

# Chapter 3

## Information Systems, Organizations, and Strategy

### LEARNING OBJECTIVES

*After reading this chapter, you will be able to answer the following questions:*

1. 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?
2. How does Porter's competitive forces model help companies develop competitive strategies using information systems?
3. How do the value chain and value web models help businesses identify opportunities for strategic information system applications?
4. How do information systems help businesses use synergies, core competencies, and network-based strategies to achieve competitive advantage?
5. What are the challenges posed by strategic information systems and how should they be addressed?

#### *Interactive Sessions:*

Technology Helps Starbucks  
Find New Ways to  
Compete

Automakers Become Software  
Companies

### CHAPTER OUTLINE

- 3.1 **ORGANIZATIONS AND INFORMATION SYSTEMS**  
What Is an Organization?  
Features of Organizations
- 3.2 **HOW INFORMATION SYSTEMS IMPACT ORGANIZATIONS AND BUSINESS FIRMS**  
Economic Impacts  
Organizational and Behavioral Impacts  
The Internet and Organizations  
Implications for the Design and Understanding of Information Systems
- 3.3 **USING INFORMATION SYSTEMS TO ACHIEVE COMPETITIVE ADVANTAGE**  
Porter's Competitive Forces Model  
Information System Strategies for Dealing with Competitive Forces  
The Internet's Impact on Competitive Advantage  
The Business Value Chain Model  
Synergies, Core Competencies, and Network-Based Strategies
- 3.4 **USING SYSTEMS FOR COMPETITIVE ADVANTAGE: MANAGEMENT ISSUES**  
Sustaining Competitive Advantage  
Aligning IT with Business Objectives  
Managing Strategic Transitions

#### **LEARNING TRACK MODULE**

The Changing Business Environment for  
Information Technology

## WILL SEARS'S TECHNOLOGY STRATEGY WORK THIS TIME?

Sears, Roebuck used to be the largest retailer in the United States, with sales representing 1 to 2 percent of the U.S. gross national product for almost 40 years after World War II. Since then, Sears has steadily lost ground to discounters such as Walmart and Target and to competitively priced specialty retailers such as Home Depot and Lowe's. Even the merger with Kmart in 2005 to create Sears Holding Company failed to stop the downward spiral in sales and market share.

Over the years, Sears had invested heavily in information technology. At one time it spent more on information technology and networking than all other non-computer firms in the United States except the Boeing Corporation. Sears used its huge customer databases of 60 million past and present Sears credit card holders to target groups such as tool buyers, appliance buyers, and gardening enthusiasts with special promotions. These efforts did not translate into competitive advantage because Sears's cost structure was one of the highest in its industry.

The company has been slow to reduce operating costs, keep pace with current merchandising trends, and remodel its 2,172 stores, many of which are run-down and in undesirable locations. It is still struggling to find a viable business strategy that will pull it out of its rut. The Sears company tried to use new technology strategies to revive flagging sales: online shopping, mobile apps, and an Amazon.com-like marketplace with other vendors for 18 million products, along with heavy in-store promotions. So far, these efforts have not paid off, and sales have declined since the 2005 merger. The company posted a loss of \$3.1 billion in 2011.

Sears Holdings CEO Lou D'Ambrosio, thinks he has an answer—even more intensive use of technology and mining of customer data. The expectation is that deeper knowledge of customer preferences and buying patterns will make promotions, merchandising, and selling much more effective. Customers will flock to Sears stores because they will be carrying exactly what they want.

A customer loyalty program called Shop Your Way Rewards promises customers generous free deals for repeat purchases if they agree to share their personal shopping data with the company. Sears would not disclose how many customers have signed up for Shop Your Way Rewards, but loyalty-marketing firm Colloquy estimates around 50 million people are members.

Shoppers who use their smartphones to “check in” to some Sears stores will be greeted by Sears employees, who find them using the global-positioning systems on their mobile

devices and then direct them to the flat-panel televisions and French Connection ankle jeans they searched for earlier online. “It’s the equivalent of walking into a coffee shop and not having to say anything as someone prepares your coffee with just the right amount of cream and sugar,” notes Michael Archer of Kurt Salmon management consultants, who had helped design Citibank’s American Airlines loyalty cards.

The data Sears is collecting are changing how its sales floors are arranged and how promotions are designed to attract



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shoppers. For example, work wear has been moved closer to where tools are sold. After data analysis showed that many jewelry customers were men who bought tools, the company created a special Valentine's Day offer for Shop Your Way Rewards members that offered \$100 credit for \$400 spent on jewelry. According to D'Ambrosio, what people are spending using their loyalty points "has exceeded our expectations."

Sears spent several hundred million dollars improving its stores in 2011, including technological enhancements. Woodfield Mall Sears, one of several hundred that was recently remodeled, reflects the new approach. Outdoor clothing from Lands, End dominates the area near the main mall entrance, while pastel-colored women's tops from Covington line the main hall. (Sears owns both of these brands.) Workers use iPads and iPod Touches to access online reviews for customers and check whether items are in stock. Ron Boire, who oversees Sears merchandising and store formats believes that with a little more time and customer information, he can make the store experience much better.

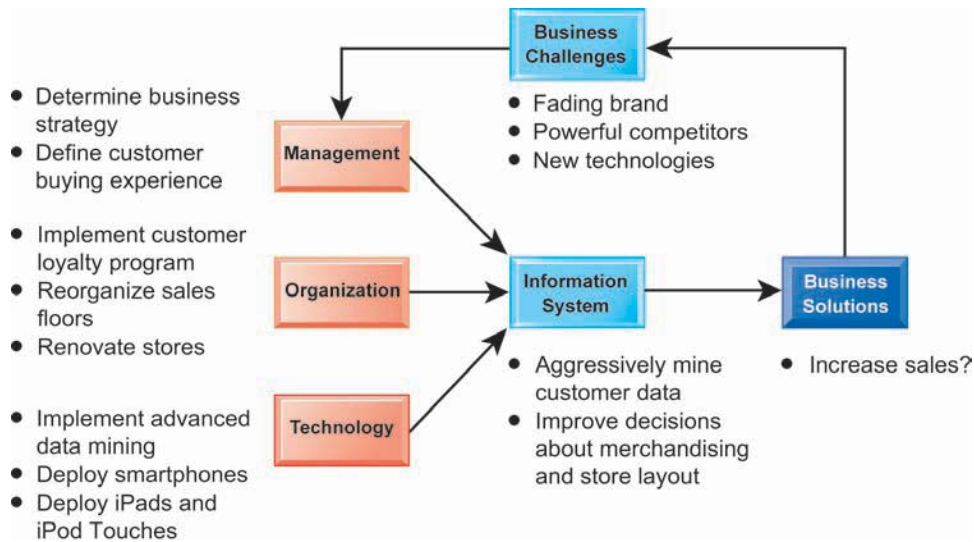
But retail industry experts are skeptical. The Sears Shop Your Way Rewards program is not very different from what Target, Macy's, and other retail chains already offer, and these programs alone cannot turn a company around. Jim Sullivan, a partner at loyalty marketing firm Colloquy, observes that a good loyalty program can be a strategic advantage if the program gives a company better intelligence about what its customers really want. But "even the best loyalty programs can't fix a fundamentally broken brand."

*Sources:* Miguel Bustillo, "The Plan to Rescue Sears," *The Wall Street Journal*, March 12, 2012; Miguel Bustillo and Dana Mattioli, "In Retreat, Sears Set to Unload Stores," *The Wall Street Journal*, February 24, 2012, and Stephanie Clifford, "A Tough Sell at Sears," *The New York Times*, December 21, 2010.

The story of Sears illustrates some of the ways that information systems help businesses compete, and it reveals the challenges of sustaining a competitive advantage. Retailing today is extremely crowded, with many large and powerful players and competition from the Internet as well as other physical stores. At one time, Sears was the top retailer in the United States, but the company is struggling with all of these competitive pressures and is searching for a competitive strategy to regain its footing.

The chapter-opening diagram calls attention to important points raised by this case and this chapter. By all accounts, Sears is a fading brand saddled with too many nonperforming physical stores in undesirable locations. Over the years, it has tried many different competitive strategies—mergers, promotional campaigns, and store renovations, and various technology initiatives. None have been able to stem the tide of red ink. Sears's most recent initiative uses a blend of technology and loyalty-rewards programs in the hope that more aggressive mining of customer data will enable stores to offer the stock customers want and deliver buying superior experiences. The case study shows how clearly difficult this will be to achieve. Both regaining competitive momentum and sustaining a competitive advantage may not be possible for Sears, given its history of missteps and its damaged brand image. Technology alone won't be able to solve Sears's problems until it repairs its tarnished brand image and creates a more robust business model.

Here are some questions to think about: 1. How do the competitive forces and value chain models apply to Sears? 2. Visit a nearby Sears store and observe sales activity. Do you think Sears's new strategy has been implemented there? How effective is it?

