Chapter 3

Information Systems, Organizations, and Strategy

Learning Objectives

- Which features of organizations do managers need to know about to build and use information systems successfully?
- What is the impact of information systems on organizations?
- 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?
- What are the challenges posed by strategic information systems and how should they be addressed?

Features of Organizations

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

THE TWO-WAY RELATIONSHIP BETWEEN ORGANIZATIONS AND INFORMATION TECHNOLOGY

This complex two-way relationship is mediated by many factors, not the least of which are the decisions made—or not made—by managers. Other factors mediating the relationship include the organizational culture, structure, politics, business processes, and environment.

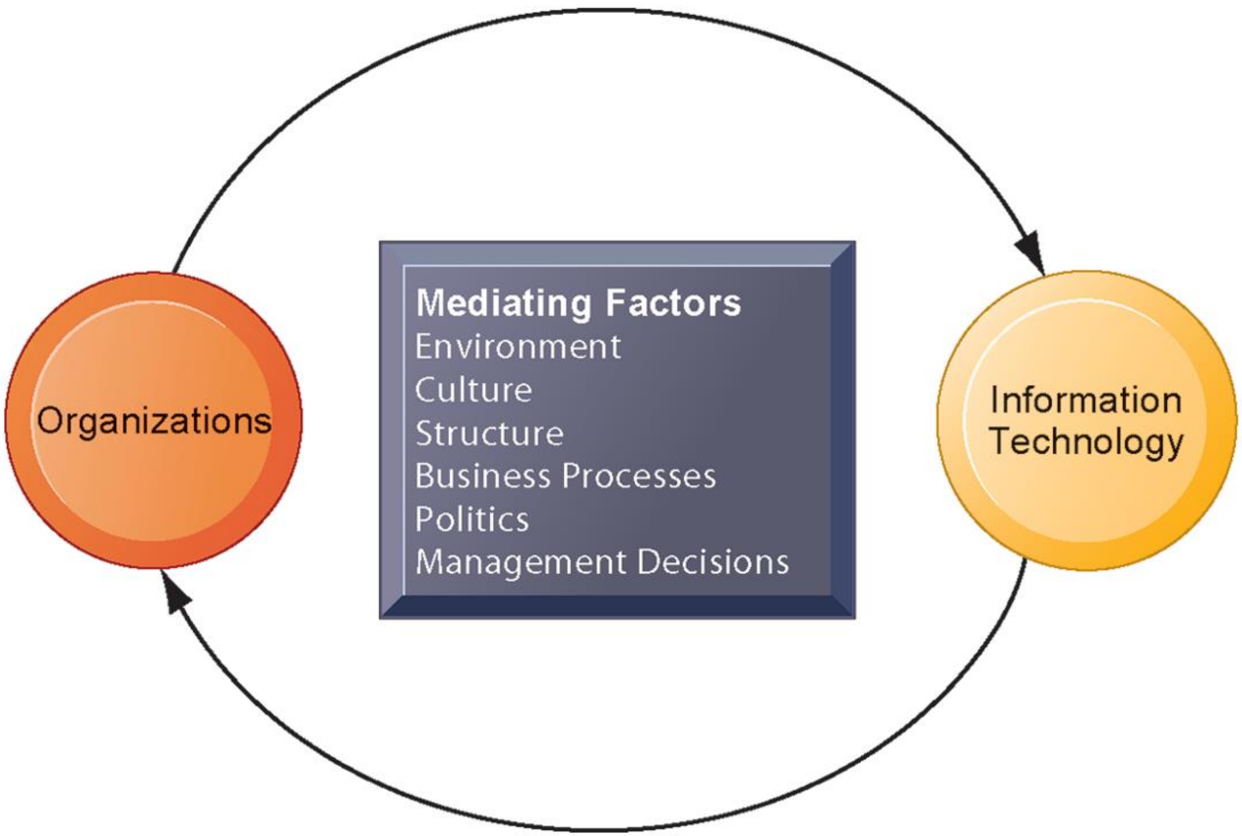


FIGURE 3-1

Features of Organizations

- **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

