

Chapter 3

Information Systems, Organizations, and Strategy

Video Cases

Case 1: GE Becomes a Digital Firm: The Emerging Industrial Internet [GE Digital: The Industrial Internet in the Real World - YouTube](#)

Case 2: National Basketball Association: Competing on Global Delivery with Akamai OS Streaming [Akamai Live Streaming Service Interview - NAB New York - YouTube](#)

Learning Objectives

- 3.1** Discuss technical and behavioral view of organizations.
- 3.2** Discuss features of organizations that affect information systems.
- 3.3** Describe the impact of information systems on organizations.
- 3.4** Discuss Porter's competitive forces model.
- 3.5** Discuss the value chain model.
- 3.6** Discuss synergies, core competencies, and network economics.
- 3.7** Understand how AI can be used in competitive strategy.
- 3.8** Describe the challenges posed by strategic information systems.
- 3.9** Understand how the information in this chapter can help your career

PepsiCo Tames the Doritos Crunch

- Problem
 - Other people's Doritos crunching distracted gamers
 - Doritos fans loved the crunch sound
 - Solutions
 - Introduced Doritos Silent (software tool)
 - Developers used AI/ML to analyze more than 5,000 different crunch sounds to create Doritos Silent SW
- > This helped PepsiCo maintain the popularity of Doritos among a very important market segment (gamers) and grow sales.

Features of Organizations

The Relationship Between Organizations and Information Technology

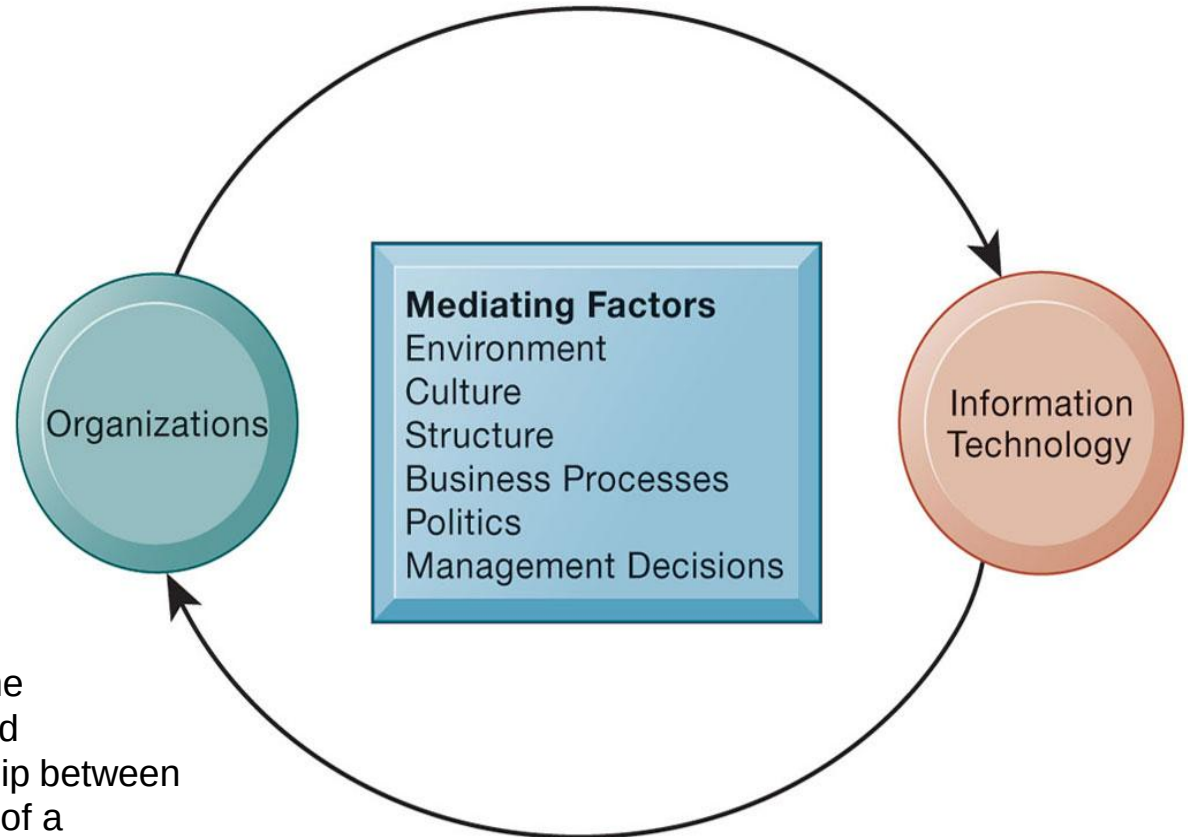
- Information technology and organizations influence each other
 - Relationship influenced by organization's
 - Structure
 - Business processes
 - Politics
 - Culture
 - Environment
 - Management decisions

* This concept was briefly discussed in Chapter 1. Figure 1-2 and 1-4 as well as the figure on the next slide, 3-1, display this interdependent relationship graphically.

Figure 3.1 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.

- Think how each factor might affect the relationship between organizations and information technology. The relationship between these two and its effects on the future of a business are difficult to predict.
- For example, very few people could have predicted the prominence of e-mail and instant messaging in business communication 15 years ago.



What Is an Organization?

- **Technical definition**

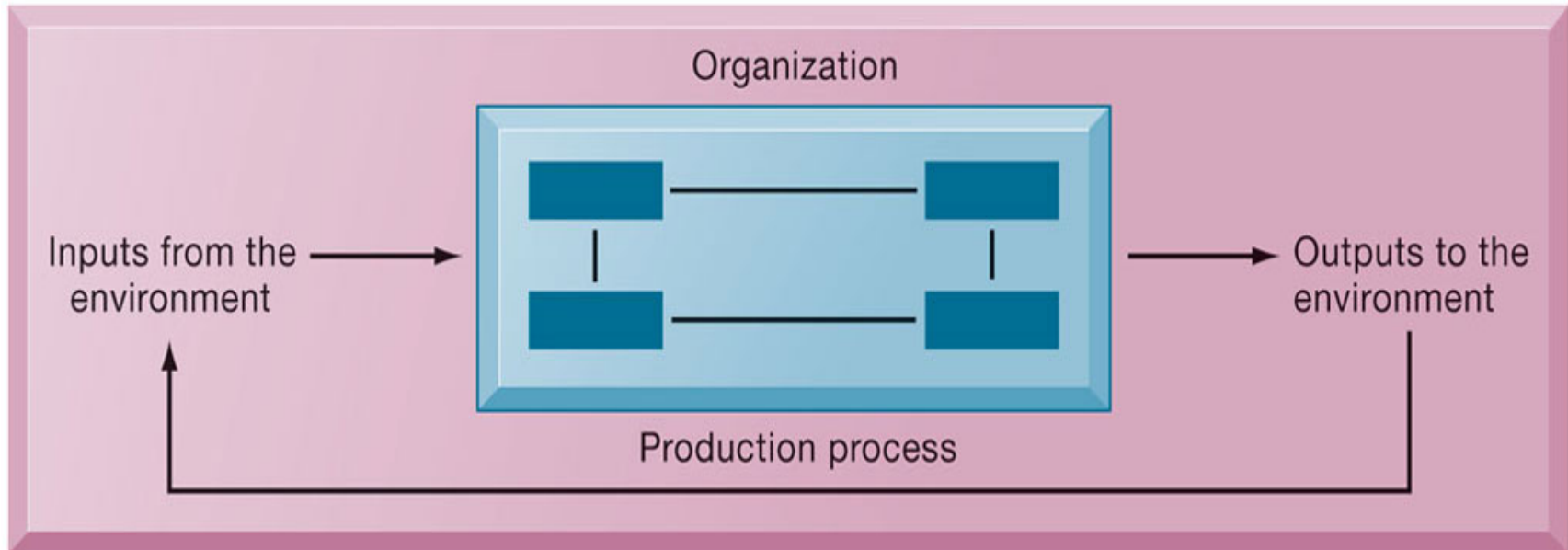
- Formal social structure that processes resources from environment to produce outputs
- A formal legal entity with internal rules and procedures, as well as a social structure