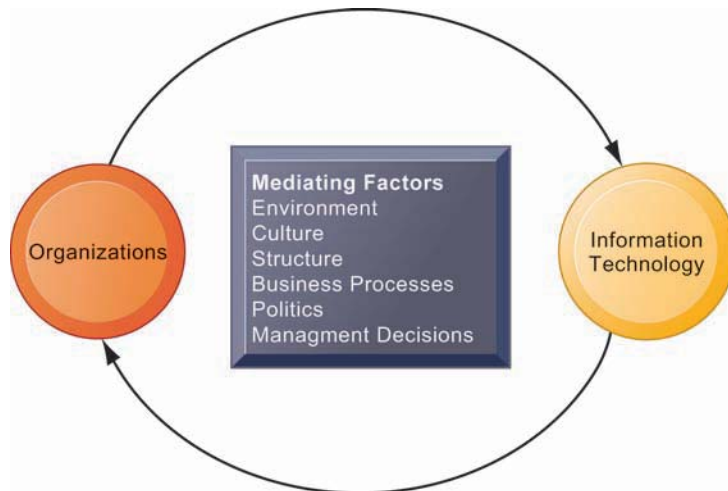


### 3.1 ORGANIZATIONS AND INFORMATION SYSTEMS

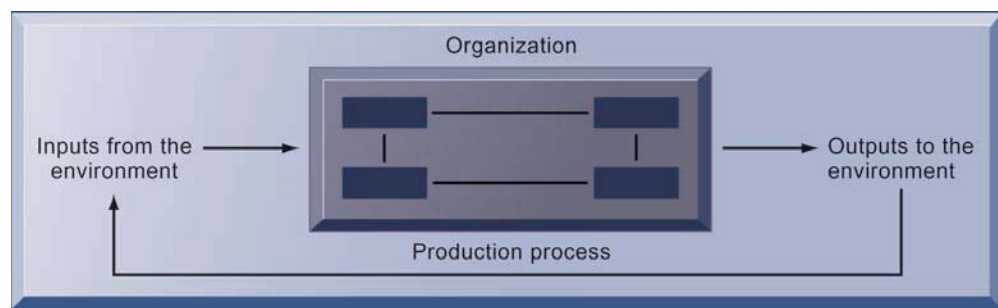
Information systems and organizations influence one another. Information systems are built by managers to serve the interests of the business firm. At the same time, the organization must be aware of and open to the influences of information systems to benefit from new technologies.

The interaction between information technology and organizations is complex and is influenced by many mediating factors, including the organization’s structure, business processes, politics, culture, surrounding environment, and management decisions (see Figure 3.1). You will need to understand how information systems can change social and work life in your firm. You will not be able to design new systems successfully or understand existing systems without understanding your own business organization.

**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.

**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.

As a manager, you will be the one to decide which systems will be built, what they will do, and how they will be implemented. You may not be able to anticipate all of the consequences of these decisions. Some of the changes that occur in business firms because of new information technology (IT) investments cannot be foreseen and have results that may or may not meet your expectations. Who would have imagined fifteen years ago, for instance, that e-mail and instant messaging would become a dominant form of business communication and that many managers would be inundated with more than 200 e-mail messages each day?

## WHAT IS AN ORGANIZATION?

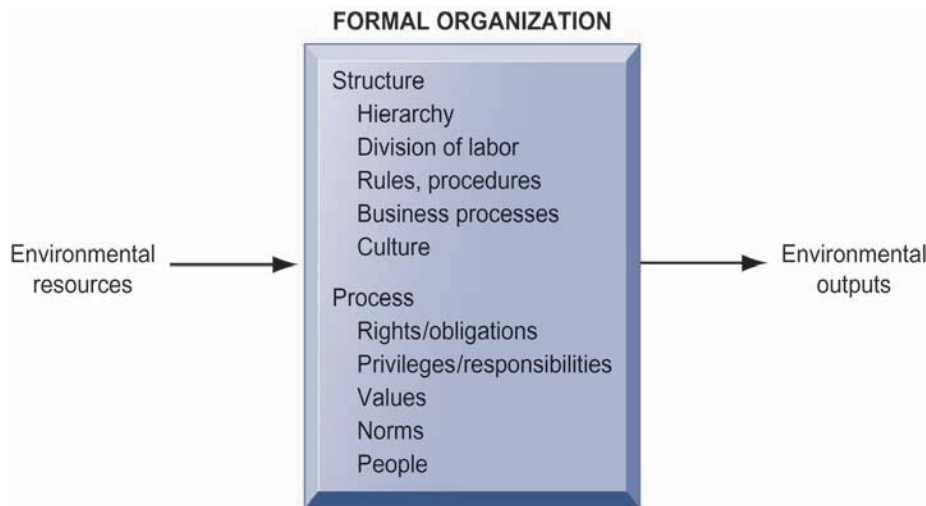
An **organization** is a stable, formal social structure that takes resources from the environment and processes them to produce outputs. This technical definition focuses on three elements of an organization. Capital and labor are primary production factors provided by the environment. The organization (the firm) transforms these inputs into products and services in a production function. The products and services are consumed by environments in return for supply inputs (see Figure 3.2).

An organization is more stable than an informal group (such as a group of friends that meets every Friday for lunch) in terms of longevity and routine-ness. Organizations are formal legal entities with internal rules and procedures that must abide by laws. Organizations are also social structures because they are a collection of social elements, much as a machine has a structure—a particular arrangement of valves, cams, shafts, and other parts.

This definition of organizations is powerful and simple, but it is not very descriptive or even predictive of real-world organizations. A more realistic behavioral definition of an organization is a collection of rights, privileges, obligations, and responsibilities delicately balanced over a period of time through conflict and conflict resolution (see Figure 3.3).

In this behavioral view of the firm, people who work in organizations develop customary ways of working; they gain attachments to existing relationships; and they make arrangements with subordinates and superiors about how work will be done, the amount of work that will be done, and under what conditions



**FIGURE 3.3 THE BEHAVIORAL VIEW OF ORGANIZATIONS**

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

work will be done. Most of these arrangements and feelings are not discussed in any formal rulebook.

How do these definitions of organizations relate to information systems technology? A technical view of organizations encourages us to focus on how inputs are combined to create outputs when technology changes are introduced into the company. The firm is seen as infinitely malleable, with capital and labor substituting for each other quite easily. But the more realistic behavioral definition of an organization suggests that building new information systems, or rebuilding old ones, involves much more than a technical rearrangement of machines or workers—that some information systems change the organizational balance of rights, privileges, obligations, responsibilities, and feelings that have been established over a long period of time.

Changing these elements can take a long time, be very disruptive, and requires more resources to support training and learning. For instance, the length of time required to implement a new information system effectively is much longer than usually anticipated simply because there is a lag between implementing a technical system and teaching employees and managers how to use the system.

Technological change requires changes in who owns and controls information, who has the right to access and update that information, and who makes decisions about whom, when, and how. This more complex view forces us to look at the way work is designed and the procedures used to achieve outputs.

The technical and behavioral definitions of organizations are not contradictory. Indeed, they complement each other: The technical definition tells us how thousands of firms in competitive markets combine capital, labor, and information technology, whereas the behavioral model takes us inside the individual firm to see how that technology affects the organization's inner workings. Section 3.2 describes how each of these definitions of organizations can help explain the relationships between information systems and organizations.

## FEATURES OF ORGANIZATIONS

All modern organizations share certain characteristics. They are bureaucracies with clear-cut divisions of labor and specialization. Organizations arrange specialists in a hierarchy of authority in which everyone is accountable to someone and authority is limited to specific actions governed by abstract rules or procedures. These rules create a system of impartial and universal decision making. Organizations try to hire and promote employees on the basis of technical qualifications and professionalism (not personal connections). The organization is devoted to the principle of efficiency: maximizing output using limited inputs. Other features of organizations include their business processes, organizational culture, organizational politics, surrounding environments, structure, goals, constituencies, and leadership styles. All of these features affect the kinds of information systems used by organizations.