THE TECHNICAL MICROECONOMIC DEFINITION OF THE ORGANIZATION

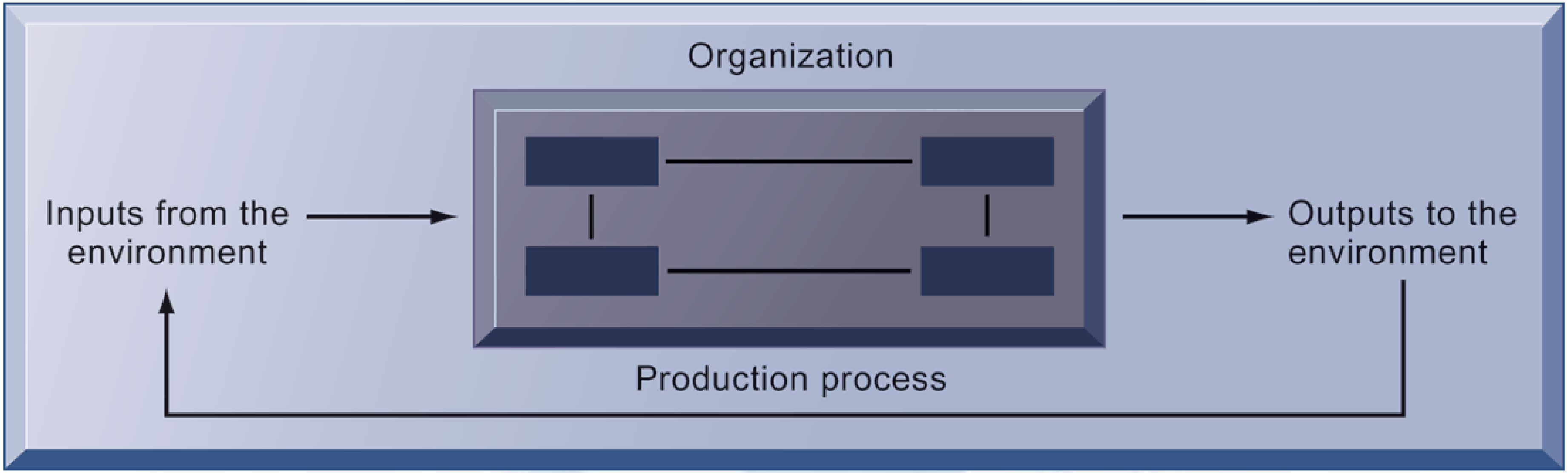
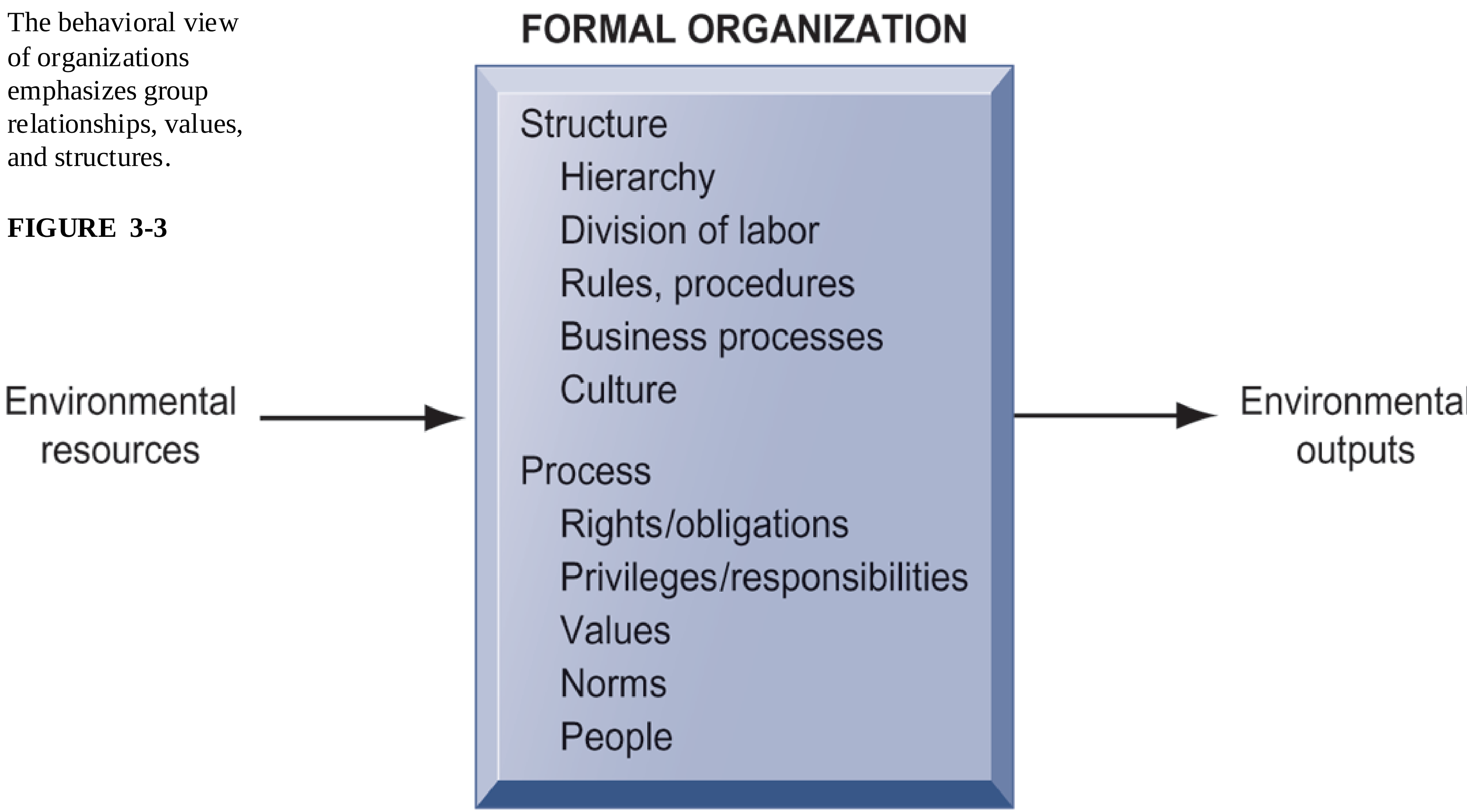


FIGURE 3-2 In the microeconomic definition of organizations, capital and labor (the primary production factors provided by the environment) are transformed by the firm through the production process into products and services (outputs to the environment). The products and services are consumed by the environment, which supplies additional capital and labor as inputs in the feedback loop.

THE BEHAVIORAL VIEW OF ORGANIZATIONS

The behavioral view of organizations emphasizes group relationships, values, and structures.

FIGURE 3-3



Features of Organizations

- **Features of organizations**
  - Use of hierarchical structure
  - Accountability, authority in system of impartial decision making
  - Adherence to principle of efficiency
    - – Maximum output using limited input
  - Routines and business processes
  - Organizational politics, culture, environments, and structures