- **Behavioral definition**

- A collection of rights, privileges, obligations, and responsibilities that is delicately balanced over a period of time through conflict and conflict resolution

* It is important to consider both definitions rather than exclusively use one at the expense of the other. The two definitions are complementary.

Figure 3.2 The Technical Microeconomic Definition of the Organization



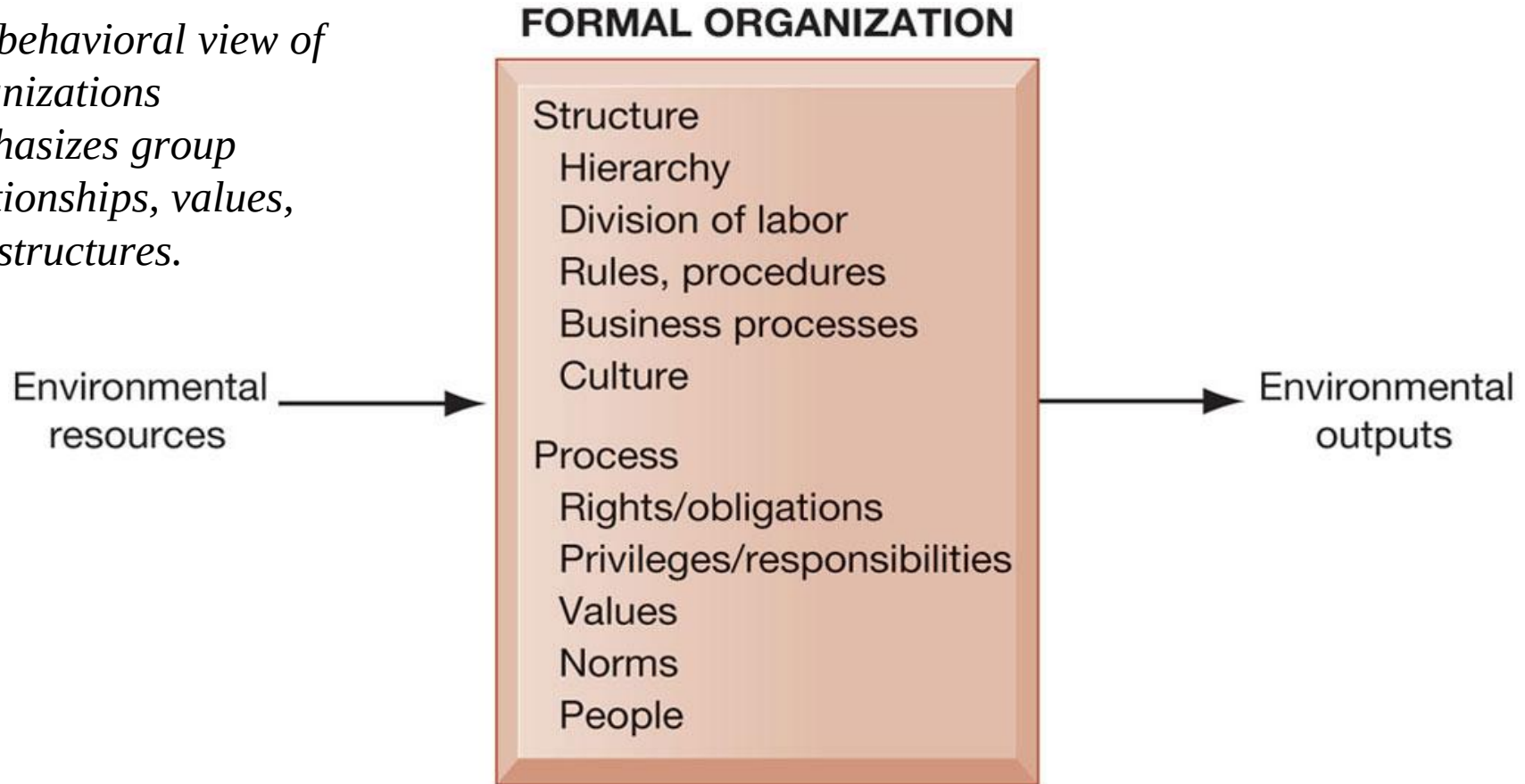
In the microeconomic definition of organizations, capital and labor (the primary production factors provided by the environment) are transformed by the firm through the production process into products and services (outputs to the environment). The products and services are consumed by the environment,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

* What are the inputs from the environment? What do organizations output (goods and services)?

In this view, the organization or business firm is rather easily changed, and malleable. The organization is a collection of parts, like a machine, that can be rearranged as needed. There are no humans in this model, or if there are, they are assumed to be relatively simple.

Figure 3.3 The Behavioral View of Organizations

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



In this view, the business firm is a little more difficult to change rapidly or on command because it is a very complex machine populated with human beings. Firms operate with an existing hierarchy, job definitions, business rules, legal contracts, procedures, and processes. Efficient organizations become very good at these elements of business. Changing these elements takes more time.

Features of Organizations

- Use of hierarchical structure
- Accountability, authority in ^{unbiased} system of impartial decision making
 - * In Ch. 4, it is a feature of systems and social institutions. It means that mechanisms are in place to determine who took responsible action, and who is responsible. (text: p. 159)
- Adherence to principle of efficiency
- Routines and business processes
- Organizational politics, culture, environments, and structures

- Envision what would happen to an organization that did not use a hierarchical structure (would anything get done?), did not adhere to the principle of efficiency (would they provide any goods or service worth using at an affordable price?), and so on.