### Routines and Business Processes

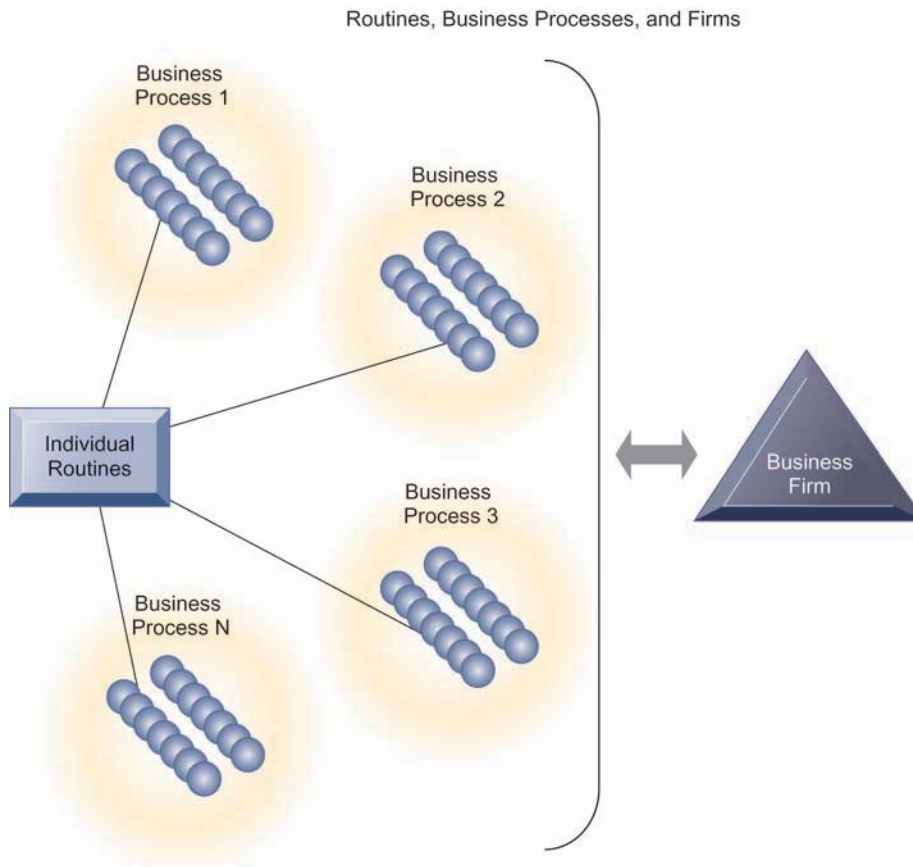
All organizations, including business firms, become very efficient over time because individuals in the firm develop **routines** for producing goods and services. Routines—sometimes called *standard operating procedures*—are precise rules, procedures, and practices that have been developed to cope with virtually all expected situations. As employees learn these routines, they become highly productive and efficient, and the firm is able to reduce its costs over time as efficiency increases. For instance, when you visit a doctor's office, receptionists have a well-developed set of routines for gathering basic information from you; nurses have a different set of routines for preparing you for an interview with a doctor; and the doctor has a well-developed set of routines for diagnosing you. *Business processes*, which we introduced in Chapters 1 and 2, are collections of such routines. A business firm, in turn, is a collection of business processes (Figure 3.4).

### Organizational Politics

People in organizations occupy different positions with different specialties, concerns, and perspectives. As a result, they naturally have divergent viewpoints about how resources, rewards, and punishments should be distributed. These differences matter to both managers and employees, and they result in political struggle for resources, competition, and conflict within every organization. Political resistance is one of the great difficulties of bringing about organizational change—especially the development of new information systems. Virtually all large information systems investments by a firm that bring about significant changes in strategy, business objectives, business processes, and procedures become politically charged events. Managers who know how to work with the politics of an organization will be more successful than less-skilled managers in implementing new information systems. Throughout this book, you will find many examples where internal politics defeated the best-laid plans for an information system.

### Organizational Culture

All organizations have bedrock, unassailable, unquestioned (by the members) assumptions that define their goals and products. Organizational culture encompasses this set of assumptions about what products the organization should produce, how it should produce them, where, and for whom. Generally, these cultural assumptions are taken totally for granted and are

**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.

rarely publicly announced or discussed. Business processes—the actual way business firms produce value—are usually ensconced in the organization's culture.

You can see organizational culture at work by looking around your university or college. Some bedrock assumptions of university life are that professors know more than students, the reason students attend college is to learn, and classes follow a regular schedule. Organizational culture is a powerful unifying force that restrains political conflict and promotes common understanding, agreement on procedures, and common practices. If we all share the same basic cultural assumptions, agreement on other matters is more likely.

At the same time, organizational culture is a powerful restraint on change, especially technological change. Most organizations will do almost anything to avoid making changes in basic assumptions. Any technological change that threatens commonly held cultural assumptions usually meets a great deal of resistance. However, there are times when the only sensible way for a firm to move forward is to employ a new technology that directly opposes an existing organizational culture. When this occurs, the technology is often stalled while the culture slowly adjusts.



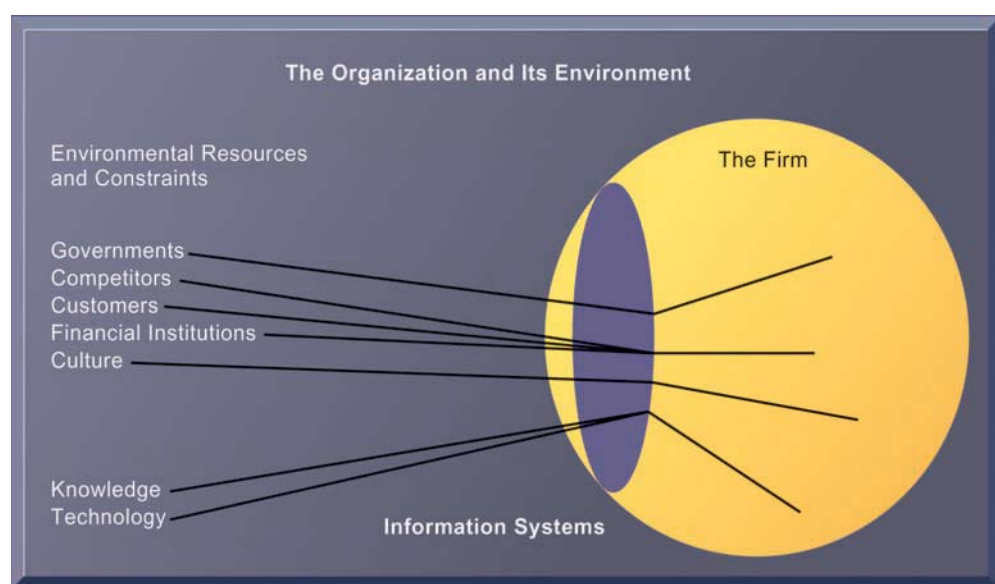
## Organizational Environments

Organizations reside in environments from which they draw resources and to which they supply goods and services. Organizations and environments have a reciprocal relationship. On the one hand, organizations are open to, and dependent on, the social and physical environment that surrounds them. Without financial and human resources—people willing to work reliably and consistently for a set wage or revenue from customers—organizations could not exist. Organizations must respond to legislative and other requirements imposed by government, as well as the actions of customers and competitors. On the other hand, organizations can influence their environments. For example, business firms form alliances with other businesses to influence the political process; they advertise to influence customer acceptance of their products.

Figure 3.5 illustrates the role of information systems in helping organizations perceive changes in their environments and also in helping organizations act on their environments. Information systems are key instruments for *environmental scanning*, helping managers identify external changes that might require an organizational response.

Environments generally change much faster than organizations. New technologies, new products, and changing public tastes and values (many of which result in new government regulations) put strains on any organization's culture, politics, and people. Most organizations are unable to adapt to a rapidly changing environment. Inertia built into an organization's standard operating procedures, the political conflict raised by changes to the existing order, and the threat to closely held cultural values inhibit organizations from making significant changes. Young firms typically lack resources to sustain even short periods of troubled times. It is not surprising that only 10 percent of the Fortune 500 companies in 1919 still exist today.

**FIGURE 3.5 ENVIRONMENTS AND ORGANIZATIONS HAVE A RECIPROCAL RELATIONSHIP**



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.** Sometimes a technology and resulting business innovation comes along to radically change the business landscape and environment. These innovations are loosely called “disruptive.” (Christensen, 2003). What makes a technology disruptive? In some cases, **disruptive technologies** are substitute products that perform as well as or better (often much better) than anything currently produced. The car substituted for the horse-drawn carriage; the word processor for typewriters; the Apple iPod for portable CD players; digital photography for process film photography.

In these cases, entire industries were put out of business. In other cases, disruptive technologies simply extend the market, usually with less functionality and much less cost, than existing products. Eventually they turn into low-cost competitors for whatever was sold before. Disk drives are an example: Small hard disk drives used in PCs extended the market for disk drives by offering cheap digital storage for small files. Eventually, small PC hard disk drives became the largest segment of the disk drive marketplace.

Some firms are able to create these technologies and ride the wave to profits; others learn quickly and adapt their business; still others are obliterated because their products, services, and business models become obsolete. They may be very efficient at doing what no longer needs to be done! There are also cases where no firms benefit, and all the gains go to consumers (firms fail to capture any profits). Table 3.1 describes just a few disruptive technologies from the past.