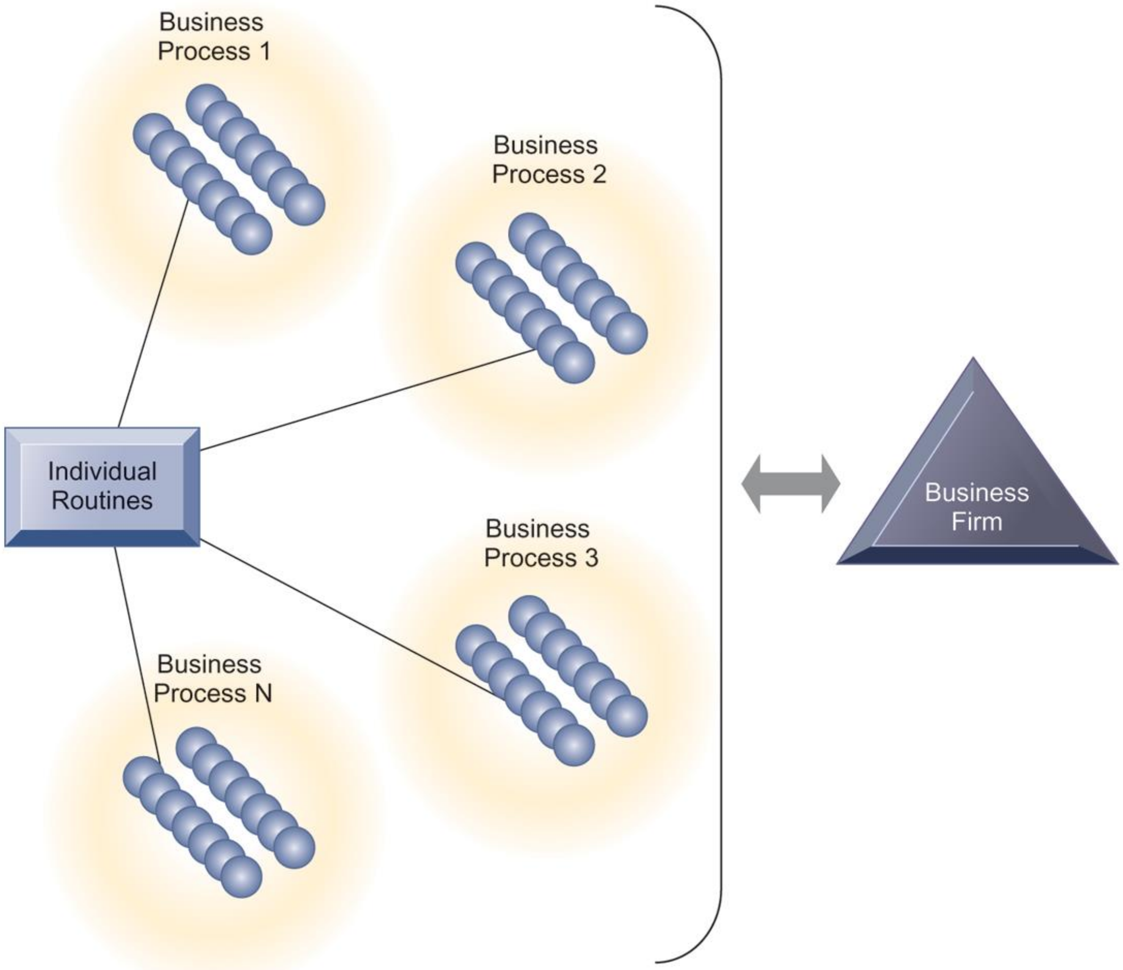
Features of Organizations

- **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**

ROUTINES, BUSINESS PROCESSES, AND FIRMS

All organizations are composed of individual routines and behaviors, a collection of which make up a business process. A collection of business processes make up the business firm. New information system applications require that individual routines and business processes change to achieve high levels of organizational performance.

