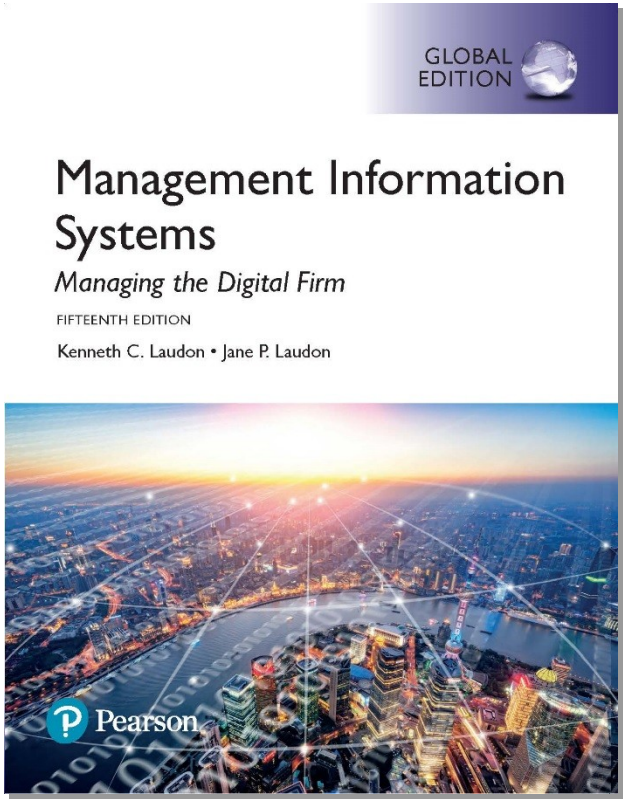
Management Information Systems: Managing the Digital Firm

Fifteenth edition



Chapter 3

Information Systems, Organizations, and Strategy

Pearson

Learning Objectives

- **3-1** Which features of organizations do managers need to know about to build and use information systems successfully?
- **3-2** What is the impact of information systems on organizations?
- **3-3** How do Porter's competitive forces model, the value chain model, synergies, core competencies, and network economics help companies develop competitive strategies using information systems?
- **3-4** What are the challenges posed by strategic information systems, and how should they be addressed?

Video Cases

- Case 1: GE Becomes a Digital Firm: The Emerging Industrial Internet
- Case 2: National Basketball Association: Competing on Global Delivery with Akamai OS Streaming

Tate & Lyle Devise a Global IT Strategy

- Problem
  - Intense competition
  - Inefficient manual system of reconciliation
- Solutions
  - Centralize financial accounting at a single location
  - Bring together all general ledger accounts and transactions into a single system
  - Integration of legacy systems into the new single system
  - Revise and simplify business processes based on industry best practices

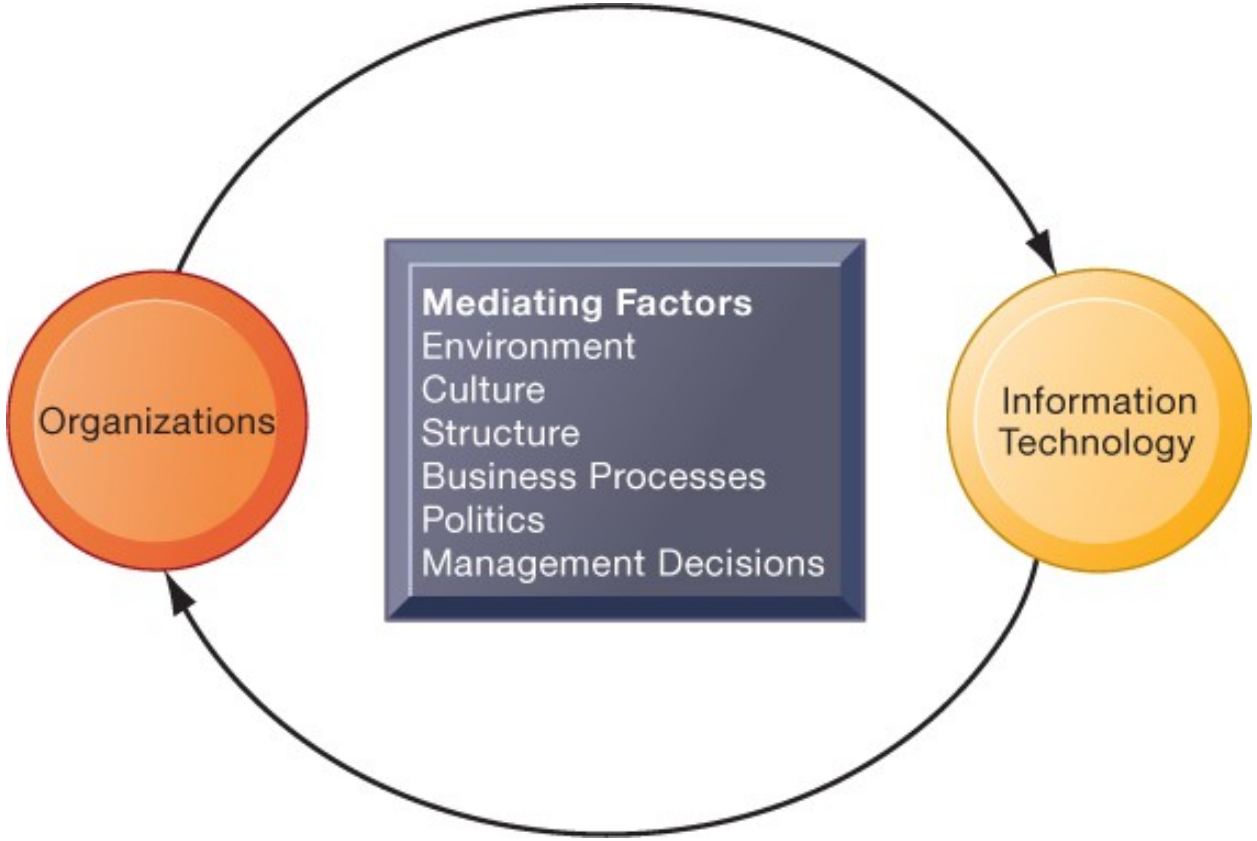
Tate & Lyle Devise a Global IT Strategy (2 of 2)

- Tate & Lyle uses technology to produce financial statements with a high degree of accuracy
- Demonstrates IT's role in helping organizations achieve business strategic objectives and remain competitive

The Relationship Between Organizations and Information Technology

- Information technology and organizations influence each other
  - Relationship influenced by organization's
    - Structure
    - Business processes
    - Politics
    - Culture
    - Environment
    - Management decisions

Figure 3.1: The Two-Way Relationship Between Organizations and Information Technology



What Is an Organization?