Disruptive technologies are tricky. Firms that invent disruptive technologies as “first movers” do not always benefit if they lack the resources to exploit the technology or fail to see the opportunity. The MITS Altair 8800 is widely regarded as the first PC, but its inventors did not take advantage of their first mover status. Second movers, so-called “fast followers” such as IBM and

**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.

Microsoft, reaped the rewards. Citibank's ATMs revolutionized retail banking, but they were copied by other banks. Now all banks use ATMs, with the benefits going mostly to the consumers.

## Organizational Structure

All organizations have a structure or shape. Mintzberg's classification, described in Table 3.2, identifies five basic kinds of organizational structure (Mintzberg, 1979).

The kind of information systems you find in a business firm—and the nature of problems with these systems—often reflects the type of organizational structure. For instance, in a professional bureaucracy such as a hospital, it is not unusual to find parallel patient record systems operated by the administration, another by doctors, and another by other professional staff such as nurses and social workers. In small entrepreneurial firms, you will often find poorly designed systems developed in a rush that often quickly outgrow their usefulness. In huge multidivisional firms operating in hundreds of locations, you will often find there is not a single integrating information system, but instead each locale or each division has its set of information systems.

## Other Organizational Features

Organizations have goals and use different means to achieve them. Some organizations have coercive goals (e.g., prisons); others have utilitarian goals (e.g., businesses). Still others have normative goals (universities, religious groups). Organizations also serve different groups or have different constituencies, some primarily benefiting their members, others benefiting clients, stockholders, or the public. The nature of leadership differs greatly from one organization to another—some organizations may be more democratic or authoritarian than others. Another way organizations differ is by the tasks they perform and the technology they use. Some organizations perform primarily

**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.	Midsized 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

routine tasks that can be reduced to formal rules that require little judgment (such as manufacturing auto parts), whereas others (such as consulting firms) work primarily with nonroutine tasks.

## 3.2 HOW INFORMATION SYSTEMS IMPACT ORGANIZATIONS AND BUSINESS FIRMS

Information systems have become integral, online, interactive tools deeply involved in the minute-to-minute operations and decision making of large organizations. Over the last decade, information systems have fundamentally altered the economics of organizations and greatly increased the possibilities for organizing work. Theories and concepts from economics and sociology help us understand the changes brought about by IT.

### ECONOMIC IMPACTS

From the point of view of economics, IT changes both the relative costs of capital and the costs of information. Information systems technology can be viewed as a factor of production that can be substituted for traditional capital and labor. As the cost of information technology decreases, it is substituted for labor, which historically has been a rising cost. Hence, information technology should result in a decline in the number of middle managers and clerical workers as information technology substitutes for their labor.

As the cost of information technology decreases, it also substitutes for other forms of capital such as buildings and machinery, which remain relatively expensive. Hence, over time we should expect managers to increase their investments in IT because of its declining cost relative to other capital investments.

IT also affects the cost and quality of information and changes the economics of information. Information technology helps firms contract in size because it can reduce transaction costs—the costs incurred when a firm buys on the marketplace what it cannot make itself. According to **transaction cost theory**, firms and individuals seek to economize on transaction costs, much as they do on production costs. Using markets is expensive because of costs such as locating and communicating with distant suppliers, monitoring contract compliance, buying insurance, obtaining information on products, and so forth (Coase, 1937; Williamson, 1985). Traditionally, firms have tried to reduce transaction costs through vertical integration, by getting bigger, hiring more employees, and buying their own suppliers and distributors, as both General Motors and Ford used to do.

Information technology, especially the use of networks, can help firms lower the cost of market participation (transaction costs), making it worthwhile for firms to contract with external suppliers instead of using internal sources. As a result, firms can shrink in size (numbers of employees) because it is far less expensive to outsource work to a competitive marketplace rather than hire employees.

For instance, by using computer links to external suppliers, the Chrysler Corporation can achieve economies by obtaining more than 70 percent of its parts from the outside. Information systems make it possible for companies such as Cisco Systems and Dell Inc. to outsource their production to contract manufacturers such as Flextronics instead of making their products themselves.

As transaction costs decrease, firm size (the number of employees) should shrink because it becomes easier and cheaper for the firm to contract for the purchase of goods and services in the marketplace rather than to make the product or offer the service itself. Firm size can stay constant or contract even as the company increases its revenues. For example, when Eastman Chemical Company split off from Kodak in 1994, it had \$3.3 billion in revenue and 24,000 full-time employees. In 2011, it generated over \$7.2 billion in revenue with only 10,000 employees.

Information technology also can reduce internal management costs. According to **agency theory**, the firm is viewed as a “nexus of contracts” among self-interested individuals rather than as a unified, profit-maximizing entity (Jensen and Meckling, 1976). A principal (owner) employs “agents” (employees) to perform work on his or her behalf. However, agents need constant supervision and management; otherwise, they will tend to pursue their own interests rather than those of the owners. As firms grow in size and scope, agency costs or coordination costs rise because owners must expend more and more effort supervising and managing employees.

Information technology, by reducing the costs of acquiring and analyzing information, permits organizations to reduce agency costs because it becomes easier for managers to oversee a greater number of employees. By reducing overall management costs, information technology enables firms to increase revenues while shrinking the number of middle managers and clerical workers. We have seen examples in earlier chapters where information technology expanded the power and scope of small organizations by enabling them to perform coordinating activities such as processing orders or keeping track of inventory with very few clerks and managers.

Because IT reduces both agency and transaction costs for firms, we should expect firm size to shrink over time as more capital is invested in IT. Firms should have fewer managers, and we expect to see revenue per employee increase over time.

## ORGANIZATIONAL AND BEHAVIORAL IMPACTS

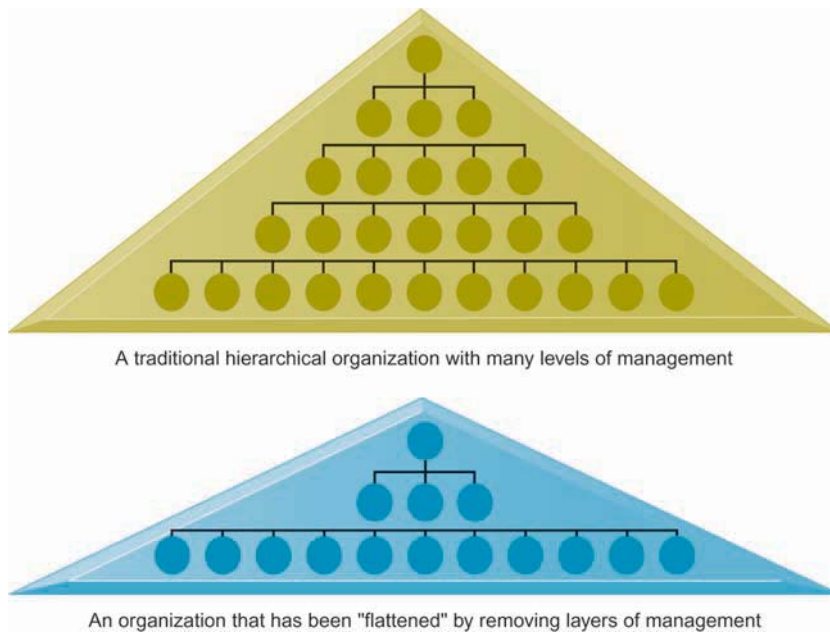
Theories based in the sociology of complex organizations also provide some understanding about how and why firms change with the implementation of new IT applications.

### IT Flattens Organizations

Large, bureaucratic organizations, which primarily developed before the computer age, are often inefficient, slow to change, and less competitive than newly created organizations. Some of these large organizations have downsized, reducing the number of employees and the number of levels in their organizational hierarchies.

Behavioral researchers have theorized that information technology facilitates flattening of hierarchies by broadening the distribution of information to empower lower-level employees and increase management efficiency (see Figure 3.6). IT pushes decision-making rights lower in the organization because lower-level employees receive the information they need to make decisions without supervision. (This empowerment is also possible because of higher educational levels among the workforce, which give employees the capabilities to make intelligent decisions.) Because managers now receive so much more accurate information on time, they become much faster at making decisions, so fewer managers are required. Management costs decline as a percentage of revenues, and the hierarchy becomes much more efficient.



**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.

These changes mean that the management span of control has also been broadened, enabling high-level managers to manage and control more workers spread over greater distances. Many companies have eliminated thousands of middle managers as a result of these changes.

### Postindustrial Organizations

Postindustrial theories based more on history and sociology than economics also support the notion that IT should flatten hierarchies. In postindustrial societies, authority increasingly relies on knowledge and competence, and not merely on formal positions. Hence, the shape of organizations flattens because professional workers tend to be self-managing, and decision making should become more decentralized as knowledge and information become more widespread throughout the firm (Drucker, 1988).

Information technology may encourage task force-networked organizations in which groups of professionals come together—face to face or electronically—for short periods of time to accomplish a specific task (e.g., designing a new automobile); once the task is accomplished, the individuals join other task forces. The global consulting service Accenture is an example. Many of its 246,000 employees move from location to location to work on projects at client locations in more than 120 different countries.