FIGURE 3-4



Features of Organizations

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

Features of Organizations

- **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**

Features of Organizations

- **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.**

ENVIRONMENTS AND ORGANIZATIONS HAVE A RECIPROCAL RELATIONSHIP

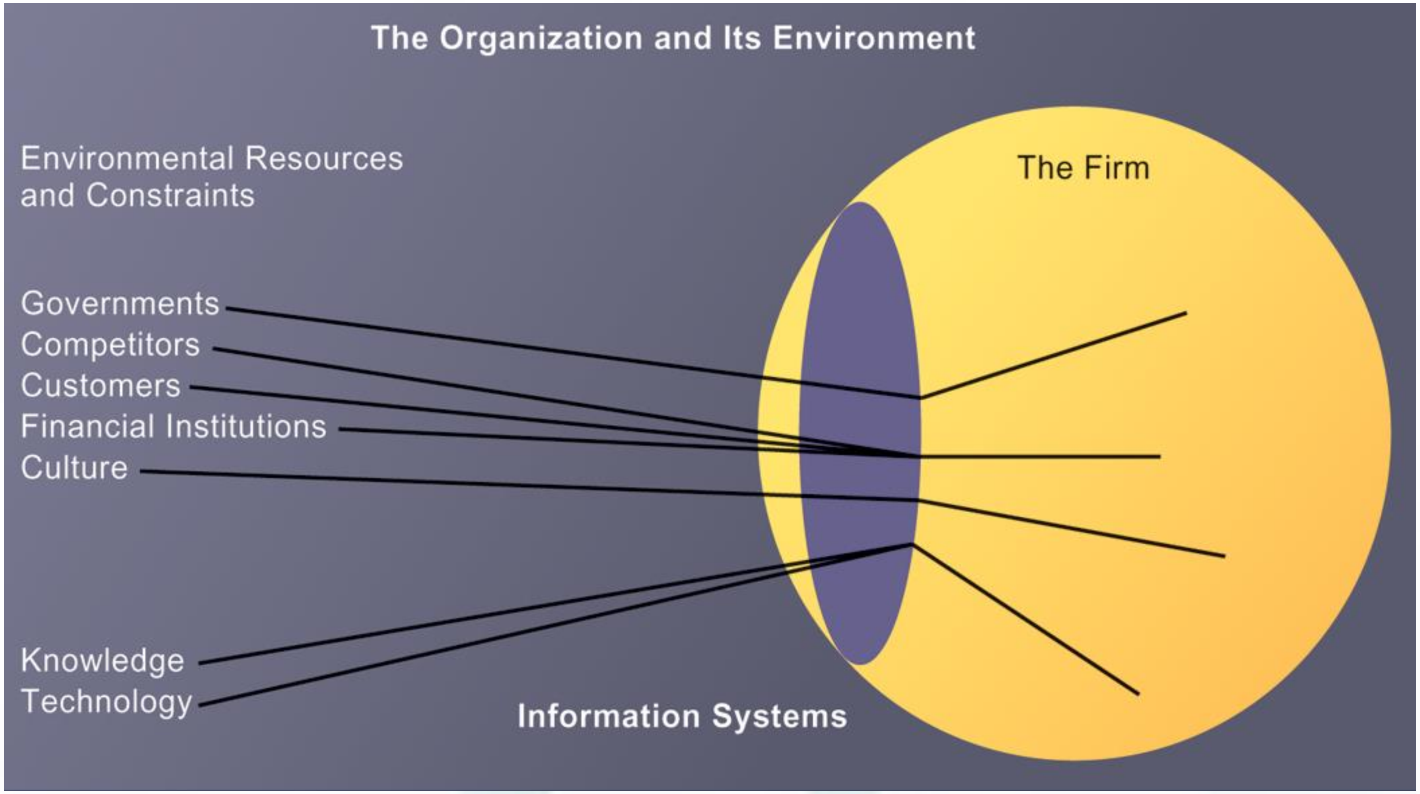


FIGURE 3-5 Environments shape what organizations can do, but organizations can influence their environments and decide to change environments altogether. Information technology plays a critical role in helping organizations perceive environmental change and in helping organizations act on their environment.

Features of Organizations

- **Disruptive technologies**
  - **Technology that brings about 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, 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), local Internet service providers win, while content owners and physical retailers lose (Tower Records, Blockbuster).
PageRank algorithm	A method for ranking Web pages in terms of their popularity to supplement Web search by key terms	Google is the winner (they own 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

- Each organization has a structure
- The kinds of information system reflects the type of organization structure
  - Small firms,
  - Huge multidivisional firms
  - Profession bureaucracy: knowledge-based organization

Features of Organizations

- **Five basic kinds of organizational structure**

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.
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.
Divisionalized bureaucracy	Combination of multiple machine bureaucracies, each producing a different product or service, all topped by one central headquarters.
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.
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.

Features of Organizations

- **Other organizational features**
  - **Goals**
    - Coercive (force people do), utilitarian (design to be useful), normative (make people obey rules)
  - **Constituencies**
  - **Leadership styles**
  - **Tasks**
  - **Surrounding environments**

The Impact of Information Systems on Organizations

- **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

The Impact of Information Systems on Organizations

- **Transaction cost theory**
  - **Transaction costs:** locating, communicating, monitoring contract…
  - **Firms seek to economize on transaction costs** Vertical integration: hiring more employees, buying suppliers and distributors
  - **IT lowers market transaction costs for firm, making it worthwhile for firms to transact with other firms rather than grow the number of employees.**

The Impact of Information Systems on Organizations

- **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.**

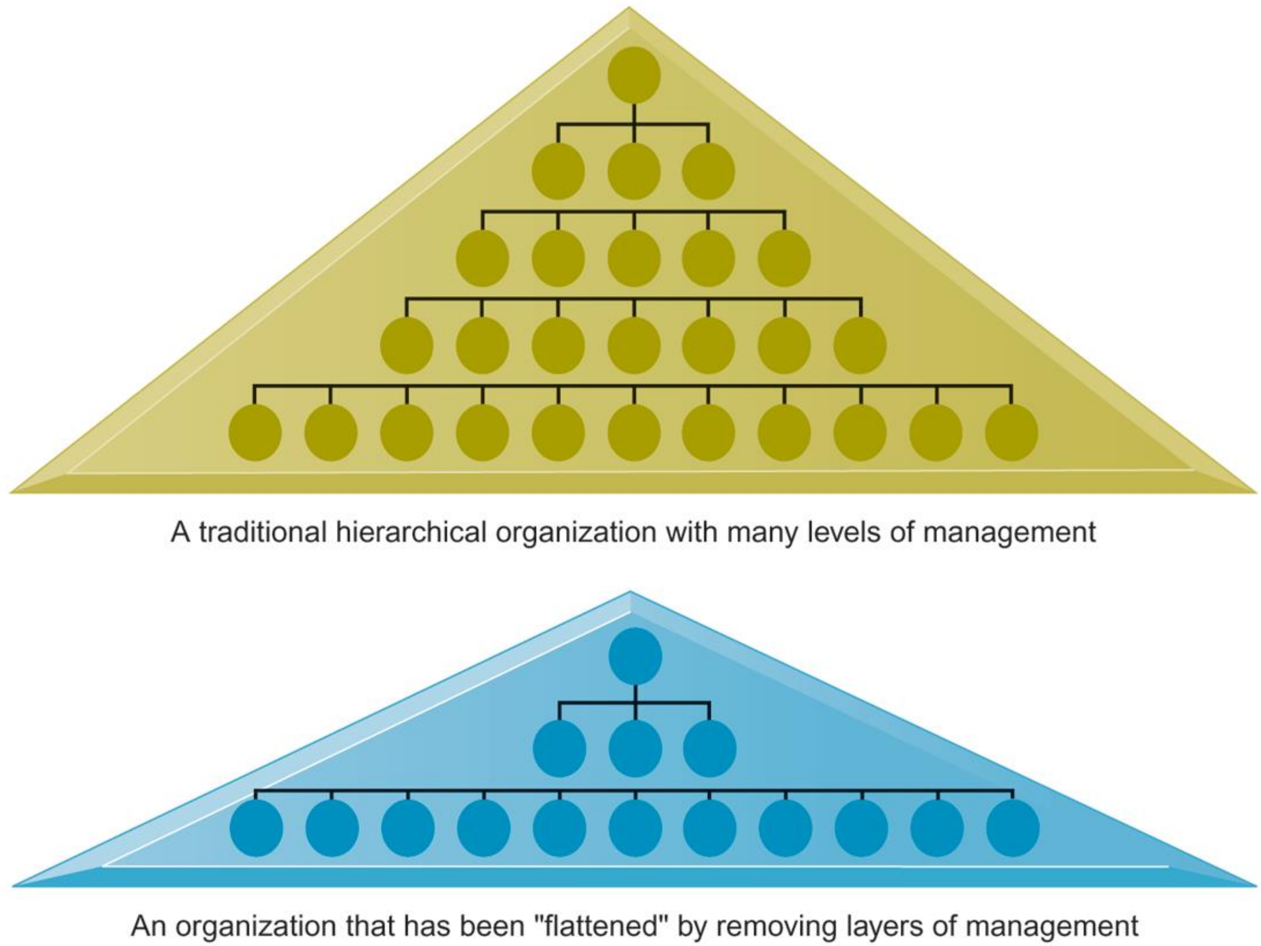
The Impact of Information Systems on Organizations