- Technical definition
  - Formal social structure that processes resources from environment to produce outputs
  - A formal legal entity with internal rules and procedures, as well as a social structure
- Behavioral definition
  - A collection of rights, privileges, obligations, and responsibilities that is delicately balanced over a period of time through conflict and conflict resolution

Figure 3.2: The Technical Microeconomic Definition of the Organization

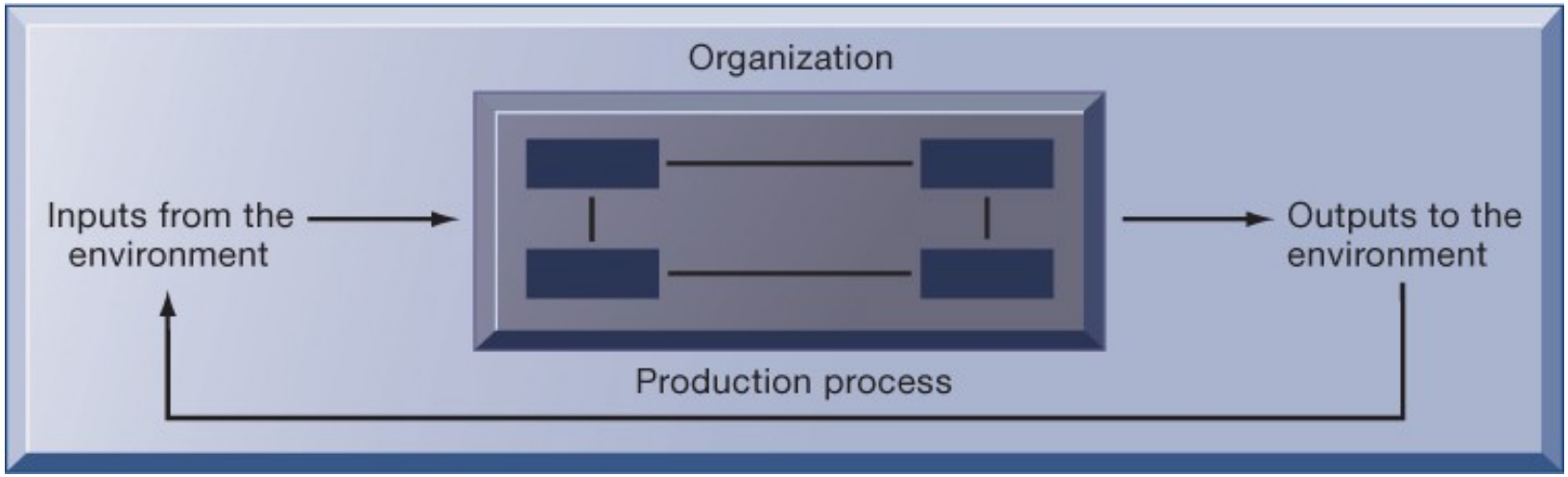
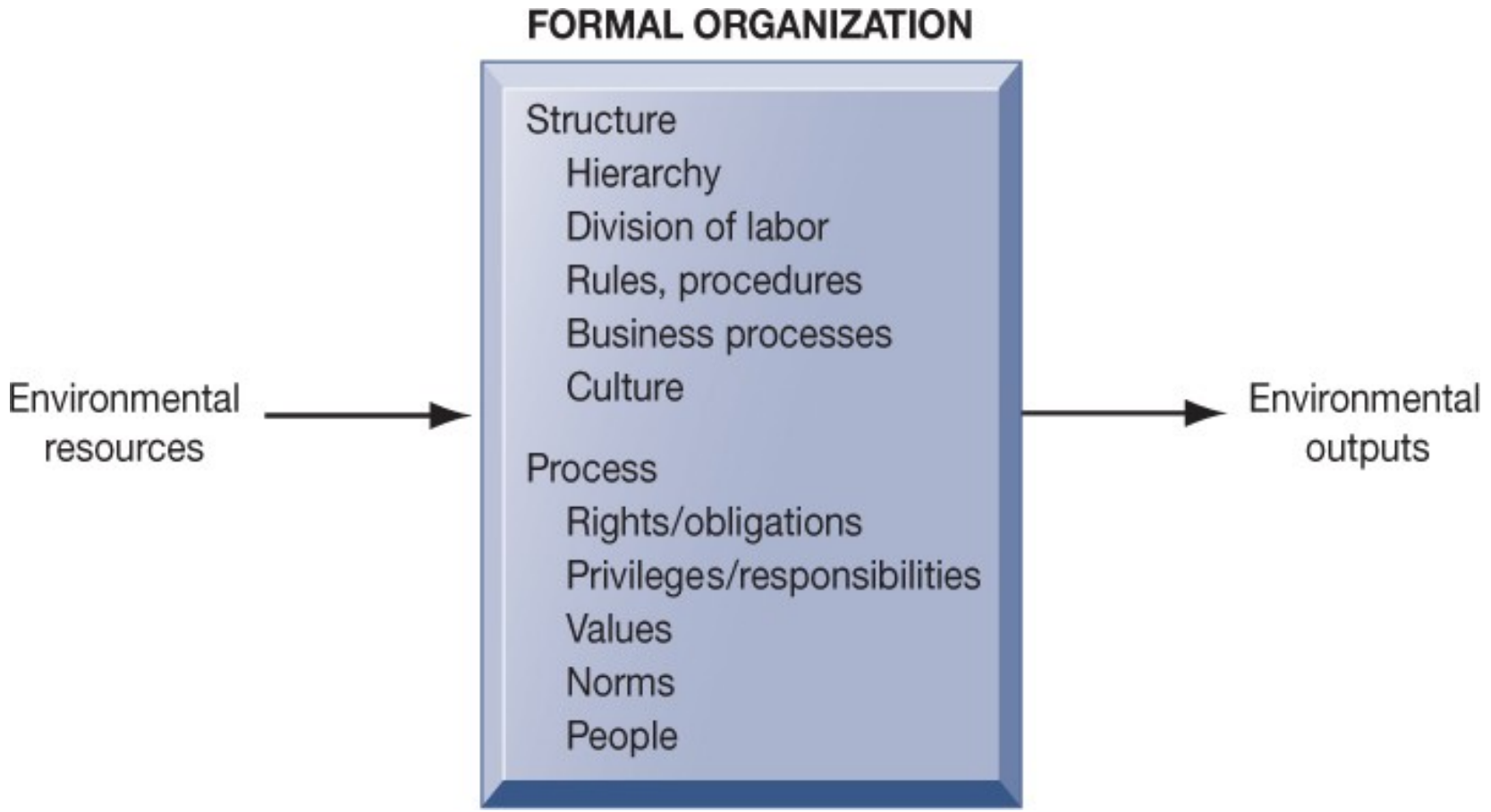