Who makes sure that self-managed teams do not head off in the wrong direction? Who decides which person works on which team and for how long? How can managers evaluate the performance of someone who is constantly rotating from team to team? How do people know where their careers are headed? New approaches for evaluating, organizing, and

informing workers are required, and not all companies can make virtual work effective.

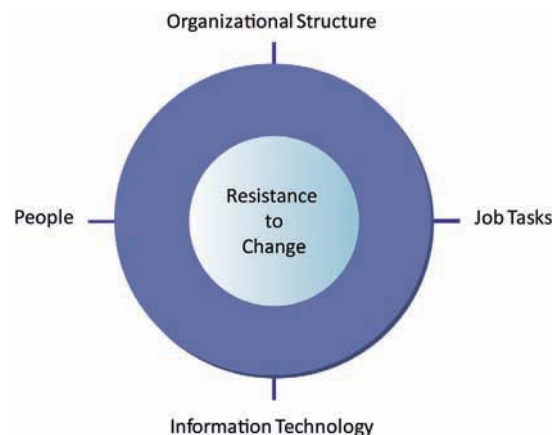
### Understanding Organizational Resistance to Change

Information systems inevitably become bound up in organizational politics because they influence access to a key resource—namely, information. Information systems can affect who does what to whom, when, where, and how in an organization. Many new information systems require changes in personal, individual routines that can be painful for those involved and require retraining and additional effort that may or may not be compensated. Because information systems potentially change an organization's structure, culture, business processes, and strategy, there is often considerable resistance to them when they are introduced.

There are several ways to visualize organizational resistance. Research on organizational resistance to innovation suggests that four factors are paramount: the nature of the IT innovation, the organization's structure, the culture of people in the organization, and the tasks impacted by the innovation (see Figure 3.7). Here, changes in technology are absorbed, interpreted, deflected, and defeated by organizational task arrangements, structures, and people. In this model, the only way to bring about change is to change the technology, tasks, structure, and people simultaneously. Other authors have spoken about the need to “unfreeze” organizations before introducing an innovation, quickly implementing it, and “refreezing” or institutionalizing the change (Kolb, 1970).

Because organizational resistance to change is so powerful, many information technology investments flounder and do not increase productivity. Indeed, research on project implementation failures demonstrates that the most common reason for failure of large projects to reach their objectives is not the failure of the technology, but organizational and political resistance to change. Chapter 14 treats this issue in detail. Therefore, as a manager involved in future IT investments, your ability to work with people and organizations is just as important as your technical awareness and knowledge.

**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 INTERNET AND ORGANIZATIONS

The Internet, especially the World Wide Web, has an important impact on the relationships between many firms and external entities, and even on the organization of business processes inside a firm. The Internet increases the accessibility, storage, and distribution of information and knowledge for organizations. In essence, the Internet is capable of dramatically lowering the transaction and agency costs facing most organizations. For instance, brokerage firms and banks in New York can now deliver their internal operating procedures manuals to their employees at distant locations by posting them on the corporate Web site, saving millions of dollars in distribution costs. A global sales force can receive nearly instant product price information updates using the Web or instructions from management sent by e-mail. Vendors of some large retailers can access retailers' internal Web sites directly to find up-to-the-minute sales information and to initiate replenishment orders instantly.

Businesses are rapidly rebuilding some of their key business processes based on Internet technology and making this technology a key component of their IT infrastructures. If prior networking is any guide, one result will be simpler business processes, fewer employees, and much flatter organizations than in the past.

## IMPLICATIONS FOR THE DESIGN AND UNDERSTANDING OF INFORMATION SYSTEMS

To deliver genuine benefits, information systems must be built with a clear understanding of the organization in which they will be used. In our experience, the central organizational factors to consider when planning a new system are the following:

- The environment in which the organization must function
- The structure of the organization: hierarchy, specialization, routines, and business processes
- The organization's culture and politics
- The type of organization and its style of leadership
- The principal interest groups affected by the system and the attitudes of workers who will be using the system
- The kinds of tasks, decisions, and business processes that the information system is designed to assist

### 3.3 USING INFORMATION SYSTEMS TO ACHIEVE COMPETITIVE ADVANTAGE

In almost every industry you examine, you will find some firms do better than most others. There's almost always a stand-out firm. In the automotive industry, Toyota is considered a superior performer. In pure online retail, Amazon is the leader; in off-line retail, Walmart, the largest retailer on earth, is the leader. In online music, Apple's iTunes is considered the leader with more than 70 percent of digital music sold worldwide, and in the related industry of digital music players, the iPod is the leader. In Web search, Google is considered the leader.

Firms that “do better” than others are said to have a competitive advantage over others: They either have access to special resources that others do not, or they are able to use commonly available resources more efficiently—usually because of superior knowledge and information assets. In any event, they do better in terms of revenue growth, profitability, or productivity growth (efficiency), all of which ultimately in the long run translate into higher stock market valuations than their competitors.

But why do some firms do better than others and how do they achieve competitive advantage? How can you analyze a business and identify its strategic advantages? How can you develop a strategic advantage for your own business? And how do information systems contribute to strategic advantages? One answer to that question is Michael Porter’s competitive forces model.

## PORTER’S COMPETITIVE FORCES MODEL

Arguably, the most widely used model for understanding competitive advantage is Michael Porter’s **competitive forces model** (see Figure 3.8). This model provides a general view of the firm, its competitors, and the firm’s environment. Earlier in this chapter, we described the importance of a firm’s environment and the dependence of firms on environments. Porter’s model is all about the firm’s general business environment. In this model, five competitive forces shape the fate of the firm.

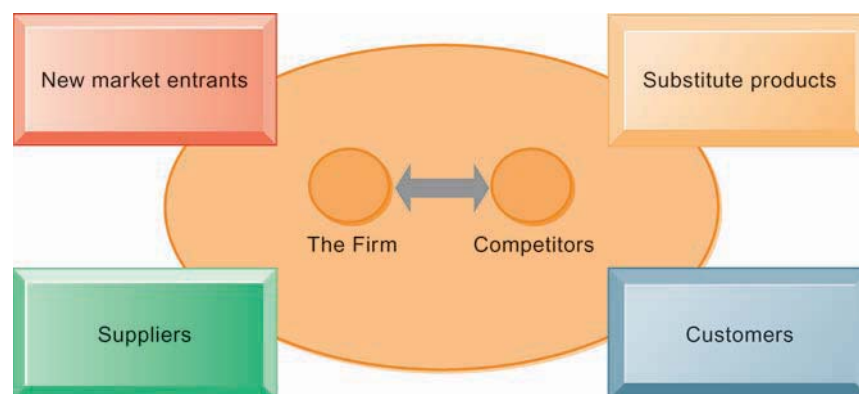
### Traditional Competitors

All firms share market space with other competitors who are continuously devising new, more efficient ways to produce by introducing new products and services, and attempting to attract customers by developing their brands and imposing switching costs on their customers.

### New Market Entrants

In a free economy with mobile labor and financial resources, new companies are always entering the marketplace. In some industries, there are very low barriers to entry, whereas in other industries, entry is very difficult. For

**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.

instance, it is fairly easy to start a pizza business or just about any small retail business, but it is much more expensive and difficult to enter the computer chip business, which has very high capital costs and requires significant expertise and knowledge that is hard to obtain. New companies have several possible advantages: They are not locked into old plants and equipment, they often hire younger workers who are less expensive and perhaps more innovative, they are not encumbered by old worn-out brand names, and they are “more hungry” (more highly motivated) than traditional occupants of an industry. These advantages are also their weakness: They depend on outside financing for new plants and equipment, which can be expensive; they have a less-experienced workforce; and they have little brand recognition.

### Substitute Products and Services

In just about every industry, there are substitutes that your customers might use if your prices become too high. New technologies create new substitutes all the time. Even oil has substitutes: Ethanol can substitute for gasoline in cars; vegetable oil for diesel fuel in trucks; and wind, solar, coal, and hydro power for industrial electricity generation. Likewise, the Internet telephone service can substitute for traditional telephone service, and fiber-optic telephone lines to the home can substitute for cable TV lines. And, of course, an Internet music service that allows you to download music tracks to an iPod is a substitute for CD-based music stores. The more substitute products and services in your industry, the less you can control pricing and the lower your profit margins.

### Customers

A profitable company depends in large measure on its ability to attract and retain customers (while denying them to competitors), and charge high prices. The power of customers grows if they can easily switch to a competitor's products and services, or if they can force a business and its competitors to compete on price alone in a transparent marketplace where there is little **product differentiation**, and all prices are known instantly (such as on the Internet). For instance, in the used college textbook market on the Internet, students (customers) can find multiple suppliers of just about any current college textbook. In this case, online customers have extraordinary power over used-book firms.