- **Organizational and behavioral impacts**
  - **IT flattens organizations**
    - Decision making is pushed to lower levels. (As they have enough information)
    - 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.

FLATTENING ORGANIZATIONS

Information systems can reduce the number of levels in an organization by providing managers with information to supervise larger numbers of workers and by giving lower-level employees more decision-making authority.

FIGURE 3-6



Reading - Can technology replace manager?

- 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

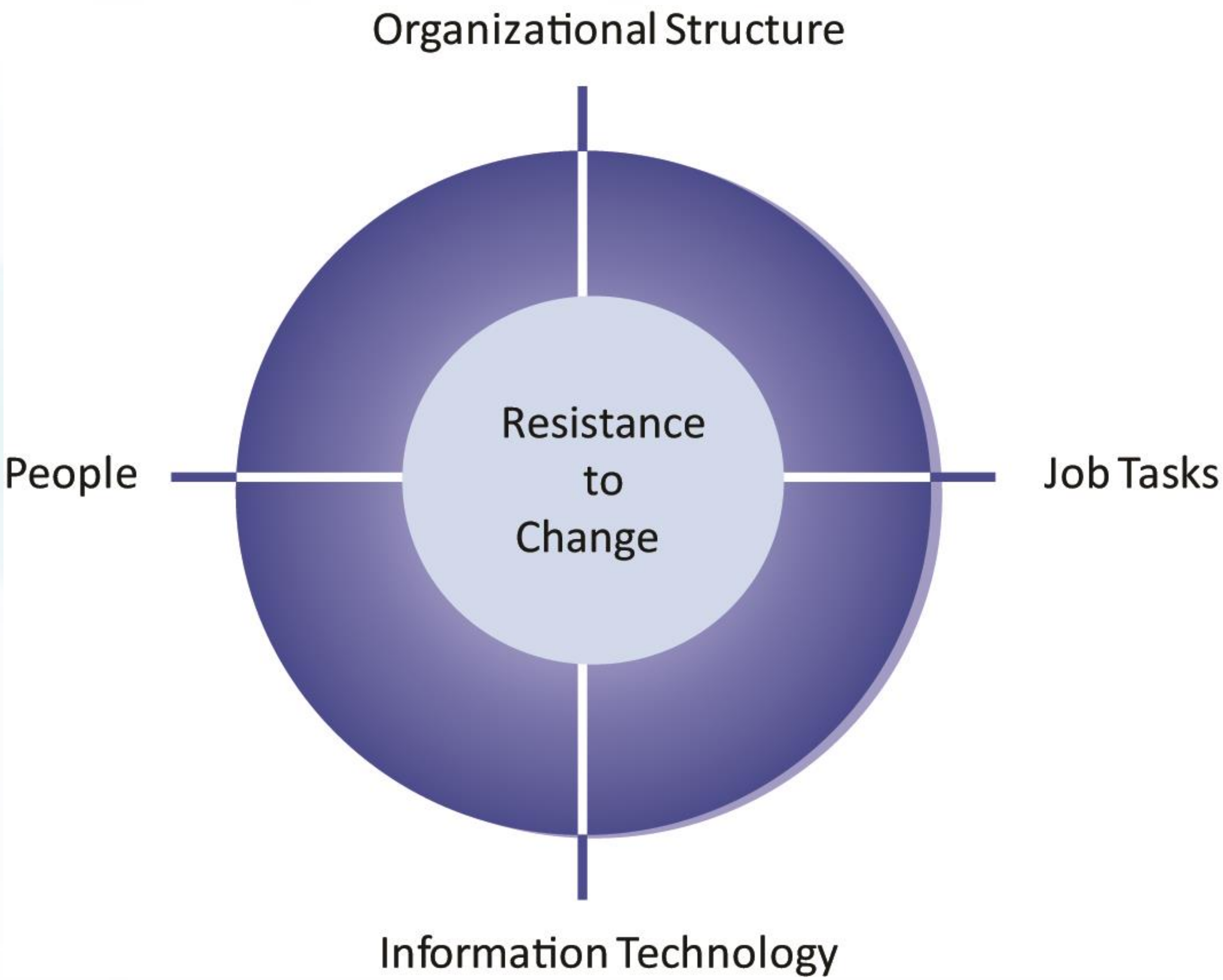
The Impact of Information Systems on Organizations

- 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.
  - Most common reason for failure of large projects is due to organizational and political resistance to change.

ORGANIZATIONAL RESISTANCE TO INFORMATION SYSTEM INNOVATIONS

Implementing information systems has consequences for task arrangements, structures, and people. According to this model, to implement change, all four components must be changed simultaneously.