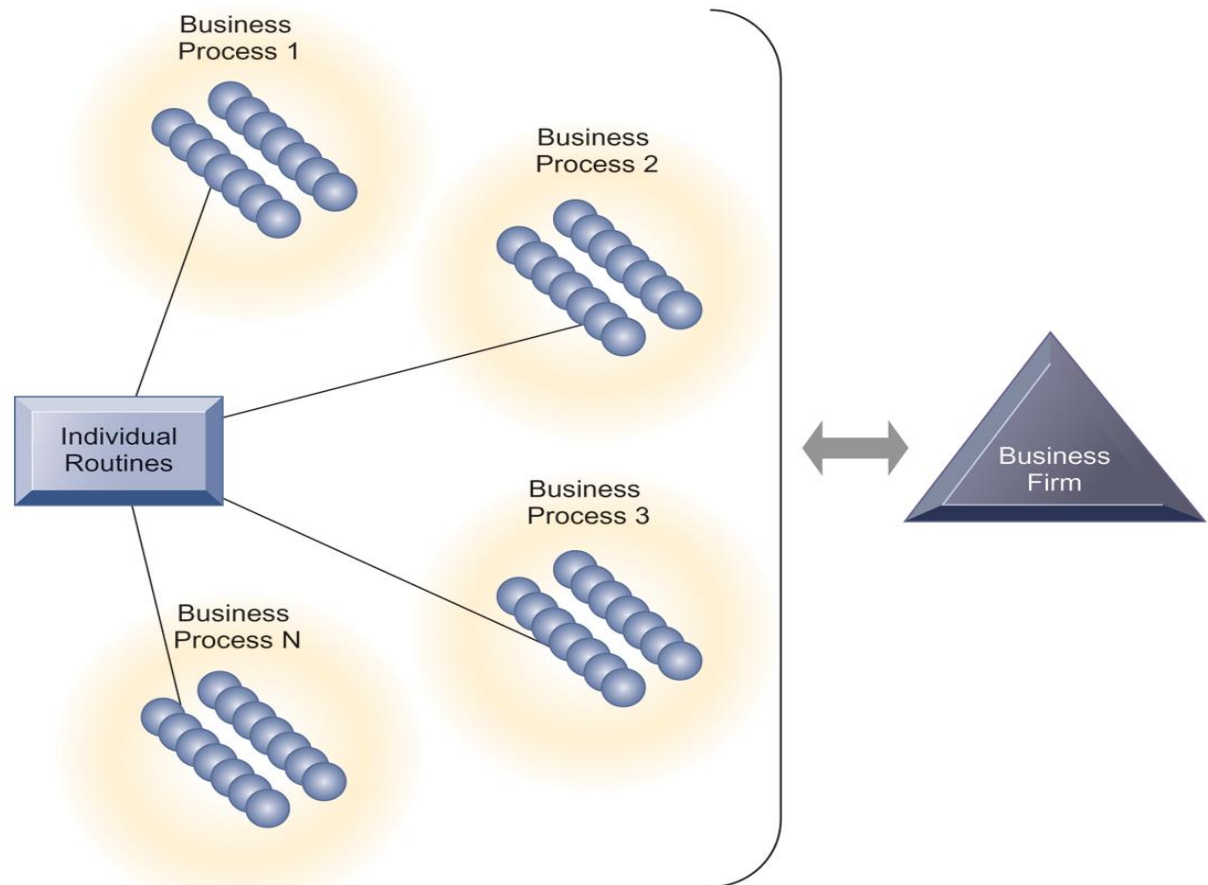
Routines and Business Processes

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

- Describe examples of situations where a business they have interacted with has had a well-understood set of routines. One such example is at the doctor's office, where the receptionist, nurses, and doctors all have a defined set of routines.

Figure 3.4 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.



- The blue spheres are individual routines, which together constitute a business process. A firm can be seen as a collection of these processes.

Organizational Politics

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

- Think about examples where organizational politics might hamper a firm's ability to succeed, or examples where effectively managed organizational politics helps a company to undergo a smoother transition or make more intelligent decisions.

Organizational Culture

Culture may seem like a pretty abstract idea.

- Encompasses set of assumptions that define goal and product

Bedrock, unassailable, unquestioned (by the members) assumptions

- 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

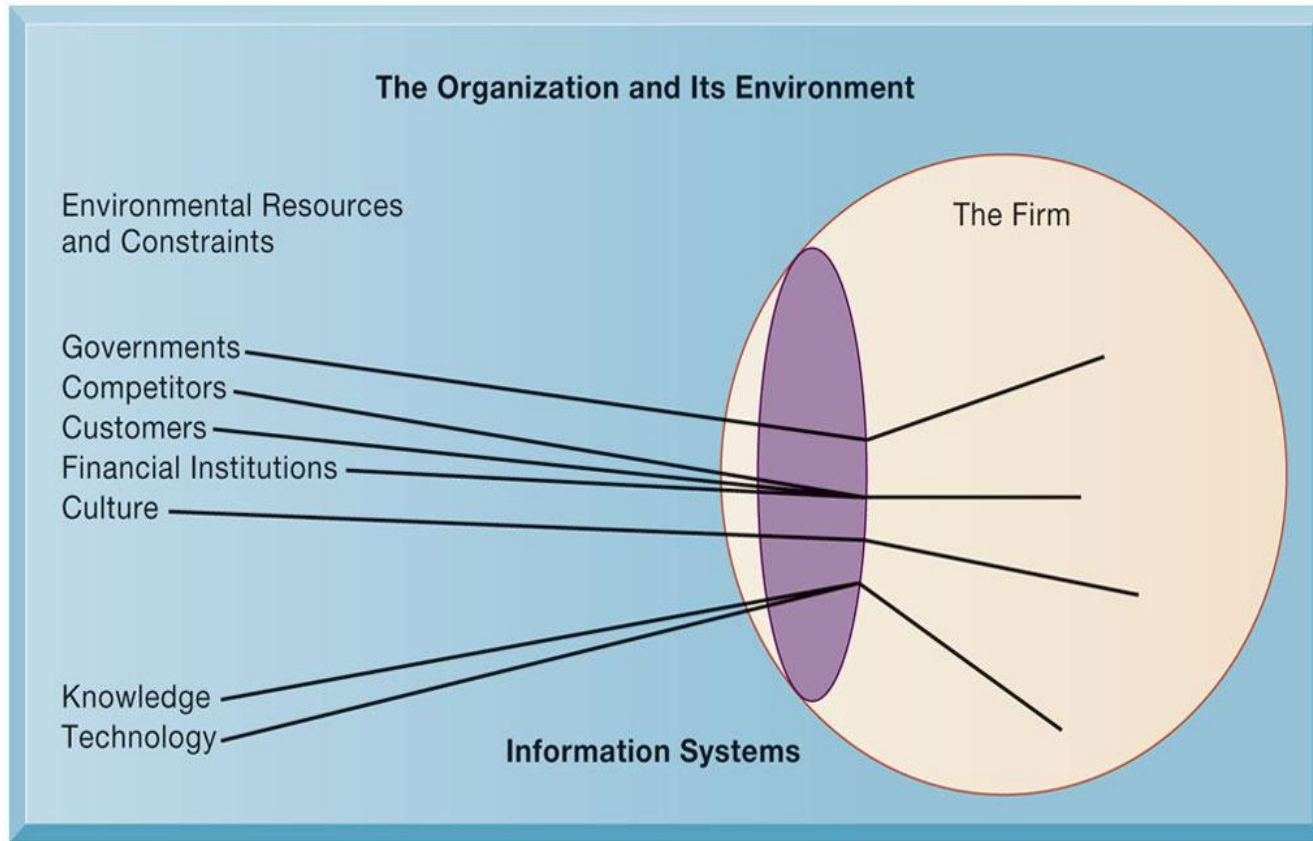
Especially technological change

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.