### Suppliers

The market power of suppliers can have a significant impact on firm profits, especially when the firm cannot raise prices as fast as can suppliers. The more different suppliers a firm has, the greater control it can exercise over suppliers in terms of price, quality, and delivery schedules. For instance, manufacturers of laptop PCs almost always have multiple competing suppliers of key components, such as keyboards, hard drives, and display screens.

## INFORMATION SYSTEM STRATEGIES FOR DEALING WITH COMPETITIVE FORCES

What is a firm to do when it is faced with all these competitive forces? And how can the firm use information systems to counteract some of these forces? How do you prevent substitutes and inhibit new market entrants? There are four generic strategies, each of which often is enabled by using information technology and systems: low-cost leadership, product differentiation, focus on market niche, and strengthening customer and supplier intimacy.



Supermarkets and large retail stores such as Walmart use sales data captured at the checkout counter to determine which items have sold and need to be reordered. Walmart's continuous replenishment system transmits orders to restock directly to its suppliers. The system enables Walmart to keep costs low while fine-tuning its merchandise to meet customer demands.



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## Low-Cost Leadership

Use information systems to achieve the lowest operational costs and the lowest prices. The classic example is Walmart. By keeping prices low and shelves well stocked using a legendary inventory replenishment system, Walmart became the leading retail business in the United States. Walmart's continuous replenishment system sends orders for new merchandise directly to suppliers as soon as consumers pay for their purchases at the cash register. Point-of-sale terminals record the bar code of each item passing the checkout counter and send a purchase transaction directly to a central computer at Walmart headquarters. The computer collects the orders from all Walmart stores and transmits them to suppliers. Suppliers can also access Walmart's sales and inventory data using Web technology.

Because the system replenishes inventory with lightning speed, Walmart does not need to spend much money on maintaining large inventories of goods in its own warehouses. The system also enables Walmart to adjust purchases of store items to meet customer demands. Competitors, such as Sears, have been spending 24.9 percent of sales on overhead. But by using systems to keep operating costs low, Walmart pays only 16.6 percent of sales revenue for overhead. (Operating costs average 20.7 percent of sales in the retail industry.)

Walmart's continuous replenishment system is also an example of an **efficient customer response system**. An efficient customer response system directly links consumer behavior to distribution and production and supply chains. Walmart's continuous replenishment system provides such an efficient customer response.

## Product Differentiation

Use information systems to enable new products and services, or greatly change the customer convenience in using your existing products and services. For instance, Google continuously introduces new and unique search services

on its Web site, such as Google Maps. By purchasing PayPal, an electronic payment system, in 2003, eBay made it much easier for customers to pay sellers and expanded use of its auction marketplace. Apple created the iPod, a unique portable digital music player, plus a unique online Web music service where songs can be purchased for \$.69 to \$1.29 each. Apple has continued to innovate with its multimedia iPhone, iPad tablet computer, and iPod video player.

Manufacturers and retailers are using information systems to create products and services that are customized and personalized to fit the precise specifications of individual customers. For example, Nike sells customized sneakers through its NIKEiD program on its Web site. Customers are able to select the type of shoe, colors, material, outsoles, and even a logo of up to eight characters. Nike transmits the orders via computers to specially equipped plants in China and Korea. The sneakers cost only \$10 extra and take about three weeks to reach the customer. This ability to offer individually tailored products or services using the same production resources as mass production is called **mass customization**.

Table 3.3 lists a number of companies that have developed IT-based products and services that other firms have found difficult to copy, or at least a long time to copy.

### Focus on Market Niche

Use information systems to enable a specific market focus, and serve this narrow target market better than competitors. Information systems support this strategy by producing and analyzing data for finely tuned sales and marketing techniques. Information systems enable companies to analyze customer buying patterns, tastes, and preferences closely so that they efficiently pitch advertising and marketing campaigns to smaller and smaller target markets.

The data come from a range of sources—credit card transactions, demographic data, purchase data from checkout counter scanners at supermarkets and retail stores, and data collected when people access and interact with Web sites. Sophisticated software tools find patterns in these large pools of data and infer rules from them to guide decision making. Analysis of such data drives one-to-one marketing that creates personal messages based on individualized preferences. For example, Hilton Hotels' OnQ system analyzes detailed data collected on active guests in all of its properties to determine the preferences of each guest and each guest's profitability. Hilton uses this information to give its most profitable customers additional privileges, such as late

**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 over 13 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.

checkouts. Contemporary customer relationship management (CRM) systems feature analytical capabilities for this type of intensive data analysis (see Chapters 2 and 9).

Credit card companies are able to use this strategy to predict their most profitable cardholders. The companies gather vast quantities of data about consumer purchases and other behaviors and mine these data to construct detailed profiles that identify cardholders who might be good or bad credit risks. We discuss the tools and technologies for data analysis in Chapters 6 and 12.

### Strengthen Customer and Supplier Intimacy

Use information systems to tighten linkages with suppliers and develop intimacy with customers. Chrysler Corporation uses information systems to facilitate direct access by suppliers to production schedules, and even permits suppliers to decide how and when to ship supplies to Chrysler factories. This allows suppliers more lead time in producing goods. On the customer side, Amazon keeps track of user preferences for book and CD purchases, and can recommend titles purchased by others to its customers. Strong linkages to customers and suppliers increase **switching costs** (the cost of switching from one product to a competing product), and loyalty to your firm.

Table 3.4 summarizes the competitive strategies we have just described. Some companies focus on one of these strategies, but you will often see companies pursuing several of them simultaneously. Starbucks, discussed in the Interactive Session on Organizations, is an example.

## THE INTERNET'S IMPACT ON COMPETITIVE ADVANTAGE

Because of the Internet, the traditional competitive forces are still at work, but competitive rivalry has become much more intense (Porter, 2001). Internet technology is based on universal standards that any company can use, making it easy for rivals to compete on price alone and for new competitors to enter the market. Because information is available to everyone, the Internet raises the bargaining power of customers, who can quickly find the lowest-cost provider

**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	Google, eBay, Apple, Lands' End
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	Chrysler Corporation, Amazon

## INTERACTIVE SESSION: ORGANIZATIONS

### TECHNOLOGY HELPS STARBUCKS FIND NEW WAYS TO COMPETE

Starbucks is the world's largest specialty coffee retailer, with over 1,700 coffee shops in 55 countries. For years, Starbucks grew throughout the United States and internationally, opening franchises at an impressive rate. From 2002 to 2007 alone, the company tripled the number of stores it operated worldwide. Starbucks offers a unique experience: high-end specialty coffees and beverages, friendly and knowledgeable servers, and customer-friendly coffee shops. This was a winning formula for many years and enabled Starbucks to charge premium prices.

During the economic downturn beginning in 2008, profits plunged. Customers complained that the company had lost its hip, local feel and had become more like a fast-food chain. Many coffee drinkers went in search of cheaper alternatives from McDonald's and Dunkin' Donuts for their coffee fixes. Starbucks stock lost over 50 percent of its value by the end of 2008. Major changes were in order.

Starbucks seized the opportunity to overhaul its business by using several different strategies simultaneously. First, the company has revamped its in-store technology and sought to integrate its business processes with wireless technology and the mobile digital platform. Also, rather than copy the practices of competitors, Starbucks pursued a more aggressive product differentiation strategy, intended to emphasize the high quality of their drinks and efficient and helpful customer service. At the same time, however, Starbucks also focused on becoming 'lean', like many of their competitors, eliminating inefficiency wherever possible.

When Starbucks set out to improve its customer experience, it found that more than a third of its customers are active users of smartphones. The company set out to implement several features and improvements that would appeal to this segment of its customer base. First, Starbucks implemented a technology that allows customers to pay using a smartphone app. The app is integrated with the Starbucks Card system, which allows regular customers to pay with a pre-paid and rechargeable card at any Starbucks branch. When customers make a purchase using the app, a cashier scans a bar code displayed on the phone, and the resulting sale is charged to the customer's Starbucks Card

account. Customers report that paying using this app, available for all major smartphone operating systems, is much faster than traditional forms of payment. In its first 15 months of use, the Starbucks mobile payment system processed 42 million transactions.

Many of Starbucks' most loyal customers regularly spend time using the free Wi-Fi wireless network offered in each store. A majority of these customers also use mobile devices to connect to the in-store Wi-Fi networks. Recognizing this, Starbucks launched what it calls the "Starbucks Digital Network," a portal designed specifically for mobile devices as opposed to traditional Web browsers. The site is optimized for all major smartphone operating systems (iOS, Android, and BlackBerry), and responds to the multi-touch capability of devices like the iPad.