Figure 3.3: The Behavioral View of Organizations



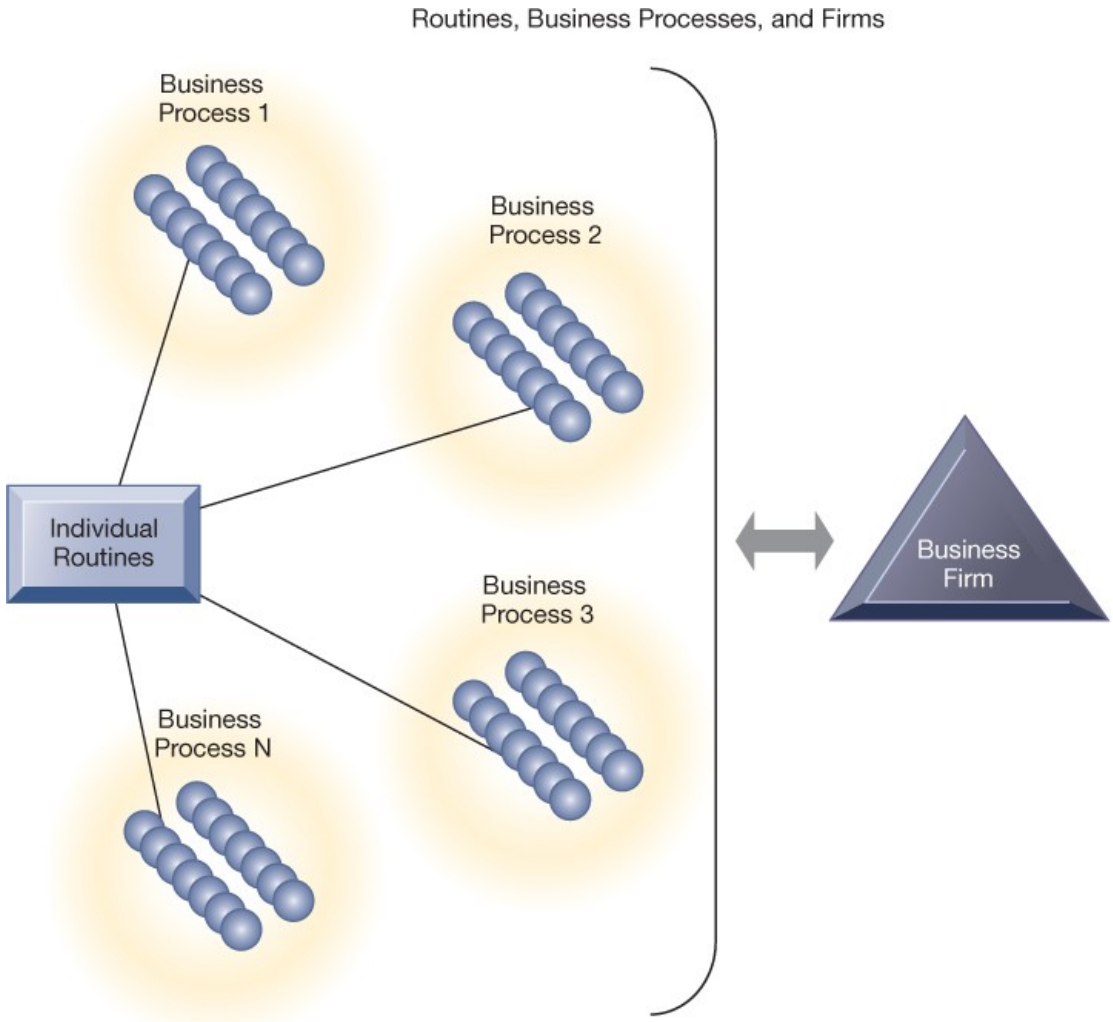
Features of Organizations

- Use of hierarchical structure
- Accountability, authority in system of impartial decision making
- Adherence to principle of efficiency
- Routines and business processes
- Organizational politics, culture, environments, and structures

Routines and Business Processes

- Routines (standard operating procedures)
  - Precise rules, procedures, and practices developed to cope with virtually all expected situations
- Business processes: Collections of routines
- Business firm: Collection of business processes

Figure 3.4: Routines, Business Processes, and Firms



Organizational Politics

- Divergent viewpoints lead to political struggle, competition, and conflict.
- Political resistance greatly hampers organizational change.

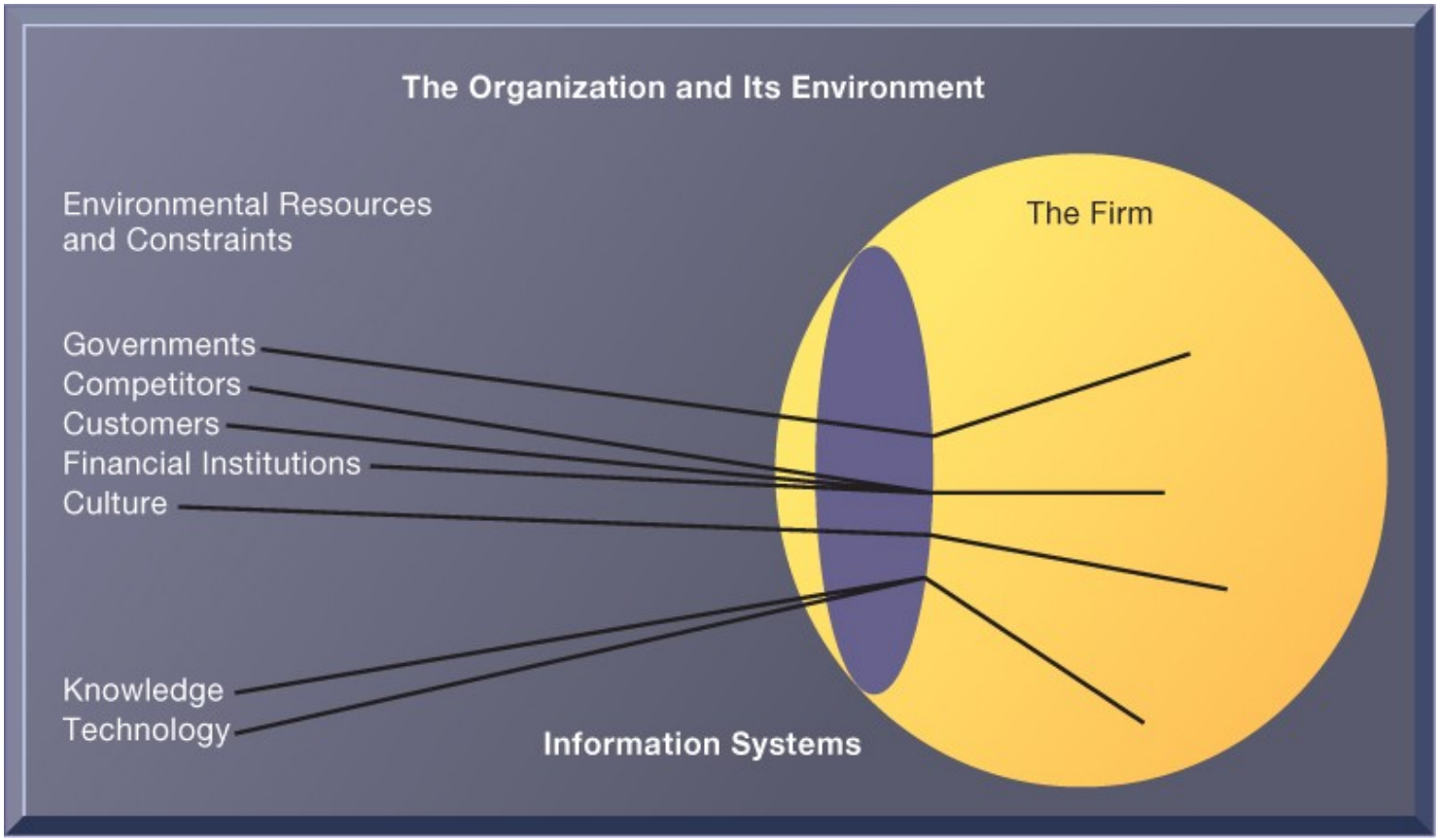
Organizational Culture

- Encompasses set of assumptions that define goal and product
  - What products the organization should produce
  - How and where it should be produced
  - For whom the products should be produced
- May be powerful unifying force as well as restraint on change