- Environmental scanning involves searching for and determining external changes that may require an organizational response. The current economic climate represents an example of external change that requires sweeping organizational responses to ensure survival.

Figure 3.5 Environments and Organizations Have a Reciprocal Relationship



* This graphic further establishes information systems as the “lens” of the firm, observing external factors and filtering information back into the firm. To some extent, organizations “see” only what their systems will let them see. If systems are poorly built, they may blind managers to difficulties and problems.

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.

Disruptive Technologies: Riding the Wave

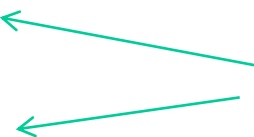
- Substitute products that perform as well as or better (often much better) than existing product
- Technology that brings sweeping change to businesses, industries, markets
- **Examples:** personal computers, smartphones, Big Data, artificial intelligence, the Internet
- First movers and fast followers
 - First movers—inventors of disruptive technologies
 - Fast followers—firms with the size and resources to capitalize on that technology

* You understand that the PageRank algorithm is the underlying technology behind Google search. You can give examples of any first movers that invented a disruptive technology, yet failed to last (examples might include the Altair personal computer, the Netscape Navigator Internet browser, etc.).

Organizational Structure

- All organizations have a structure or shape.

- Five basic kinds of organizational structure (by Mintzberg, 1979)
 - Entrepreneurial structure:
 - Small start-up business
 - Machine bureaucracy:
 - Midsize manufacturing firm
 - Divisionalized bureaucracy:
 - Fortune 500 firms
 - Professional bureaucracy:
 - Law firms, school systems, hospitals
 - Adhocracy:
 - Consulting firms
- Information system often reflects organizational structure



Having a weak
central
management
or authority

Other Organizational Features

- Goals
 - Coercive, utilitarian, normative, and so on
 - Constituencies
 - Leadership styles : more democratic or authoritarian
 - Types of tasks : routine tasks or non-routine tasks
 - Different environments
- * Different organizations (prisons, businesses, colleges) have different types of goals (coercive, utilitarian, normative, respectively).

3.3 Describe the impact of ISs 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)
 - * The cost incurred when a firm buys on the marketplace what it cannot make itself.
 - Outsourcing
- IT figures to replace the function of more middle managers as time passes, as well as reduce the need for other forms of capital (buildings, machinery). You can understand what is meant by “economics of information” and why outsourcing is a possibility due to IT.

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 for firm, making it worthwhile for firms to transact with other firms rather than grow the number of employees

- Think that using the market can be expensive. If you depend on the market, rather than hiring employees, you will need to search for talent, research the quality of providers and workers, write contracts for work to be performed, monitor the work, and so forth. When participation in markets is expensive, firms would rather hire employees to accomplish their work. But the Internet makes it less expensive to use the marketplace. With the Internet, firms find it more cost effective to use the marketplace and contract for work in a market, rather than hire employees. Why can the Internet make participating in markets less expensive than before?

Agency Theory

- IT also can reduce internal management costs.

- 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

- By characterizing employees as independent agents requiring constant supervision, agency theory underscores a key reason that costs increase as firms grow in size and scope—the need to expend more effort managing their employees.