FIGURE 3-7



The Impact of Information Systems on Organizations

- **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 Web site, saving millions of dollars in distribution costs

The Impact of Information Systems on Organizations

- **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**

Using Information Systems to Develop Competitive Strategies

- **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:**
    1. Traditional competitors
    2. New market entrants
    3. Substitute products and services
    4. Customers
    5. Suppliers

PORTER'S COMPETITIVE FORCES MODEL

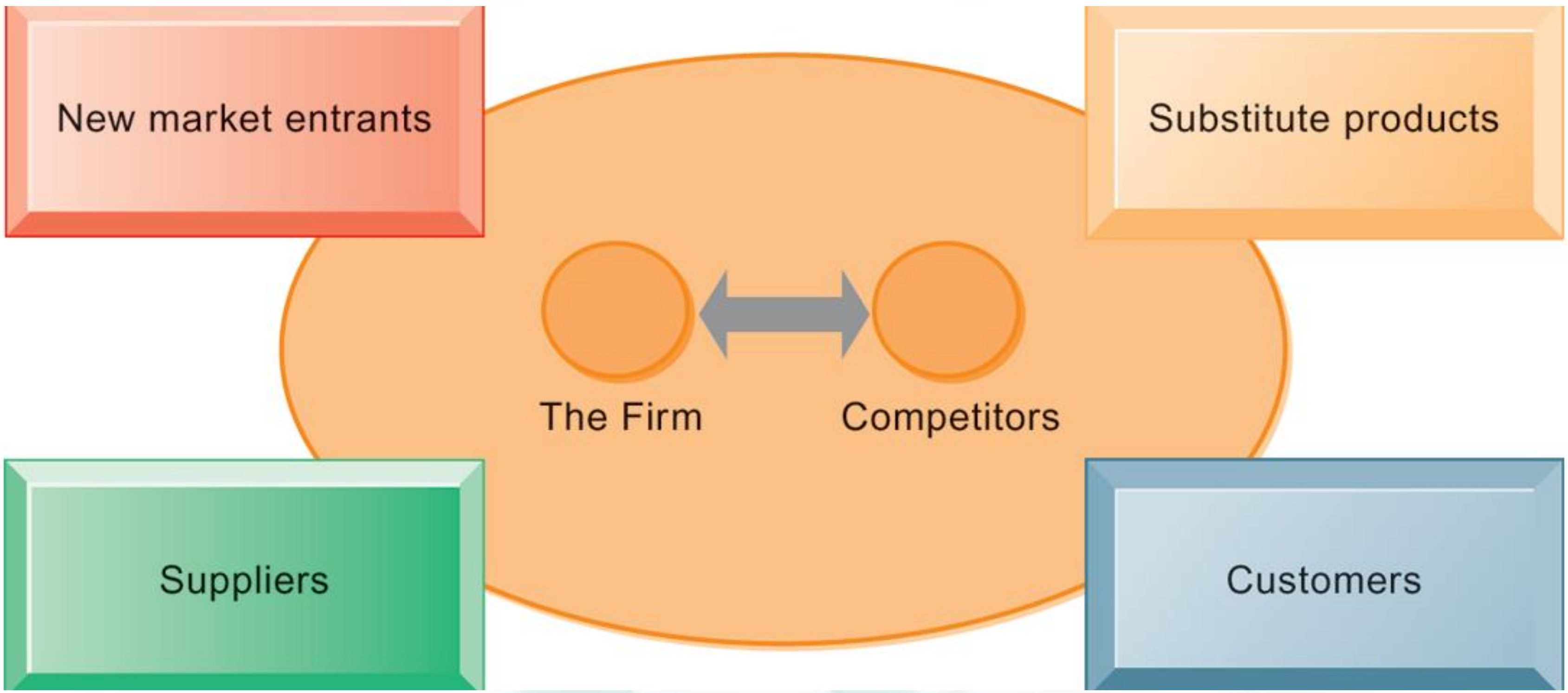


FIGURE 3-8 In Porter's competitive forces model, the strategic position of the firm and its strategies are determined not only by competition with its traditional direct competitors but also by four other forces in the industry's environment: new market entrants, substitute products, customers, and suppliers.

Using Information Systems to Develop Competitive Strategies

- 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.

Using Information Systems to Develop Competitive Strategies

- **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

Using Information Systems to Develop Competitive Strategies

- **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

Using Information Systems to Develop Competitive Strategies

- **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

Interactive Session: Technology

AUTOMAKERS BECOME SOFTWARE COMPANIES

Read the Interactive Session and discuss the following questions

- How is software adding value to automakers' products?
- How are the automakers benefiting from software-enhanced cars? How are customers benefiting?
- What value chain activities are involved in enhancing cars with software?
- How much of a competitive advantage is software providing for automakers? Explain your answer.

Using Information Systems to Develop Competitive Strategies

- **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*
  - Example: Netflix, Amazon

Interactive Session: Organizations

Identifying Market Niches in the Age of Big Data

Read the Interactive Session and discuss the following questions

- Describe the kinds of data being analyzed by the companies in this case.
- How is this fine-grained data analysis improving operations and decision making in the companies described in this case? What business strategies are being supported?
- Are there any disadvantages to mining customer data? Explain your answer.
- How do you feel about airlines mining your inflight data? Is this any different from companies mining your credit card purchases or Web surfing?

Using Information Systems to Develop Competitive Strategies

- **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**
  - **Smart Products and the Internet of Things**

Using Information Systems to Develop Competitive Strategies

- **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**

THE VALUE CHAIN MODEL

This figure provides examples of systems for both primary and support activities of a firm and of its value partners that can add a margin of value to a firm's products or services.