The Starbucks Digital Network site was developed in partnership with Yahoo and functions as a content portal. Starbucks customers using the site will receive free Wall Street Journal access, select free iTunes downloads, and a wide variety of other content. The site will integrate with Foursquare, a location-based social networking site for mobile devices. This arrangement will allow users to check in and receive award points using Starbucks' site. Because Starbucks has the most Foursquare check-ins of any company to date, this feature has been popular with customers.

Rather than serve ads on the site, Starbucks has opted to offer the site free of advertising, hoping that striking deals with content providers will make it a profitable venture. Even if the Starbucks Digital Network is not highly profitable, analysts suggest that the site is an effective way for Starbucks to improve its relationship with its most valuable customers and a creative use of the mobile digital platform to enhance customer satisfaction.

In addition to revamping their business to better serve the needs of their mobile users, Starbucks has made a concerted effort to become more efficient, reduce waste, and use the time saved to provide better customer service. Starbucks set out to streamline the business processes used in each of its stores so that baristas do not need to bend down to scoop coffee, cutting down on idle



time while waiting for coffee to drain, and finding ways to reduce the amount of time each employee spends making a drink. Starbucks created a 10 person “lean team” whose job is to travel the country visiting franchises and coaching them in lean techniques made famous by automaker Toyota’s production system.

Store labor costs Starbucks about \$2.5 billion, amounting to 24 percent of its annual revenue. If Starbucks is able to reduce the time each employee spends making a drink, the company can make more drinks with the same number of workers or with fewer workers. Alternatively, Starbucks could use this time savings to give baristas more time to interact with customers and hopefully improve the Starbucks experience.

Wireless technology enhanced Starbucks’ business process simplification effort. Starbucks district managers use the in-store wireless networks to run store operations and to connect to the company’s private corporate network and systems. Starbucks district managers were equipped with Wi-Fi enabled laptops for this purpose. Before the in-store wireless networks were implemented, a district manager who oversaw around 10 stores had to visit each store, review its operations, develop a list of items on which to follow up, and then drive to a Starbucks regional office to file reports and send e-mail. Instead of running the business from cubicles in regional headquarters, Starbucks district managers can do most of their work sitting at a table in one of the stores they oversee. The time saved from going back and forth to regional offices can be used to observe how employees are serving customers and

improve their training. Implementing Wi-Fi technology enabled Starbucks to increase the in-store presence of district managers by 25 percent without adding any extra managers.

In 2008 and 2009, the weakened economy forced Starbucks to close 900 stores, renegotiate some rents, cut prices on some of their big ticket items, and begin offering price-reduced specials, such as a breakfast sandwich and a drink for \$3.95. Cost reductions from procedural changes made it possible for Starbucks to offer these lower prices.

Major fast food chains already used these techniques. While some baristas have resisted the changes, and analysts were skeptical that the changes would take hold, Starbucks attributes much of its recent uptick in profits to its efforts to go lean. Starbucks CEO Howard Schultz said that “the majority of cost reductions we’ve achieved come from a new way of operating and serving our customers,” and also added that the time and money saved was also allowing the company to improve its customer engagement. By 2011, Starbucks had returned to profitability and continuing growth, with plans to open 500 new stores, in large part because of the success of each these changes.

*Sources:* “Starbucks Corporation,” *The New York Times*, January 26, 2012; Mark Raby, “Starbucks Mobile Payments Hit 42 Million,” Mark Raby, “Starbucks Mobile Payments Hit 42 Million,” *SlashGear*, April 9, 2012; Trefis Team, “Starbucks Brews Up Smartphone Payment Platform,” *Forbes*, February 7, 2011; <http://blogs.forbes.com/greatspeculations/2011/02/17/starbucks-brews-up-smartphone-payment-platform/>; Ryan Kim, “Starbucks’ New Portal Designed with Mobile in Mind,” *Businessweek*, September 2, 2010; Starbucks Form 10-K for Fiscal Year ended October 2, 2011; Julie Jargon, “Latest Starbucks Buzzword: ‘Lean’ Japanese Techniques,” *The Wall Street Journal*, August 4, 2009.

## CASE STUDY QUESTIONS

1. Analyze Starbucks using the competitive forces and value chain models.
2. What is Starbucks’ business strategy? Assess the role played by technology in this business strategy.
3. How much has technology helped Starbucks compete? Explain your answer.

on the Web. Profits have been dampened. Table 3.5 summarizes some of the potentially negative impacts of the Internet on business firms identified by Porter.

The Internet has nearly destroyed some industries and has severely threatened more. For instance, the printed encyclopedia industry and the travel agency industry have been nearly decimated by the availability of substitutes



**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

over the Internet. Likewise, the Internet has had a significant impact on the retail, music, book, retail brokerage, software, telecommunications, and newspaper industries.

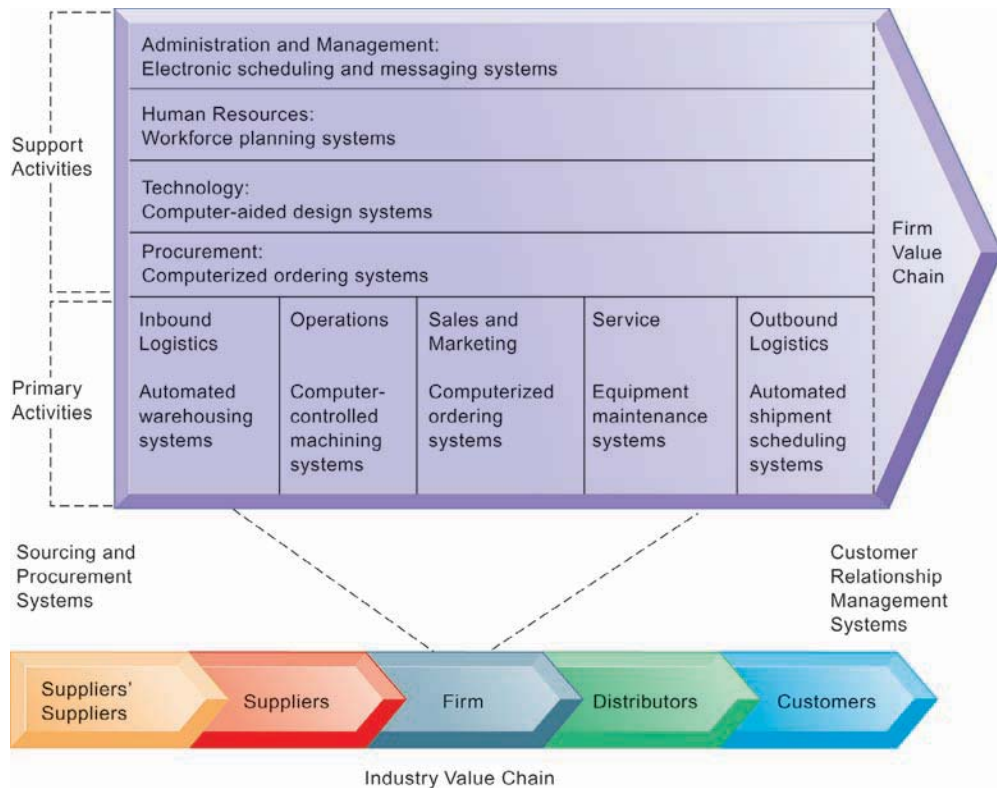
However, the Internet has also created entirely new markets, formed the basis for thousands of new products, services, and business models, and provided new opportunities for building brands with very large and loyal customer bases. Amazon, eBay, iTunes, YouTube, Facebook, Travelocity, and Google are examples. In this sense, the Internet is “transforming” entire industries, forcing firms to change how they do business.

For most forms of media, the Internet has posed a threat to business models and profitability. Growth in book sales other than textbooks and professional publications has been sluggish, as new forms of entertainment continue to compete for consumers' time. Newspapers and magazines have been hit even harder, as their readerships diminish, their advertisers shrink, and more people get their news for free online. The television and film industries have been forced to deal with pirates who are robbing them of some of their profits. The chapter-ending case explores the impact of the Internet on retail bookstores and book publishers.

## THE BUSINESS VALUE CHAIN MODEL

Although the Porter model is very helpful for identifying competitive forces and suggesting generic strategies, it is not very specific about what exactly to do, and it does not provide a methodology to follow for achieving competitive advantages. If your goal is to achieve operational excellence, where do you start? Here's where the business value chain model is helpful.

The **value chain model** highlights specific activities in the business where competitive strategies can best be applied (Porter, 1985) and where information systems are most likely to have a strategic impact. This model identifies specific, critical leverage points where a firm can use information technology most effectively to enhance its competitive position. The value chain model views the firm as a series or chain of basic activities that add a margin of value to a firm's products or services. These activities can be categorized as either primary activities or support activities (see Figure 3.9 on p. 132).