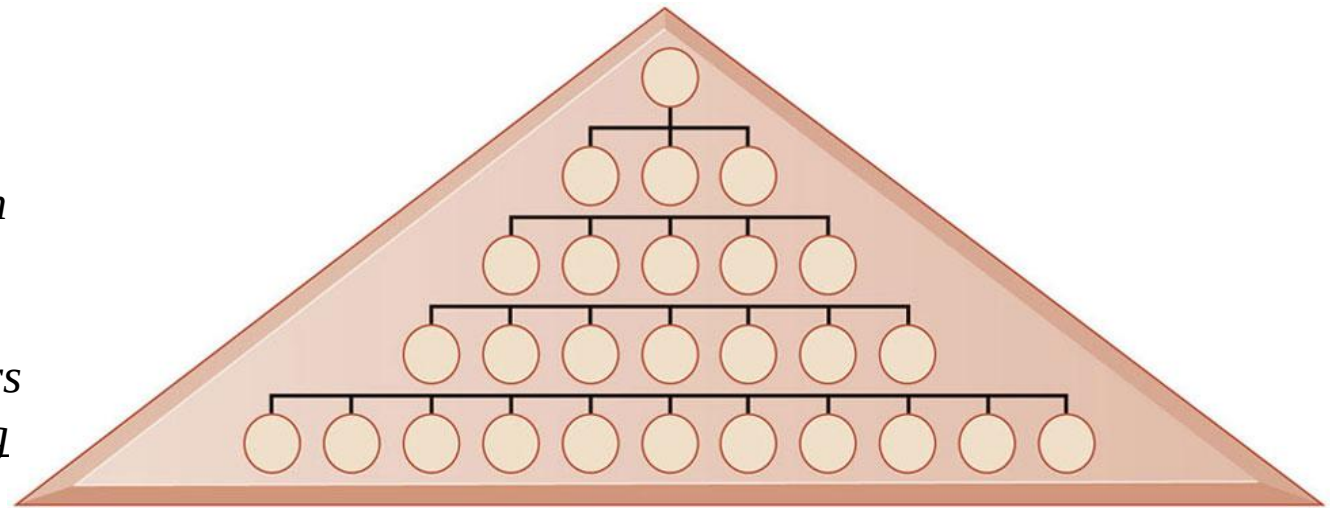
Organizational and Behavioral Impacts

Based on sociology

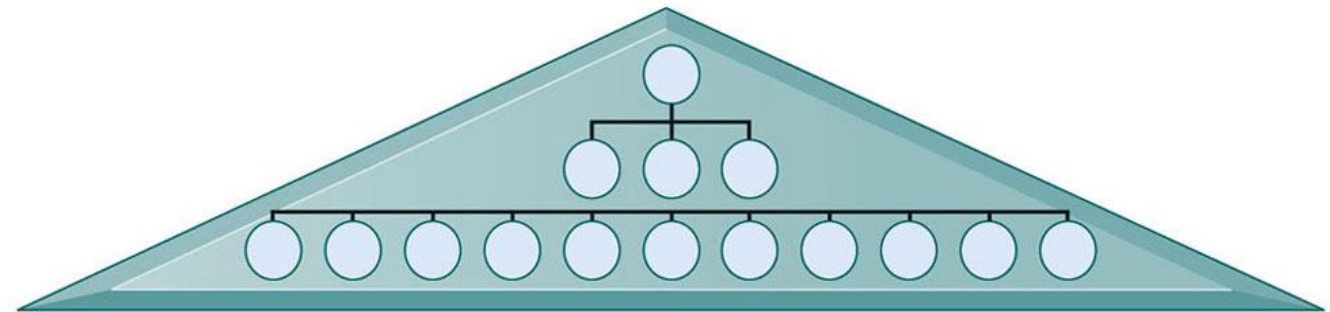
- IT flattens organizations
 - Decision making is pushed to lower levels. empowerment
 - Fewer managers are needed (IT enables faster decision making and increases span of control).
- Postindustrial organizations
 - Organizations flatten because in postindustrial societies, authority increasingly relies on knowledge and competence rather than formal positions.
 - IT may encourage task force-networked organizations in which groups of professionals come together for short periods of time. e.g. Accenture
- Think what is meant by authority relying on knowledge and competence rather than formal positions. Why might this “flatten” the organization? The idea here is that with sufficient IT, competent workers will be able to accomplish more on their own than they would under a more hierarchical arrangement.

Figure 3.6 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.



A traditional hierarchical organization with many levels of management



An organization that has been “flattened” by removing layers of management

- Think some of the benefits of the flattened organization as opposed to the more complicated hierarchy in the top of the diagram. Information travels through fewer levels to its intended recipients; there are fewer managers, so agency costs are smaller, and firms can act faster (less decision delay).

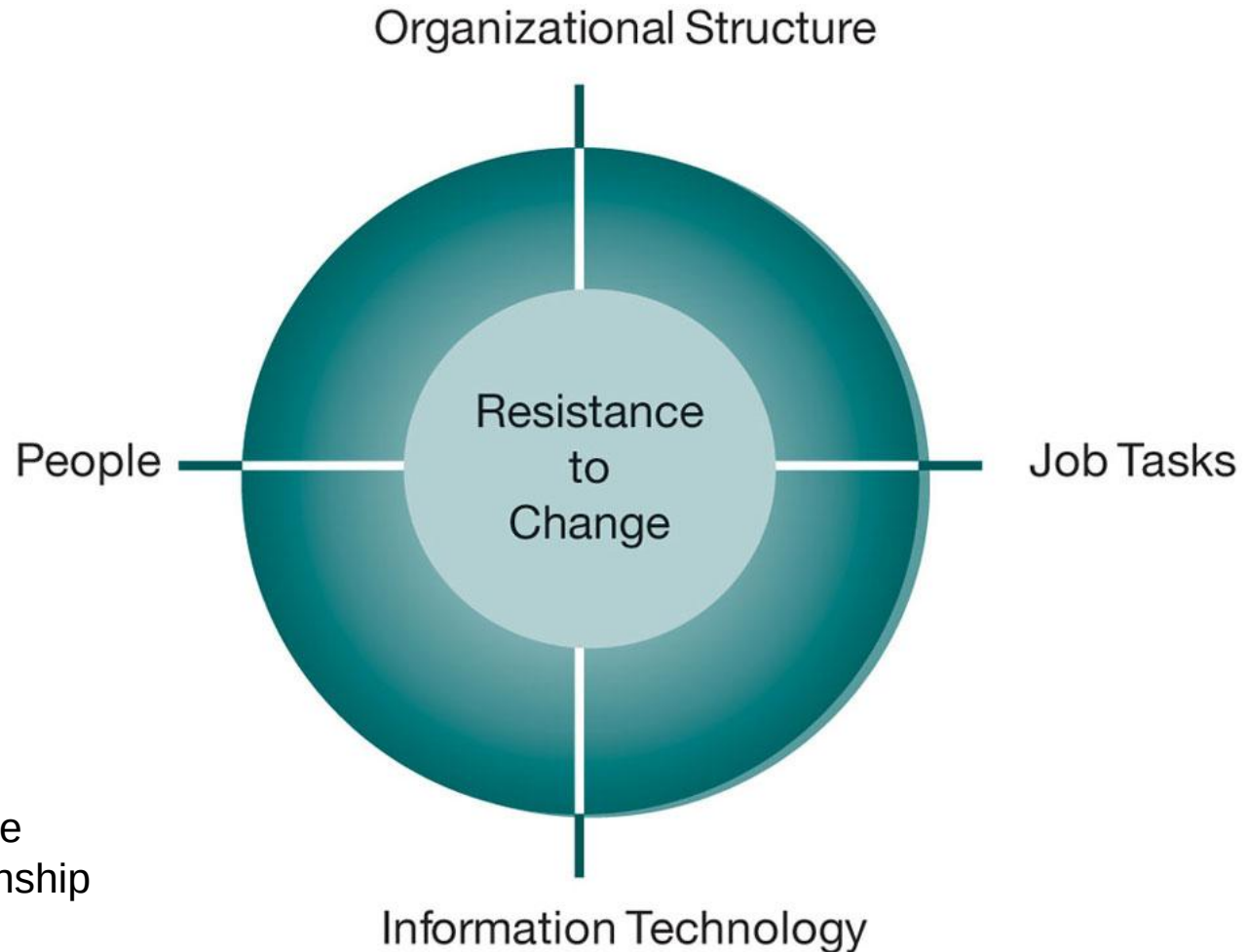
Understanding Organizational Resistance to Change

- 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
 - Most common reason for failure of large projects is due to organizational and political resistance to change.
 - Four factors
 - Nature of the innovation
 - Structure of organization
 - Culture of organization
 - Tasks affected by innovation
- Think what is meant by changes in culture and politics of the firm. For example, workers may resist changes that disrupt their routines. Also think that as important as technical understanding of information systems may be for potential managers, it is equally important to understand the people and organizational structures and customs affected by information systems.

Figure 3.7 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.

- The circle shape in the figure represents the mutual relationship among the concepts shown.



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

- The Internet should also have a flattening effect on many organizations. Can you describe any businesses that have become more efficient and flat thanks to successful incorporation of the Internet in their operations? You may remember the “bad old days” when seven or more levels of management needed to decide even simple issues in a typical firm. Many Fortune 1000 firms are still like this.

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

Consider the results of an information system implemented without properly considering each of the above factors. For example, an information system designed without an understanding of the company's culture and politics is likely to be unpopular, perhaps forcing employees to drastically deviate from their previous routines.

3.4 Porter's Competitive Forces Model

(1 of 3)

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

- Porter's competitive forces model is intended to explain why some firms do better than others. Which factor is most important to a firm's success?