Organizational Environments

- Organizations and environments have a reciprocal relationship
- Organizations are open to, and dependent on, the social and physical environment
- Organizations can influence their environments
- Environments generally change faster than organizations
- Information systems can be instrument of environmental scanning, act as a lens

Figure 3.5: Environments and Organizations Have a Reciprocal Relationship



Disruptive Technologies

- Substitute products that perform as well as or better than existing product
- Technology that brings sweeping change to businesses, industries, markets
- Examples: personal computers, word processing software, the Internet, the PageRank algorithm
- First movers and fast followers
  - First movers—inventors of disruptive technologies
  - Fast followers—firms with the size and resources to capitalize on that technology

TABLE 3.1 DISRUPTIVE TECHNOLOGIES: WINNERS AND LOSERS

TECHNOLOGY	DESCRIPTION	WINNERS AND LOSERS
Microprocessor chips (1971)	Thousands and eventually millions of transistors on a silicon chip	Microprocessor firms win (Intel, Texas Instruments), while transistor firms (GE) decline.
Personal computers (1975)	Small, inexpensive, but fully functional desktop computers	PC manufacturers (HP, Apple, IBM) and chip manufacturers prosper (Intel), while mainframe (IBM) and minicomputer (DEC) firms lose.
Digital photography (1975)	Using CCD (charge-coupled device) image sensor chips to record images	CCD manufacturers and traditional camera companies win; manufacturers of film products lose.
World Wide Web (1989)	A global database of digital files and "pages" instantly available	Owners of online content and news benefit, while traditional publishers (newspapers, magazines, and broadcast television) lose.
Internet music, video, TV services (1998)	Repositories of downloadable music, video, TV broadcasts on the web	Owners of Internet platforms, telecommunications providers owning Internet backbone (ATT, Verizon), and local Internet service providers win, while content owners and physical retailers (Tower Records, Blockbuster) lose.
PageRank algorithm	A method for ranking web pages in terms of their popularity to supplement web search by key terms	Google is the winner (it owns the patent), while traditional key word search engines (Alta Vista) lose.
Software as web service	Using the Internet to provide remote access to online software	Online software services companies (Salesforce.com) win, while traditional "boxed" software companies (Microsoft, SAP, Oracle) lose.

Organizational Structure

- Five basic kinds of organizational structure (Mintzberg)
  - Entrepreneurial
  - Machine bureaucracy
  - Divisionalized bureaucracy
  - Professional bureaucracy
  - Adhocracy
- Information system often reflects organizational structure

TABLE 3.2 ORGANIZATIONAL STRUCTURES

ORGANIZATIONAL TYPE	DESCRIPTION	EXAMPLES
Entrepreneurial structure	Young, small firm in a fast-changing environment. It has a simple structure and is managed by an entrepreneur serving as its single chief executive officer.	Small start-up business
Machine bureaucracy	Large bureaucracy existing in a slowly changing environment, producing standard products. It is dominated by a centralized management team and centralized decision making.	Midsize manufacturing firm
Divisionalized bureaucracy	Combination of multiple machine bureaucracies, each producing a different product or service, all topped by one central headquarters.	*Fortune* 500 firms, such as General Motors
Professional bureaucracy	Knowledge-based organization where goods and services depend on the expertise and knowledge of professionals. Dominated by department heads with weak centralized authority.	Law firms, school systems, hospitals
Adhocracy	Task force organization that must respond to rapidly changing environments. Consists of large groups of specialists organized into short-lived multidisciplinary teams and has weak central management.	Consulting firms, such as the Rand Corporation

Other Organizational Features

- Goals
  - Coercive, utilitarian, normative, and so on
- Constituencies
- Leadership styles
- Types of tasks

Economic Impacts

- IT changes relative costs of capital and the costs of information
- Information systems technology is a factor of production, like capital and labor
- IT affects the cost and quality of information and changes economics of information
  - Information technology helps firms contract in size because it can reduce transaction costs (the cost of participating in markets)
    - Outsourcing

Transaction Cost Theory

- Firms seek to economize on transaction costs (the costs of participating in markets)
  - Vertical integration, hiring more employees, buying suppliers and distributors
- IT lowers market transaction costs, making it worthwhile for firms to transact with other firms rather than grow the number of employees

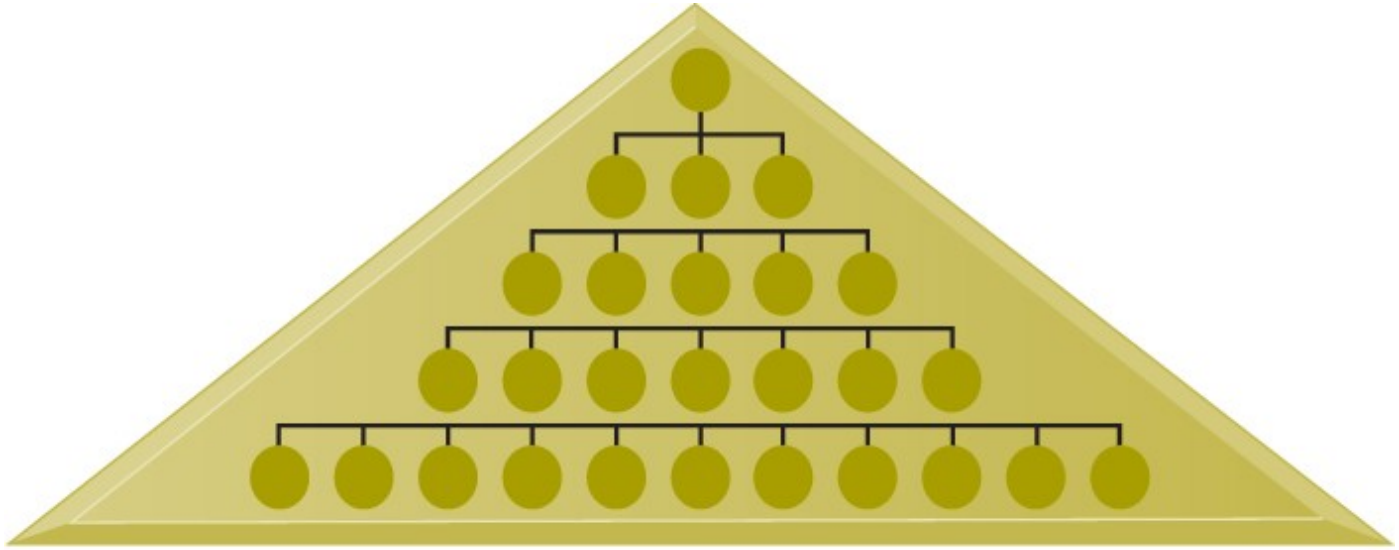
Agency Theory

- Firm is nexus of contracts among self-interested parties requiring supervision
- Firms experience agency costs (the cost of managing and supervising) which rise as firm grows
- IT can reduce agency costs, making it possible for firms to grow without adding to the costs of supervising, and without adding employees