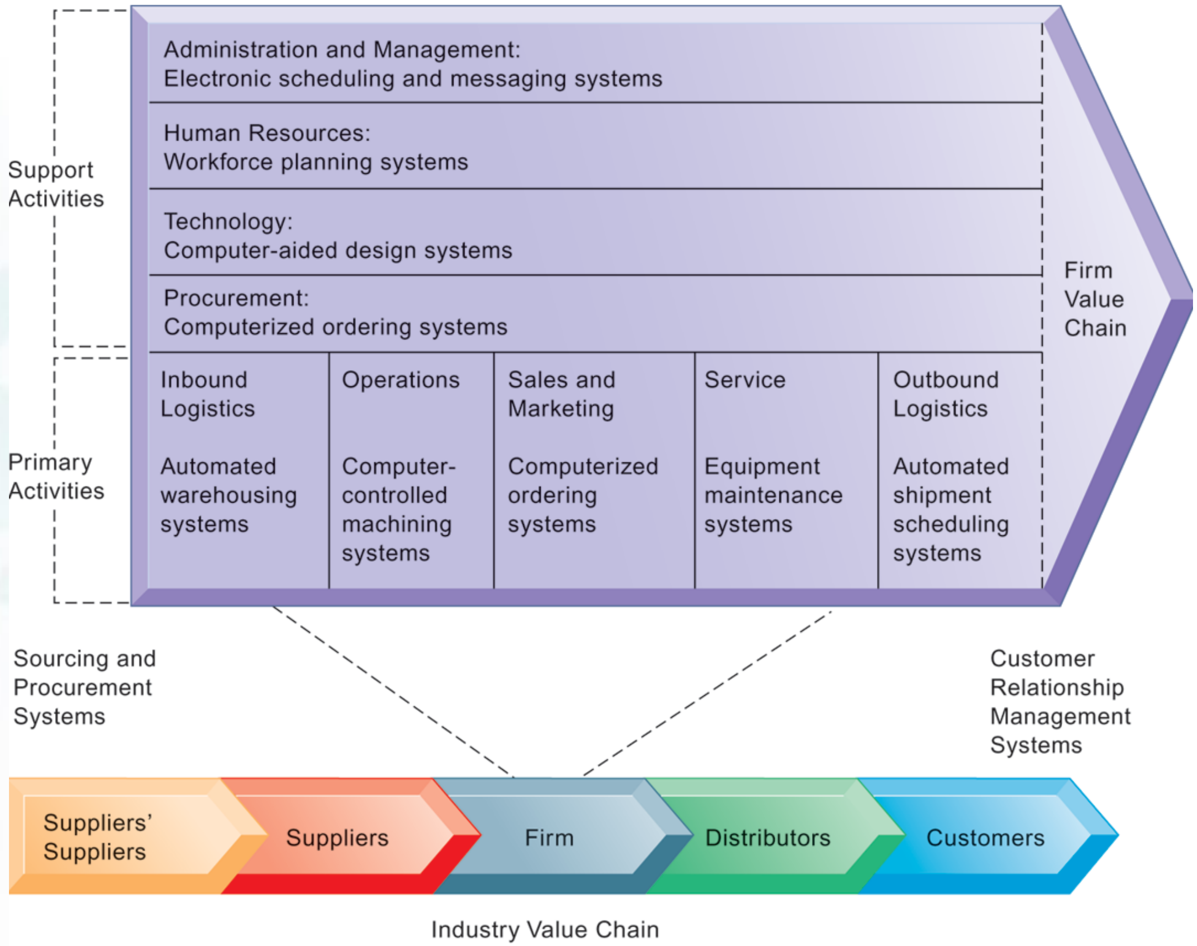


FIGURE 3-9

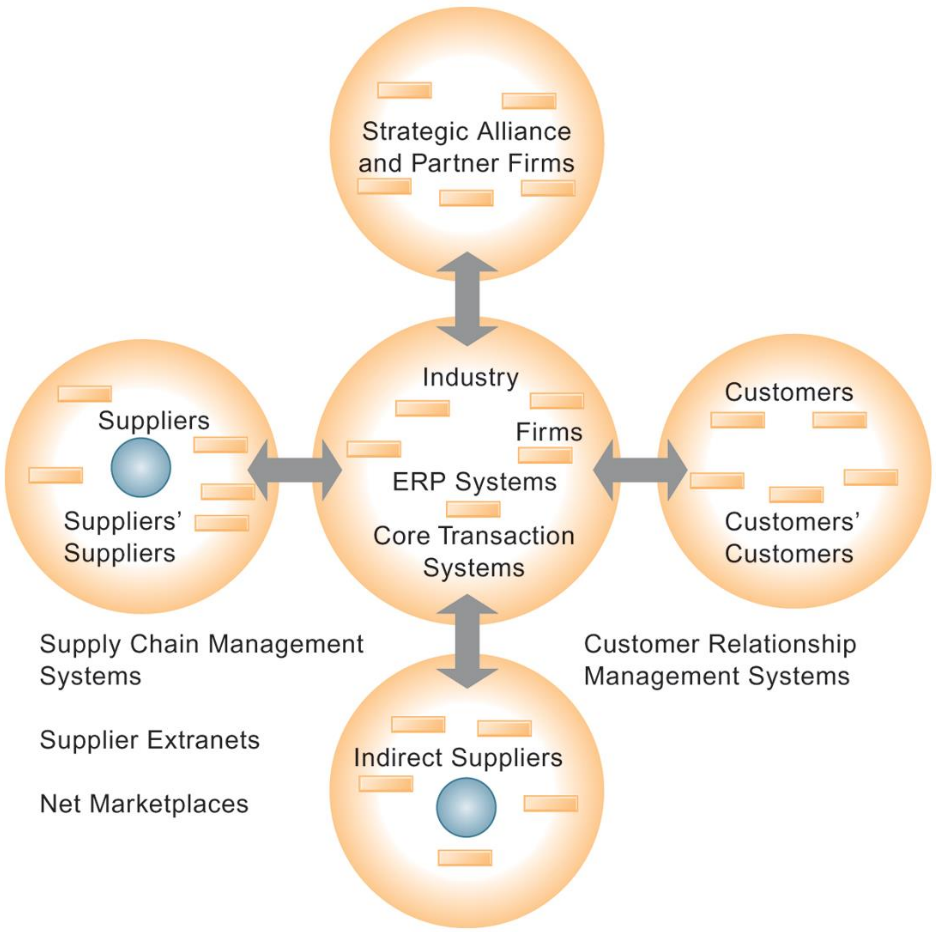
Using Information Systems to Develop Competitive Strategies

- **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

THE VALUE WEB

The value web is a networked system that can synchronize the value chains of business partners within an industry to respond rapidly to changes in supply and demand.