Porter's Competitive Forces Model

(2 of 3)

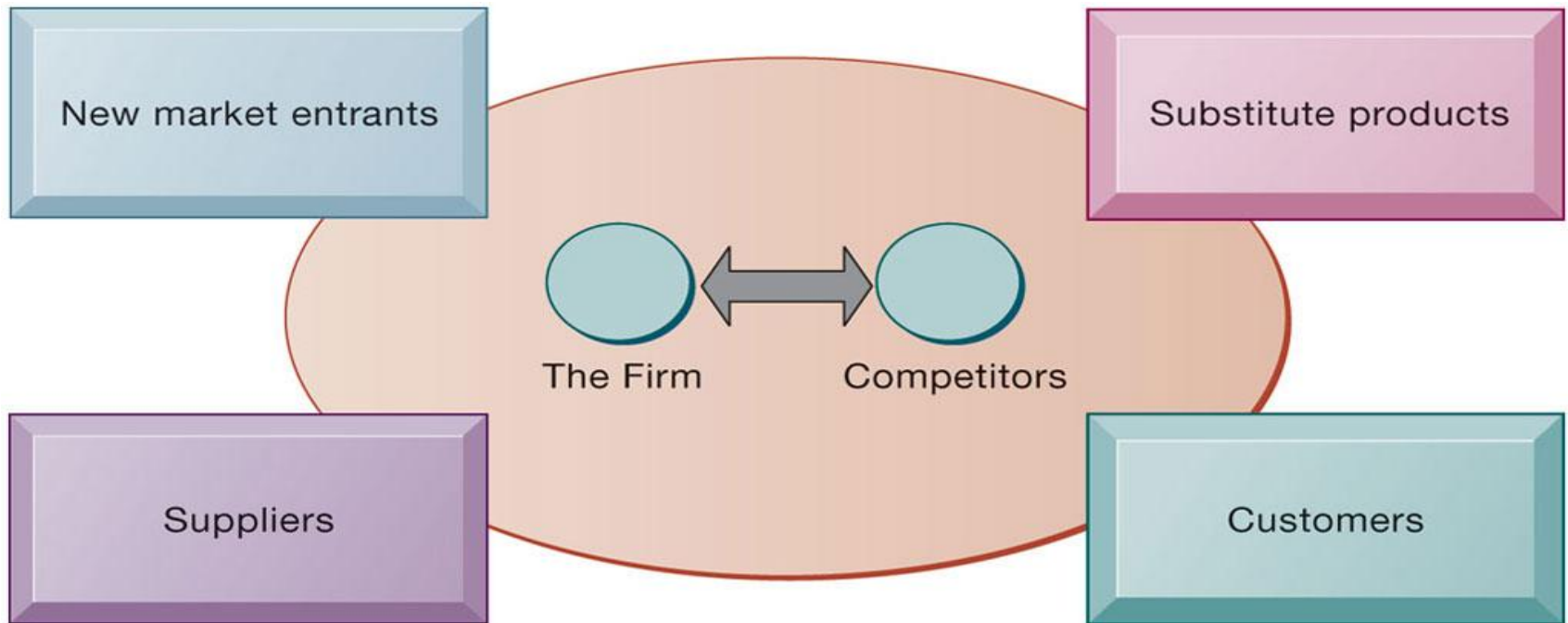
- Traditional competitors
 - All firms share market space with competitors who are continuously devising new products, services, efficiencies, and switching costs.
- New market entrants
 - Some industries have high barriers to entry, for example, computer chip business.
 - New companies have new equipment, 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? (little product differentiation)
 - Suppliers
 - Market power of suppliers when firm cannot raise prices as fast as suppliers
- Describe whether or not customers have great control over the business or vice versa, or whether substitute products are a large or insignificant threat to the success of the business.

Figure 3.8 Porter's Competitive Forces Model



- 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.

- Notice that in the graphic, competitors are represented differently than the other four competitive forces influencing a firm. Why do you think this is the case? One answer might be that competitors are firms in the same industry and are under similar pressures as other firms in the industry.

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 <- continuous replenishment system * efficient customer response system
- Product differentiation
 - Enable new products or services, greatly change customer convenience and experience
 - Example: Google, Nike, Apple
 - **Mass customization** -> Ability to offer individually tailored products or services using the same production resources as mass production
 - Customer experience management

Information System Strategies for Dealing with Competitive Forces

(3 of 3)

-> ISs support this strategy by producing and analyzing data for finely tuned sales and marketing techniques.
+ CRM: analytical capabilities

- 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 -> The cost of switching from one product to a competing product
 - Examples: Toyota, Amazon, Starbucks

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

- Internet of Things (IoT)
 - Growing use of Internet-connected sensors in products
- Smart products: products that are a part of a larger set of information-intensive services sold by firms
 - Fitness equipment, health trackers
- Expand product differentiation opportunities
 - Increasing rivalry between competitors
- Raise switching costs
- Inhibit new entrants
- May decrease power of suppliers