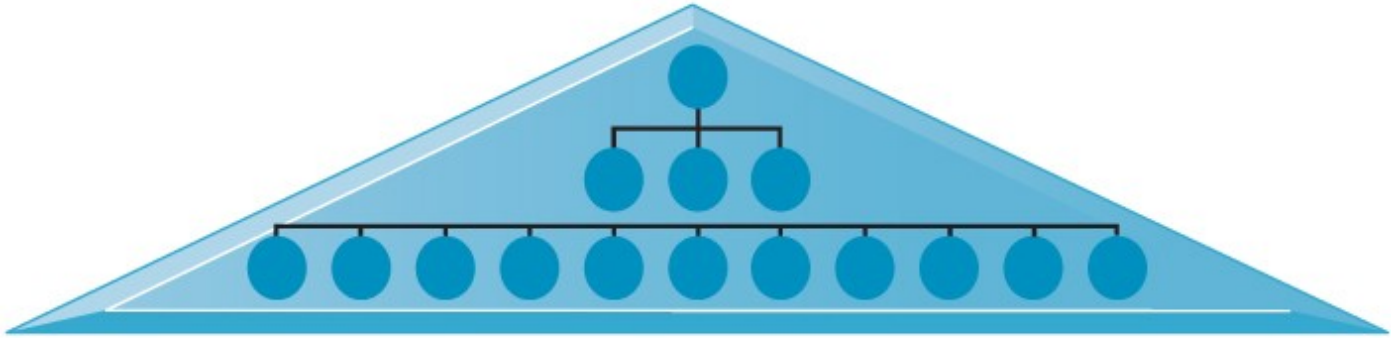
Organizational and Behavioral Impacts

- IT flattens organizations
  - Decision making is pushed to lower levels
  - Fewer managers are needed (IT enables faster decision making and increases span of control)
- Postindustrial organizations
  - Organizations flatten because in postindustrial societies, authority increasingly relies on knowledge and competence rather than formal positions

Figure 3.6: Flattening Organizations



A traditional hierarchical organization with many levels of management



An organization that has been "flattened" by removing layers of management

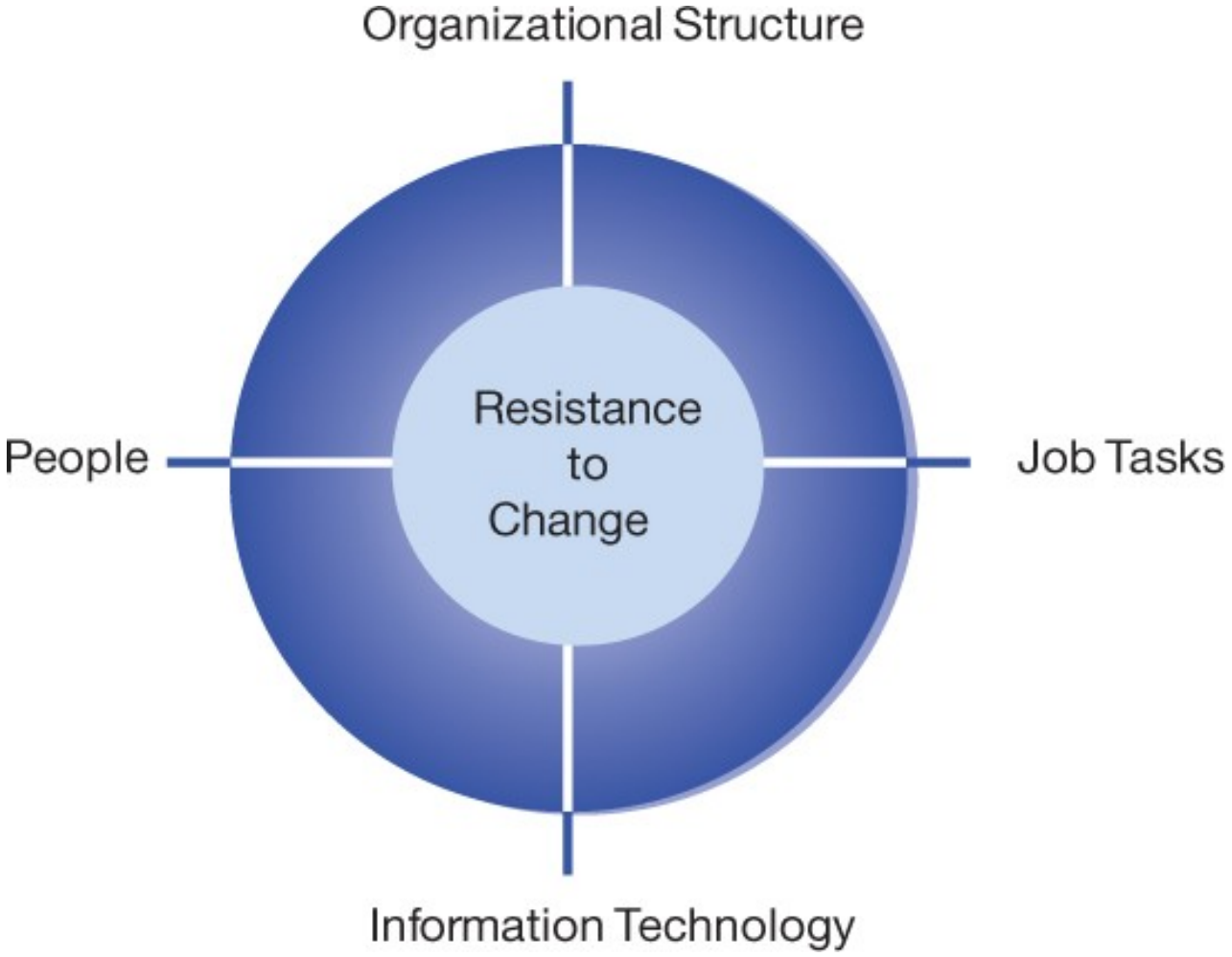
Interactive Session: Management: Can Technology Replace Managers?

- Class discussion
  - How do flat organizations differ from traditional bureaucratic hierarchies?
  - How has information technology made it possible to eliminate middle manager positions?
  - What management, organization, and technology issues would you consider if you wanted to move from a traditional bureaucracy to a flatter organization?
  - Can technology replace managers? Explain your answer.

Understanding Organizational Resistance to Change

- Information systems become bound up in organizational politics because they influence access to a key resource—information
- Information systems potentially change an organization's structure, culture, politics, and work
- Four factors
  - Nature of the innovation
  - Structure of organization
  - Culture of organization
  - Tasks affected by innovation

Figure 3.7: Organizational Resistance to Information System Innovations



The Internet and Organizations

- The Internet increases the accessibility, storage, and distribution of information and knowledge for organizations
- The Internet can greatly lower transaction and agency costs
  - Example: Large firm delivers internal manuals to employees via a corporate website, saving millions of dollars in distribution costs

Implications for the Design and Understanding of Information Systems

- Organizational factors in planning a new system:
  - Environment
  - Structure
    - Hierarchy, specialization, routines, business processes
  - Culture and politics
  - Type of organization and style of leadership
  - Main interest groups affected by system; attitudes of end users
  - Tasks, decisions, and business processes the system will assist

Porter's Competitive Forces Model (1 of 3)

- Why do some firms become leaders in their industry?
- Michael Porter's competitive forces model
  - Provides general view of firm, its competitors, and environment
- Five competitive forces shape fate of firm:
  - Traditional competitors
  - New market entrants
  - Substitute products and services
  - Customers
  - Suppliers

