlines – low cost, safety and friendliness

Summary

- ITO – input, transformation, outputs – the DNA of the supply chain
- Supply chain flows – physical goods and services, information and funds
- A supply chain is a system of interrelated activities and entities
- Supply chains operate in open and closed system environments

Hot Topic – Natural Disaster

- **How a natural disaster can cripple a supply chain**
- In this chapter you learned how supply chains are actually a series of input-transformation-output (ITO) entities. An interruption at any ITO point in the supply chain can stop the movement of goods within that chain. For example, an earthquake in Asia can cause factories in other parts of the world to shut down.

Discussion Questions

- Why is the ITO model called the DNA of supply chains?
- Describe the four types of flows inside a supply chain. How do they complement each other?
- Using Table 2.2, describe other types of supply chains.
- Describe the internal and external customers of a market-driven supply chain.
- What types of external influences impact the supply chain?

Discussion Questions (cont.)

- How can a supply chain manager deal with the obstacles and enablers of supply chain integration?
- How is supply chain performance measured?
- Describe strategies that companies use to create value for their customers.
- How does outsourcing increase or decrease the risk of supply chain disruptions?
- Discuss the potential use of chaos theory in supply chain management.