* pp. 129-130

3.5 The Value Chain Model

** The Porter model's limitation-> p.118*

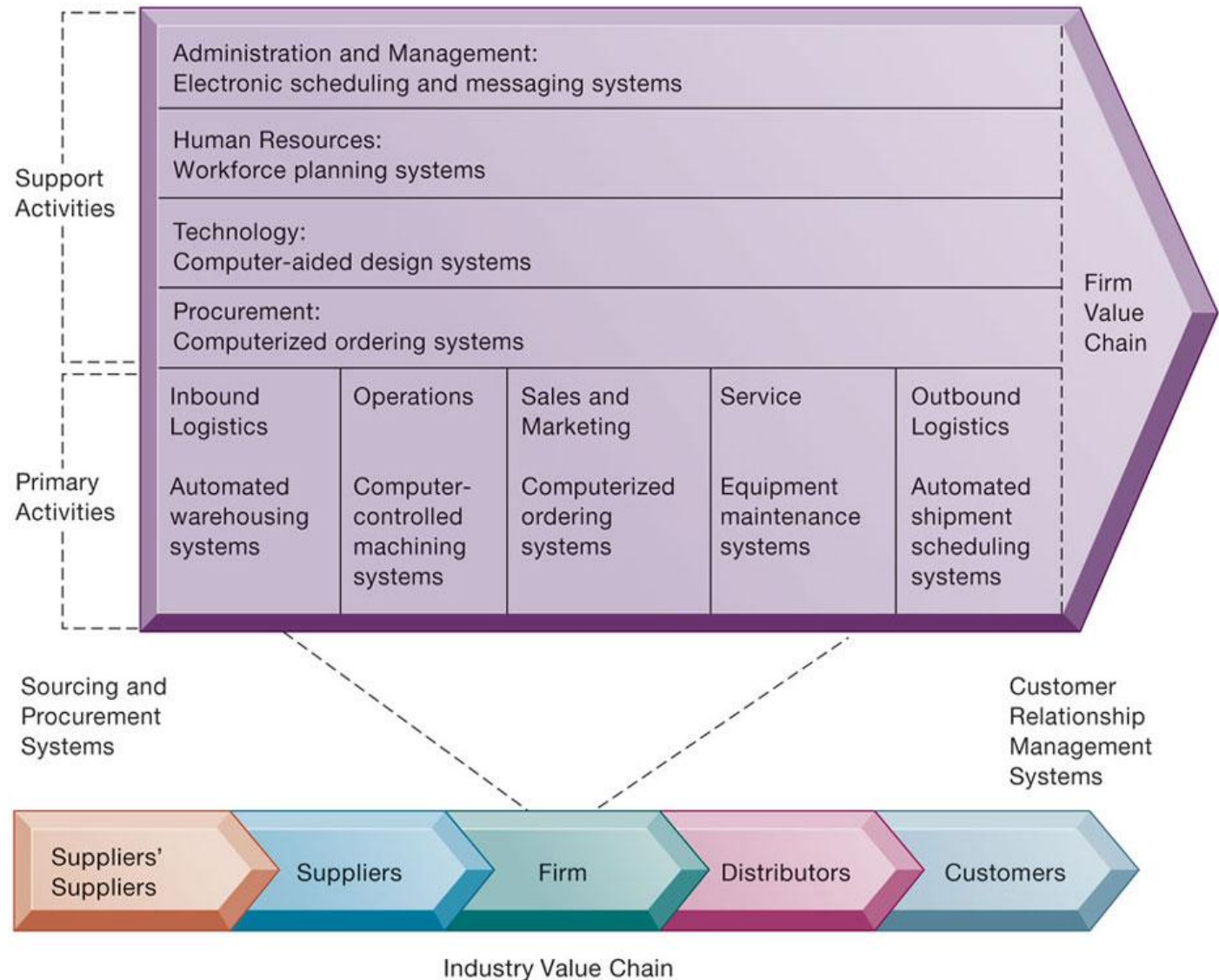
- Firm as series of activities that add value to products or services
- Highlights activities where competitive strategies can best be applied
 - Primary activities vs. support activities
- At each stage, determine how information systems can improve operational efficiency and improve customer and supplier intimacy
- Utilize benchmarking, industry best practices p.119

How does the value chain model differ from the Porter model? (It offers more specific detail about what exactly to do to achieve competitive advantages.) How do primary activities differ from support activities?

- The Porter model does not provide a methodology to follow for achieving competitive advantages.
- The Porter model is not very specific about what exactly to do.

Figure 3.9 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.



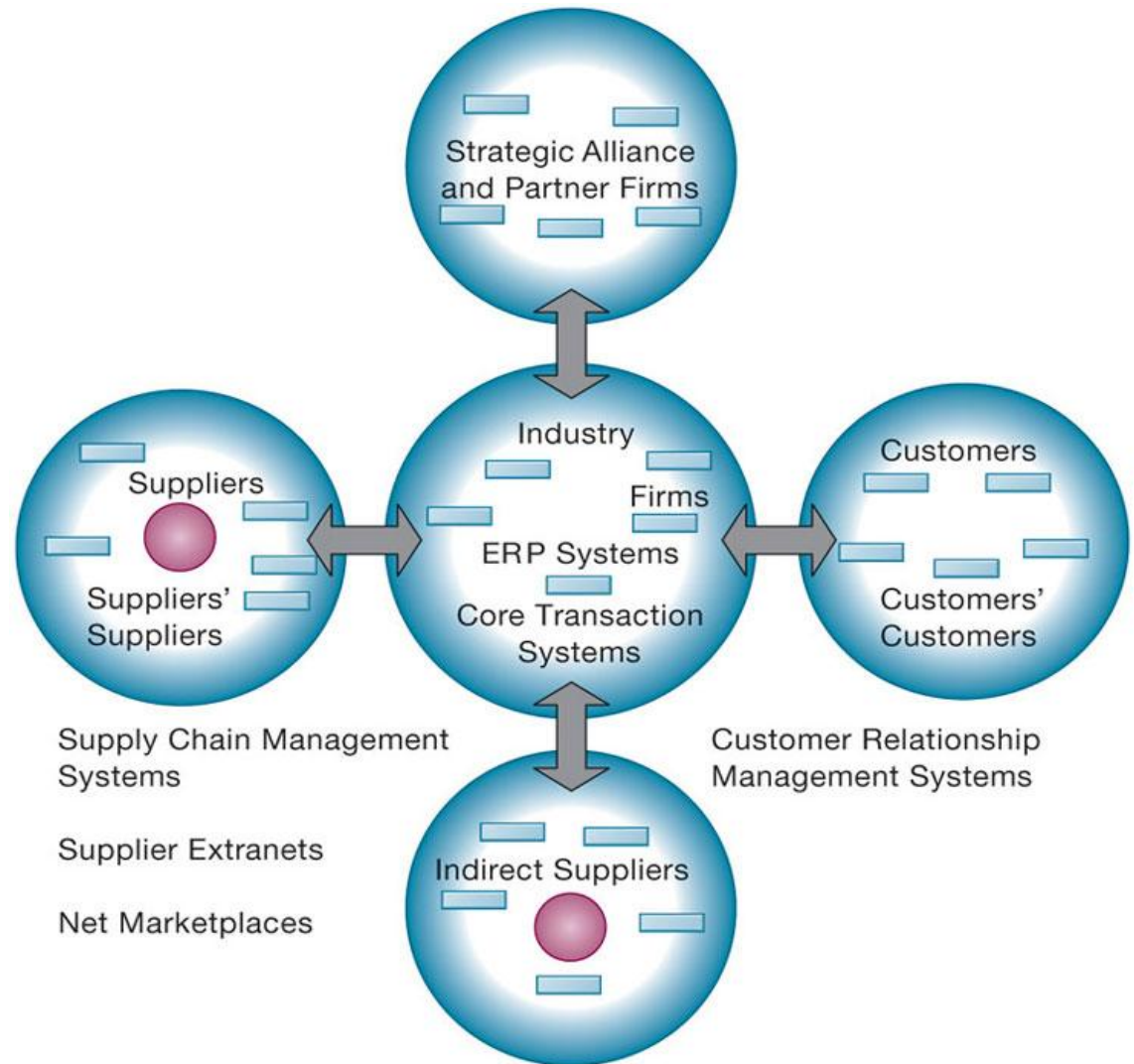
Extending the Value Chain: The Value Web

* Internet technology has made it possible to create highly synchronized industry value chains called **value webs**.

- 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
- A **value web** extends beyond the boundaries of an individual firm and represents the coordination of value chains across multiple independent firms. A value web is flexible and adapts to changes in supply and demand and changing market conditions.

Figure 3.10 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.*



- Why a model like the one displayed in the figure might be more likely to adapt quickly to changes in supply and demand. Also think about the networking among the different segments of the value web.