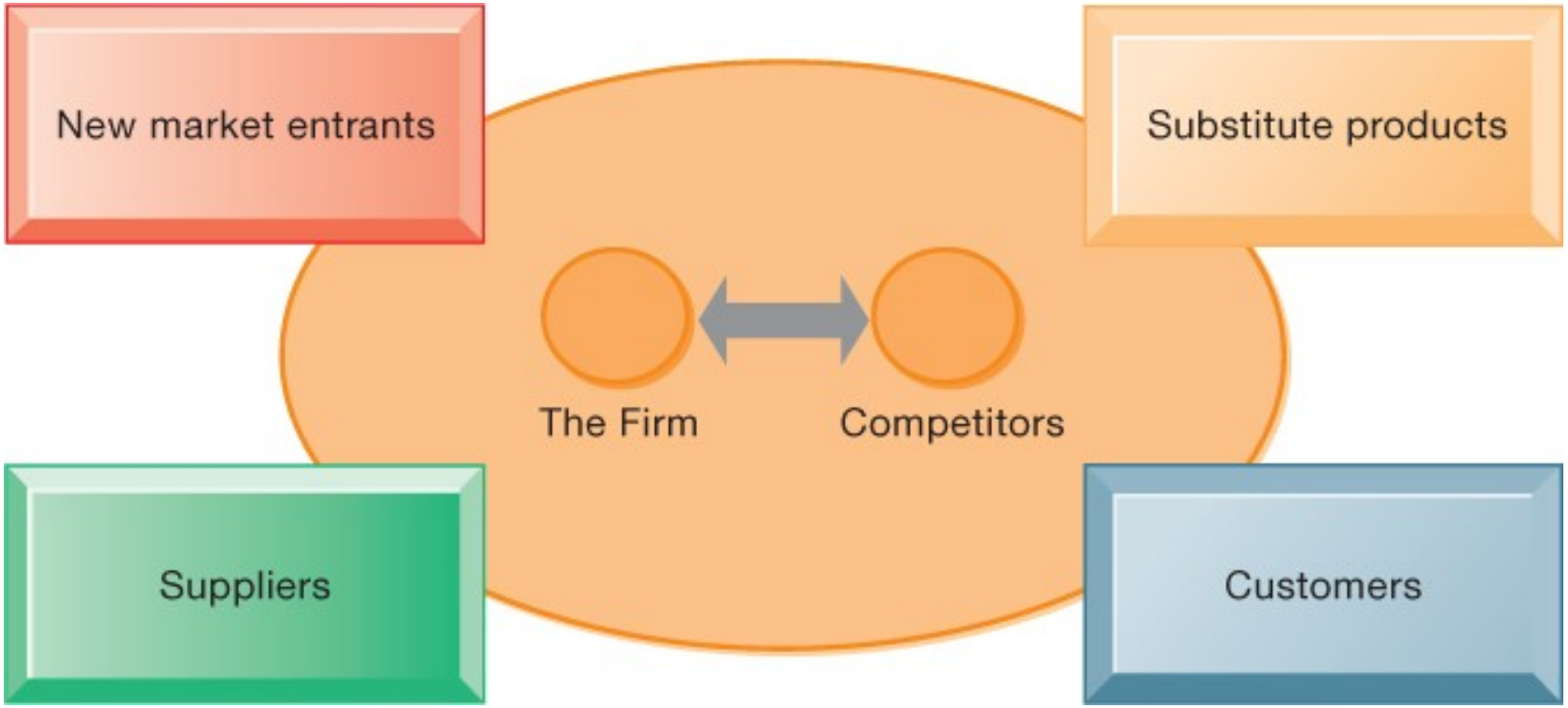
Porter's Competitive Forces Model (2 of 3)

- Traditional competitors
  - All firms share market space with competitors who are continuously devising new products, services, efficiencies, and switching costs
- New market entrants
  - Some industries have high barriers to entry, for example, computer chip business
  - New companies have new equipment, younger workers, but little brand recognition

Porter's Competitive Forces Model (3 of 3)

- Substitute products and services
  - Substitutes customers might use if your prices become too high, for example, iTunes substitutes for CDs
- Customers
  - Can customers easily switch to competitor's products? Can they force businesses to compete on price alone in transparent marketplace?
- Suppliers
  - Market power of suppliers when firm cannot raise prices as fast as suppliers

Figure 3.8: Porter's Competitive Forces Model



Information System Strategies for Dealing with Competitive Forces (1 of 3)

- Four generic strategies for dealing with competitive forces, enabled by using IT:
  - Low-cost leadership
  - Product differentiation
  - Focus on market niche
  - Strengthen customer and supplier intimacy

Information System Strategies for Dealing with Competitive Forces (2 of 3)

- Low-cost leadership
  - Produce products and services at a lower price than competitors
  - Example: Walmart's efficient customer response system
- Product differentiation
  - Enable new products or services, greatly change customer convenience and experience
  - Example: Google, Nike, Apple
  - Mass customization

Information System Strategies for Dealing with Competitive Forces (3 of 3)

- Focus on market niche
  - Use information systems to enable a focused strategy on a single market niche; specialize
  - Example: Hilton Hotels' OnQ system
- Strengthen customer and supplier intimacy
  - Use information systems to develop strong ties and loyalty with customers and suppliers
  - Increase switching costs
  - Examples: Chrysler, Amazon, Starbucks

TABLE 3.3 IT-ENABLED NEW PRODUCTS AND SERVICES PROVIDING COMPETITIVE ADVANTAGE

Amazon: One-click shopping	Amazon holds a patent on one-click shopping that it licenses to other online retailers.
Online music: Apple iPod and iTunes	The iPod is an integrated handheld player backed up with an online library of more than 43 million songs.
Golf club customization: Ping	Customers can select from more than 1 million different golf club options; a build-to-order system ships their customized clubs within 48 hours.
Online person-to-person payment: PayPal	PayPal enables the transfer of money between individual bank accounts and between bank accounts and credit card accounts.

TABLE 3.4 FOUR BASIC COMPETITIVE STRATEGIES

STRATEGY	DESCRIPTION	EXAMPLE
Low-cost leadership	Use information systems to produce products and services at a lower price than competitors while enhancing quality and level of service	Walmart
Product differentiation	Use information systems to differentiate products, and enable new services and products	Uber, Nike, Apple
Focus on market niche	Use information systems to enable a focused strategy on a single market niche; specialize	Hilton Hotels, Harrah's
Customer and supplier intimacy	Use information systems to develop strong ties and loyalty with customers and suppliers	Toyota Corporation, Amazon

The Internet's Impact on Competitive Advantage

- Transformation or threat to some industries
  - Examples: travel agency, printed encyclopedia, media
- Competitive forces still at work, but rivalry more intense
- Universal standards allow new rivals, entrants to market
- New opportunities for building brands and loyal customer bases

TABLE 3.5 IMPACT OF THE INTERNET ON COMPETITIVE FORCES AND INDUSTRY STRUCTURE

COMPETITIVE FORCE	IMPACT OF THE INTERNET
Substitute products or services	Enables new substitutes to emerge with new approaches to meeting needs and performing functions
Customers' bargaining power	Availability of global price and product information shifts bargaining power to customers
Suppliers' bargaining power	Procurement over the Internet tends to raise bargaining power over suppliers; suppliers can also benefit from reduced barriers to entry and from the elimination of distributors and other intermediaries standing between them and their users
Threat of new entrants	Internet reduces barriers to entry, such as the need for a sales force, access to channels, and physical assets; it provides a technology for driving business processes that makes other things easier to do
Positioning and rivalry among existing competitors	Widens the geographic market, increasing the number of competitors and reducing differences among competitors; makes it more difficult to sustain operational advantages; puts pressure to compete on price