FIGURE 3-10



Using Information Systems to Develop Competitive Strategies

- **Information systems can improve overall performance of business units by promoting synergies and core competencies**
  - **Synergies**
    - When output of some units 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

Using Information Systems to Develop Competitive Strategies

- 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

Using Information Systems to Develop Competitive Strategies

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

Using Information Systems to Develop Competitive Strategies

- **Traditional economics: Law of diminishing returns**
  - The more any given resource is applied to production, the lower the marginal gain in output, until a point is reached where the additional inputs produce no additional outputs
- **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

Using Information Systems to Develop Competitive Strategies

- Virtual company strategy
  - Virtual company uses networks to ally with other companies to create and distribute products without being limited by traditional organizational boundaries or physical locations
  - Example: Li & Fung manages production, shipment of garments for major fashion companies, outsourcing all work to more than 7,500 suppliers

Using Information Systems to Develop Competitive Strategies

- **Business ecosystems**
  - **Industry sets of firms providing related services and products**
    - Microsoft platform used by thousands of firms
    - Walmart’s order entry and inventory management
  - **Keystone firms:** Dominate ecosystem and create platform used by other firms
  - **Niche firms:** Rely on platform developed by keystone firm
  - **Individual firms can consider how IT will help them become profitable niche players in larger ecosystems**

AN ECOSYSTEM STRATEGIC MODEL

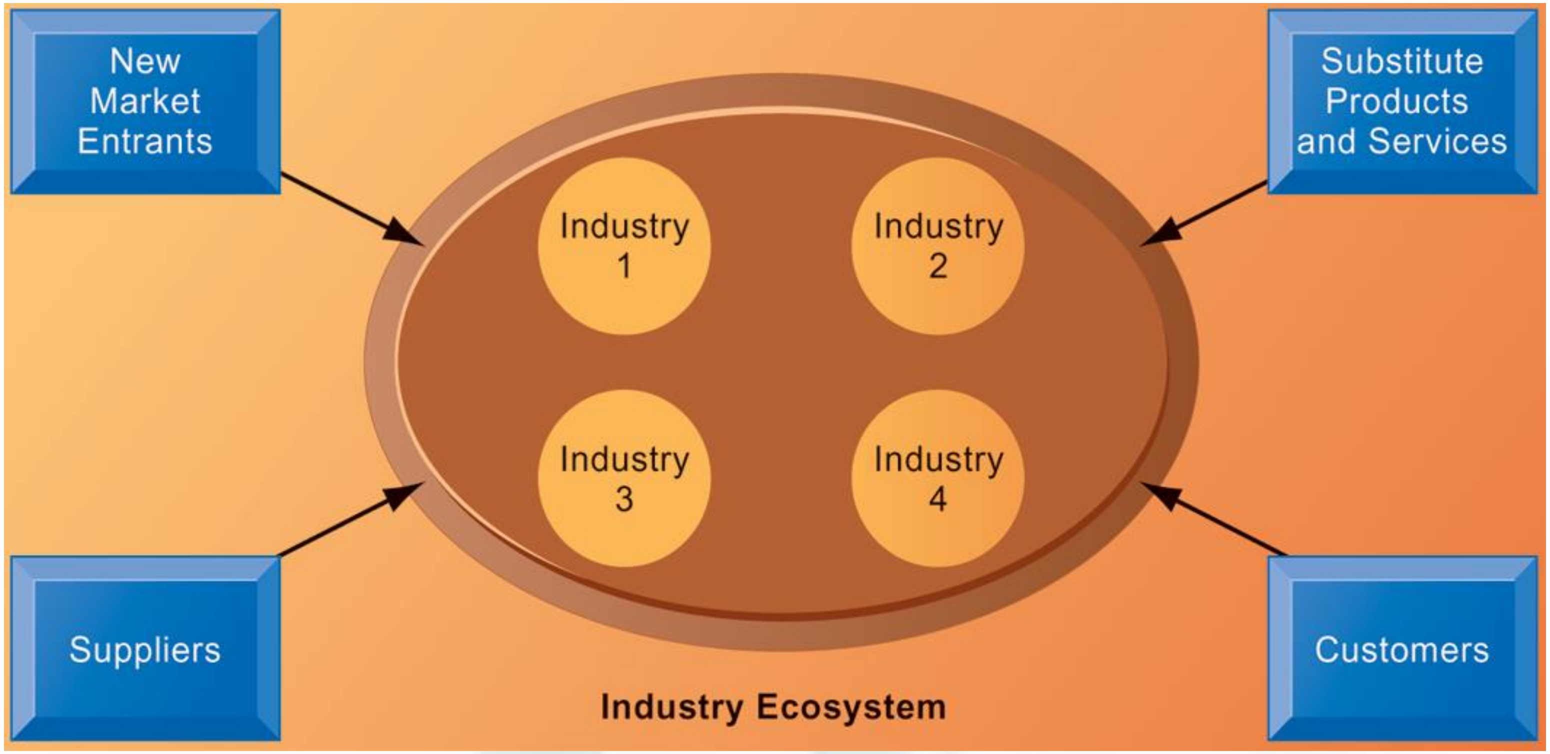


FIGURE 3-11 The digital firm era requires a more dynamic view of the boundaries among industries, firms, customers, and suppliers, with competition occurring among industry sets in a business ecosystem. In the ecosystem model, multiple industries work together to deliver value to the customer. IT plays an important role in enabling a dense network of interactions among the participating firms.

Using Information Systems to Develop Competitive Strategies

- **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**