Synergies, Core Competencies, and Network Economics

Synergies

* Information systems can improve overall performance of business units by promoting synergies and core competencies *SBU

- When the output of some units is used as inputs to others, or two organizations pool markets and expertise-> these relationships lower costs and generate profits
- Example: Merger of Bank of NY and JP Morgan Chase
- Purchase of YouTube by Google

- Information technology's role in promoting synergy is often tying together operations of disparate business units so that they can act as a whole.

-> This might lead to reduced costs and increased efficiency.

Core Competencies

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

* Other notable examples of core competencies among firms:
Google-> search, Microsoft-> office productivity software;
Intel-> processors)

Network-Based Strategies

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

* Examples: Facebook and eBay, which are based on networks of millions of users, are examples of firms that use this type of strategy to achieve an advantage. These companies have used the web and Internet communication tools to build communities. The more people who join these communities, the more benefit members receive. Many other companies are following suit in using a network-based strategy—can you name any others?

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
 - **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
- Think the difference between these two schools of economics. What aspect of network economics allows value to continue to increase with the size of the community?

Virtual Company Model

- Virtual company (aka. virtual organization) strategy
 - 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
 - Outsources all work to thousands of suppliers

pp. 136-137

* **Virtual**: the companies do not actually own any factories, machines, or other similar infrastructure. Instead, they offer a series of services, aided by IS and uninhibited by geographical boundaries.

Business Ecosystems and Platforms

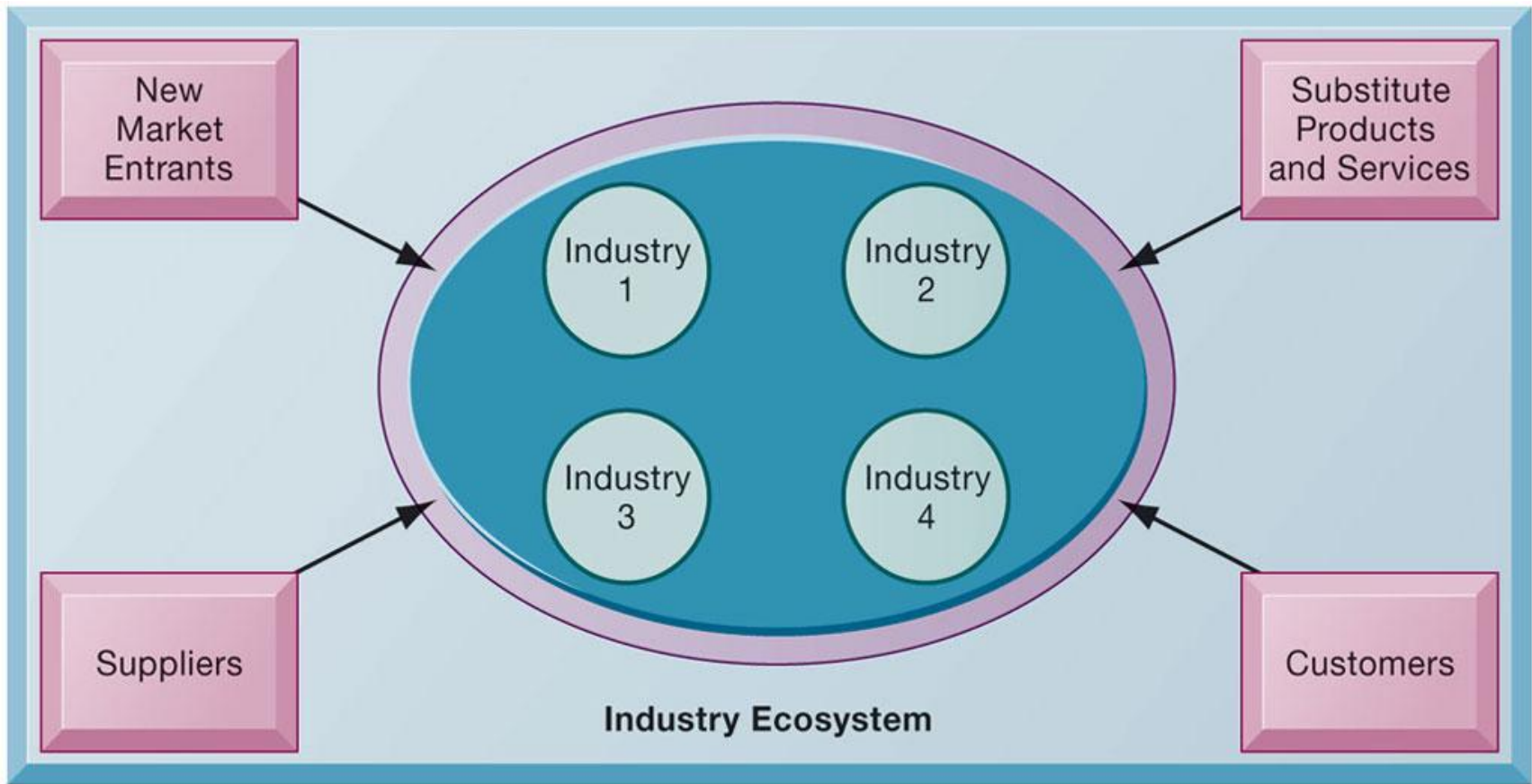
* Loosely coupled but interdependent networks of suppliers, distributors, outsourcing firms, transportation service firms, and technology manufacturers (Iansiti and Levien, 2004)

- **Business ecosystems**

- **Industry sets of firms providing related services and products**
 - Microsoft platform used by thousands of firms
 - Facebook
 - Walmart's order entry and inventory management
- **Keystone firms:** Dominate ecosystem and create platform used by other (niche) 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**

* Similarities and differences between business ecosystems and value webs: The former extends across industries as opposed to just firms within the same industry

Figure 3.11 An Ecosystem Strategic Model



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.

3.7 How AI Can Be Used in Competitive Strategy

- **AI and the Value Chain**
 - Table 3.6
- **AI and Porter's Competitive Forces Model**
 - Table 3.7

3.8 Challenges Posed by Strategic Information Systems

- **Sustaining competitive advantage**
 - **Competitors can retaliate and copy strategic systems**-> competitive advantage is not always sustainable.
 - **Systems may become tools for survival**
- **Aligning IT with business objectives**
 - **Performing strategic systems analysis**
 - Structure of industry
 - Firm value chains (+ industry value chains)
- **Management checklist: Performing a strategic system analysis**
 - **Managers need to perform a strategic systems analysis** to align IT with the business and use ISs effectively for competitive advantage.

* statistics: p.127

3.9 Understand How the Information in This Chapter Can Help Your Career

- The Company: Crayola
- Position Description: Business Development representative
- Job Description
- IT Knowledge
- Career Path and Average Salaries

* Chapter Case Study: AI Redesigns the Fashion Industry