Smart Products and the Internet of Things

- Internet of Things (IoT)
  - Growing use of Internet-connected sensors in products
- Smart products
  - Fitness equipment, health trackers
- Expand product differentiation opportunities
  - Increasing rivalry between competitors
- Raise switching costs
- Inhibit new entrants
- May decrease power of suppliers

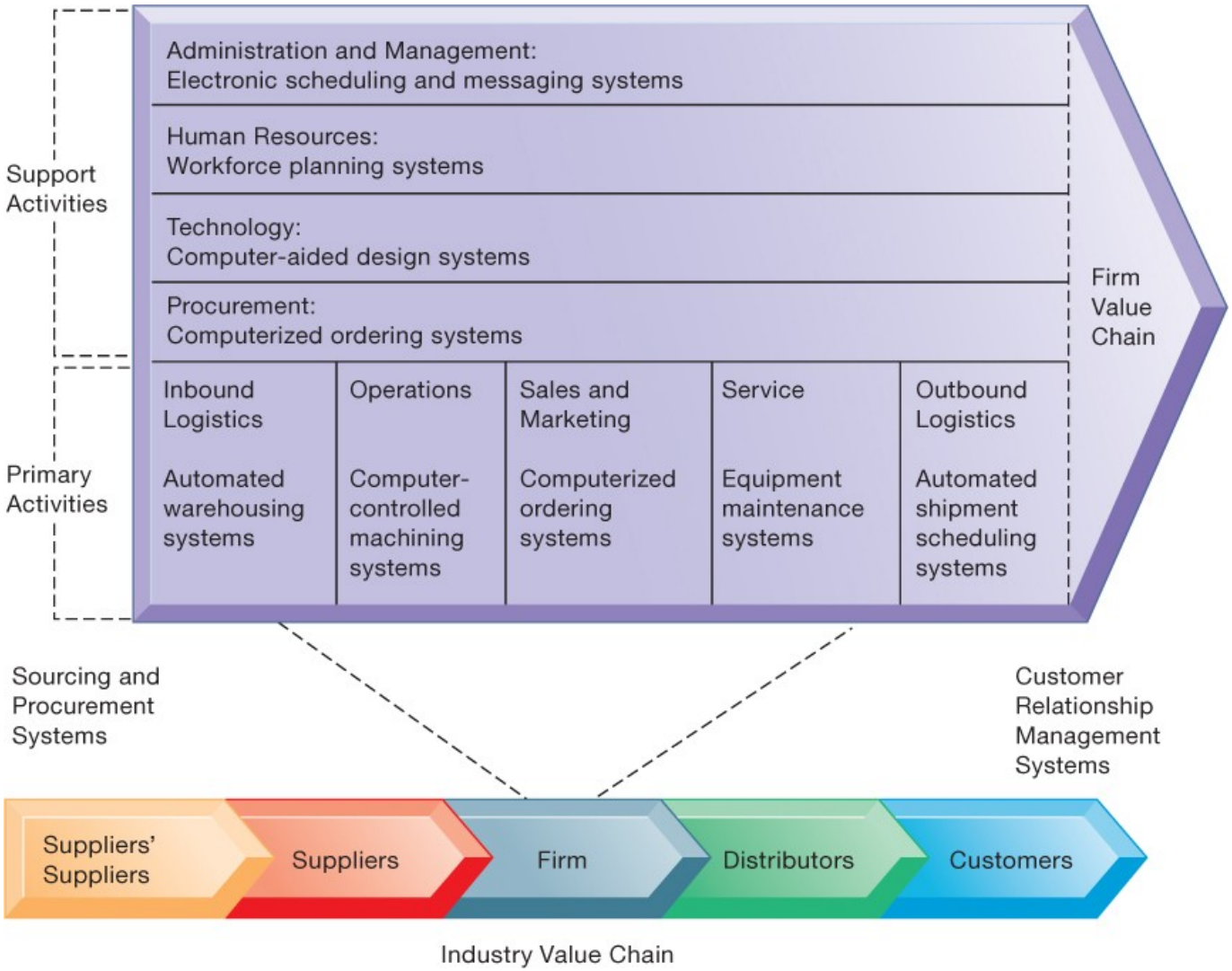
Interactive Session: Technology: Smart Products, Smart Companies

- Class discussion
  - What competitive strategies are the companies discussed in this case pursuing?
  - How are information technology and smart products related to these strategies? Describe the role of information technology in these products.
  - Are there any ethical issues raised by these smart products such as their impact on consumer privacy? Explain your answer.

The Business Value Chain Model

- Firm as series of activities that add value to products or services
- Highlights activities where competitive strategies can best be applied
  - Primary activities vs. support activities
- At each stage, determine how information systems can improve operational efficiency and improve customer and supplier intimacy
- Utilize benchmarking, industry best practices

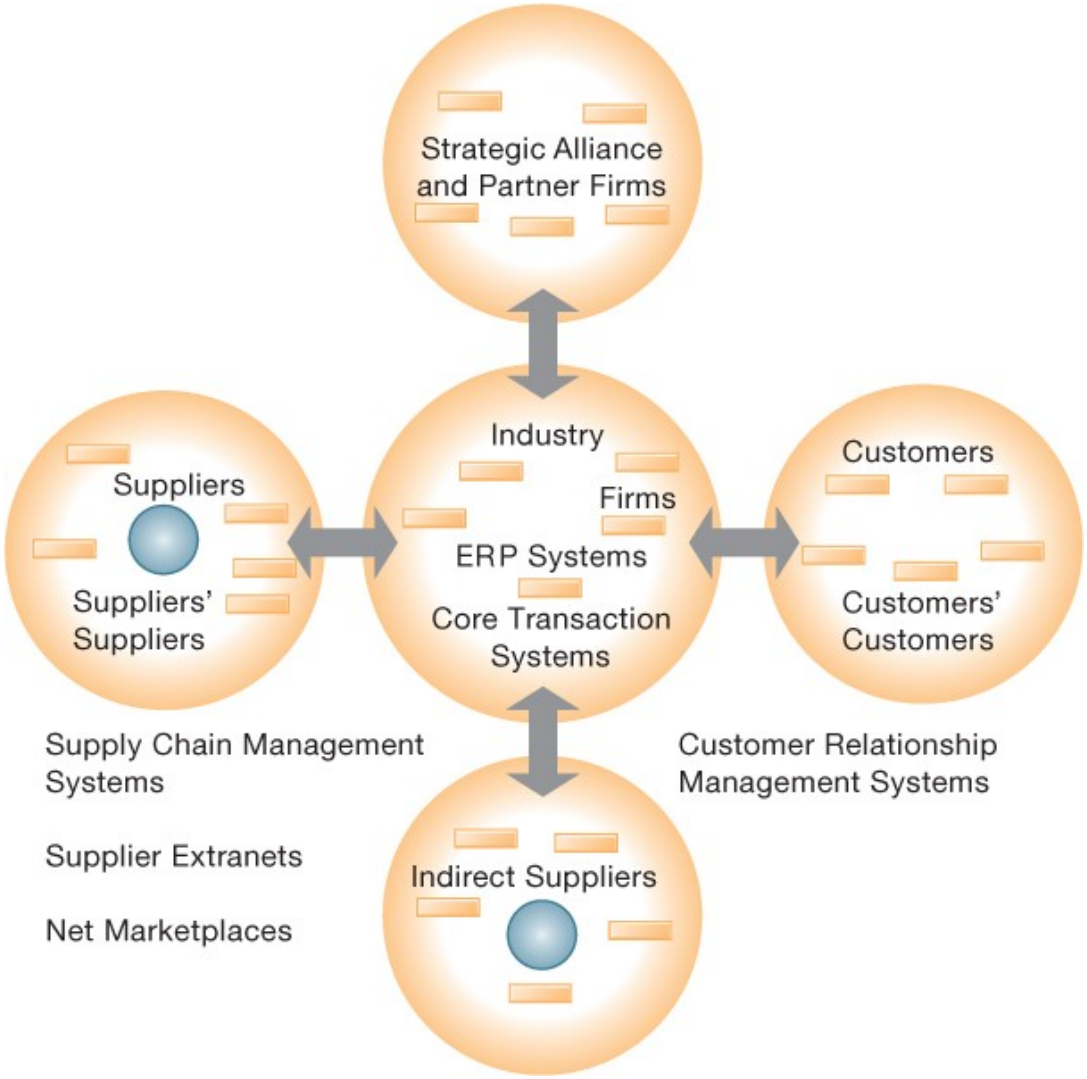
Figure 3.9: The Value Chain Model



Extending the Value Chain: The Value Web

- Firm's value chain is linked to value chains of suppliers, distributors, customers
- Industry value chain
- Value web
  - Collection of independent firms using highly synchronized IT to coordinate value chains to produce product or service collectively
  - More customer driven, less linear operation than traditional value chain

Figure 3.10: The Value Web



Synergies

- When output of some units are used as inputs to others, or organizations pool markets and expertise
- Example: merger of Bank of NY and JPMorgan Chase
- Purchase of YouTube by Google

Core Competencies

- Activity for which firm is world-class leader
- Relies on knowledge, experience, and sharing this across business units
- Example: Procter & Gamble's intranet and directory of subject matter experts

Network-Based Strategies (1 of 3)

- Take advantage of firm's abilities to network with one another
- Include use of:
  - Network economics
  - Virtual company model
  - Business ecosystems

Network Economics

- Marginal cost of adding new participant almost zero, with much greater marginal gain
- Value of community grows with size
- Value of software grows as installed customer base grows
- Compare to traditional economics and law of diminishing returns

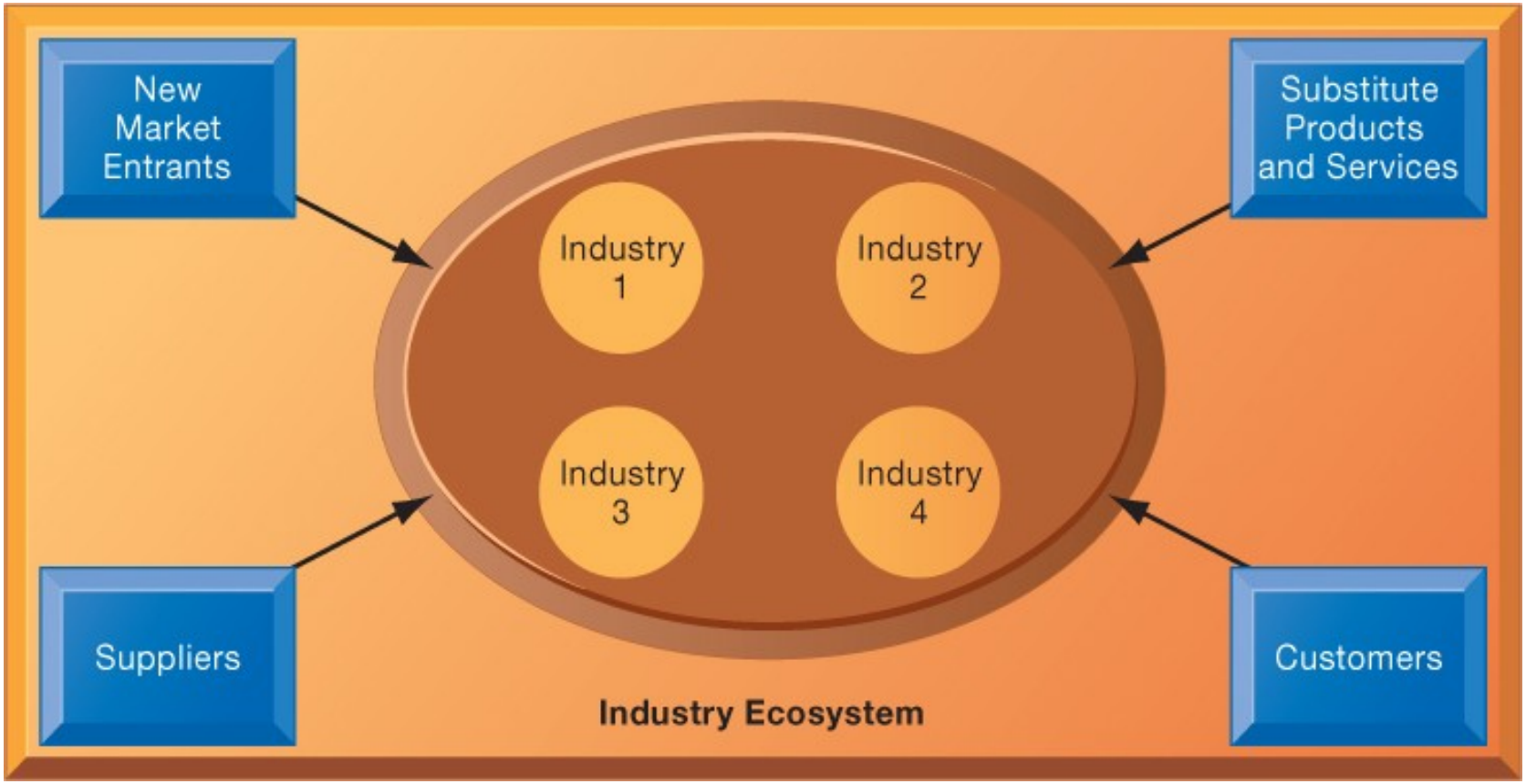
Virtual Company Model

- Virtual company
  - Uses networks to ally with other companies
  - Creates and distributes products without being limited by traditional organizational boundaries or physical locations
- Example: Li & Fung
  - Manages production, shipment of garments for major fashion companies
  - Outsources all work to thousands of suppliers

Business Ecosystems and Platforms

- Industry sets of firms providing related services and products
- Platforms
  - Microsoft, Facebook
- Keystone firms
- Niche firms
- Individual firms can consider how IT will help them become profitable niche players in larger ecosystems

Figure 3.11: An Ecosystem Strategic Model



Challenges Posed by Strategic Information Systems

- Sustaining competitive advantage
  - Competitors can retaliate and copy strategic systems
  - Systems may become tools for survival
- Aligning IT with business objectives
  - Performing strategic systems analysis
    - Structure of industry
    - Firm value chains
- Managing strategic transitions
  - Adopting strategic systems requires changes in business goals, relationships with customers and suppliers, and business processes