**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.

**Primary activities** are most directly related to the production and distribution of the firm's products and services, which create value for the customer. Primary activities include inbound logistics, operations, outbound logistics, sales and marketing, and service. Inbound logistics includes receiving and storing materials for distribution to production. Operations transforms inputs into finished products. Outbound logistics entails storing and distributing finished products. Sales and marketing includes promoting and selling the firm's products. The service activity includes maintenance and repair of the firm's goods and services.

**Support activities** make the delivery of the primary activities possible and consist of organization infrastructure (administration and management), human resources (employee recruiting, hiring, and training), technology (improving products and the production process), and procurement (purchasing input).

Now you can ask at each stage of the value chain, "How can we use information systems to improve operational efficiency, and improve customer and supplier intimacy?" This will force you to critically examine how you perform value-adding activities at each stage and how the business processes might be improved. You can also begin to ask how information systems can be used to improve the relationship with customers and with suppliers who lie outside the firm's value chain but belong to the firm's extended value chain where they

are absolutely critical to your success. Here, supply chain management systems that coordinate the flow of resources into your firm, and customer relationship management systems that coordinate your sales and support employees with customers, are two of the most common system applications that result from a business value chain analysis. We discuss these enterprise applications in detail later in Chapter 9.

Using the business value chain model will also cause you to consider benchmarking your business processes against your competitors or others in related industries, and identifying industry best practices. **Benchmarking** involves comparing the efficiency and effectiveness of your business processes against strict standards and then measuring performance against those standards. Industry **best practices** are usually identified by consulting companies, research organizations, government agencies, and industry associations as the most successful solutions or problem-solving methods for consistently and effectively achieving a business objective.

Once you have analyzed the various stages in the value chain at your business, you can come up with candidate applications of information systems. Then, once you have a list of candidate applications, you can decide which to develop first. By making improvements in your own business value chain that your competitors might miss, you can achieve competitive advantage by attaining operational excellence, lowering costs, improving profit margins, and forging a closer relationship with customers and suppliers. If your competitors are making similar improvements, then at least you will not be at a competitive disadvantage—the worst of all cases!

In the Interactive Session on Technology, we can see how value chain analysis might have helped automakers refine their competitive strategies. Ford, GM, and other leading automakers are adding more value to their products by offering software interfaces and applications for improving vehicle performance, providing entertainment, and integrating with other systems for maintenance and future traffic control.

### Extending the Value Chain: The Value Web

Figure 3.9 shows that a firm's value chain is linked to the value chains of its suppliers, distributors, and customers. After all, the performance of most firms depends not only on what goes on inside a firm but also on how well the firm coordinates with direct and indirect suppliers, delivery firms (logistics partners, such as FedEx or UPS), and, of course, customers.

How can information systems be used to achieve strategic advantage at the industry level? By working with other firms, industry participants can use information technology to develop industry-wide standards for exchanging information or business transactions electronically, which force all market participants to subscribe to similar standards. Such efforts increase efficiency, making product substitution less likely and perhaps raising entry costs—thus discouraging new entrants. Also, industry members can build industry-wide, IT-supported consortia, symposia, and communications networks to coordinate activities concerning government agencies, foreign competition, and competing industries.

Looking at the industry value chain encourages you to think about how to use information systems to link up more efficiently with your suppliers, strategic partners, and customers. Strategic advantage derives from your ability to relate your value chain to the value chains of other partners in the process. For instance, if you are Amazon.com, you want to build systems that:

## INTERACTIVE SESSION: TECHNOLOGY

### AUTOMAKERS BECOME SOFTWARE COMPANIES

As the smartphone market continues to expand and initiatives like smart electric grids continue to pick up steam, another industry has begun getting “smarter” with software and apps: the automobile industry. Ford, BMW, and other automobile companies are enhancing their vehicles with on-board software that improves the customer experience, and the auto industry is working on technology that will allow cars to be managed via the cloud.

Automakers are finding that software is a way of adding more “value” and freshness to their products without having to invest so heavily in new vehicle production. It takes Ford Motor Company, for example, about two and one-half years to plan, design, and build a new car. Design and production, including metal stamping equipment and assembly line setup, must be finalized long before the car rolls off the line. But the auto makers can create a new software interface for a car within months and update it again and again over the life of the car without much lead time. This enables Ford and other automakers to significantly improve the passenger experience and add new features to cars years after they are built.

Ford is perhaps the automaker doing the most to innovate with software and apps. Its MyFord Touch interface is an in-dash touch screen available for select vehicles with controls for navigation, music, phone integration, and temperature. Ford has upgraded this interface and the Sync software behind the interface, adding tablet and smartphone integration and better voice response. In 2010, Ford added support for the online music streaming service Pandora, which is very popular among young potential buyers. This update enables drivers to connect their tablets and smartphones to the Sync system to access music and other apps using voice commands.

Chairman Bill Ford Jr. has championed the use of software to alleviate urban congestion by investing in technology that responds to the problems created by traffic in the biggest cities. Theoretically, technology might help cars to avoid traffic jams, to reserve parking spaces in advance, and possibly to even drive themselves.

To manage vehicles in this way, cars need to be connected to some kind of central system, which would coordinate with public transit and other

transportation methods, and to do this, cars need to be equipped with software that can monitor and enhance vehicle function at the most basic levels. The eventual system would require that cars feed increasing amounts of information to systems whose purpose would be to minimize highway congestion. The system would also require an industry standard, which does not exist as of yet. Ford has doubled its investment in vehicle-to-vehicle communication technologies and BMW is also continuing to develop ways for vehicles to communicate with one another on the road to avoid collisions.

With the inclusion of software in their cars, automakers are entering uncharted territory. They must now devote resources to updating and testing their software, as well as establishing ways to provide the updated software to their customers. Car companies need to coordinate their car development cycles more closely with their software development cycles. Also, many of the technologies included in automobile software packages raise the same privacy concerns surrounding location tracking that have often plagued smartphone manufacturers and app developers.

Ford is grappling with the best way to roll out software upgrades to its customers. The company has been mailing USB sticks to 250,000 customers whose cars have an advanced touch screen control panel running the MyFord Touch interface. The stick contains a software upgrade that will improve navigation controls, the music and phone features, as well as the ability to control car temperature. The upgrade also contains code that will upgrade system speed and improve the interface based on common criticisms from Ford owners.

Although Ford says it plans to continue issuing software upgrades this way, the company hopes that customers will get into the habit of checking the Ford Web site for software upgrades on their own. Though most car owners are used to the technology in their cars remaining constant throughout the life of the car, newer cars are poised to change all of that.

Ford has hired “human-machine interface engineers,” whose job is to analyze how their customers interact with the software in their cars. Often, these engineers use customer feedback to make changes to the software. Customers complained that too



much information was available on each screen of the interface, so Ford moved the most commonly used features to more prominent positions on screen and increased their font size, relegating the rest to submenus. Feedback has been positive. Ford has also asked dealers to dedicate more time and personnel to hands-on technology training to help customers master its interface.

GM, Daimler, and other companies are all developing new features for their cars that operate online in the cloud. Users will be able to remotely track their cars (you'll never forget where you parked again) and diagnose problems with the car, like low tire pressure or the need for an oil change. Corporations will be able to track employee use of company cars by interpreting car sensors and engine readouts. Manufacturers will be able to aggregate and analyze the data from customers' cars to identify quality problems and, if necessary, quickly issue recalls. Just as with apps, the possibilities are limited only by the imagination of automakers.

GM will allow its app developers to access its computer systems to improve app function, which raises a familiar set of privacy concerns. Auto analysts believe that automakers will make mistakes as they learn how to properly handle

sensitive customer data and to provide robust privacy options. On the other hand, automakers are hoping that younger customers who have grown up using Facebook are less likely to care about privacy, and features that collect highly targeted information about a car's location and driving habits.

BMW is also investing a whopping \$100 million in mobile apps, hoping to market them to their customers as "premium services." Some analysts are skeptical of the decision to invest that much money, but BMW believes that mobile apps will become an increasingly attractive selling point for customers of its BMWi electric and hybrid cars. Although the future of cars sharing information with other nearby cars is still years away, automakers are excited by the possibilities afforded by smart software and apps.

*Sources:* Ian Sherr, "Cars Pump Up IQ To Get Edge," *The Wall Street Journal*, January 13, 2012; Chris Murphy, "4 Ways Ford Is Exploring Next-Gen Car Tech," *Information Week*, July 27, 2012; Mike Ramsey, "Avoiding Gridlock with Smart Autos," *The Wall Street Journal*, February 27, 2012; Joseph B. White, "New Driver's Ed: Tutors to Decode High-Tech Dashboards," *The Wall Street Journal*, May 8, 2012; Chris Murphy, "Ford is Now a Software Company," *Information Week*, November 28, 2011 and "Why BMW Suddenly Loves Mobile Apps," *Information Week*, March 2, 2011; and Chuck Squatriglia, "Ford Brings SmartPhone Apps to Your Dashboard," *Wired*, April 20, 2010.

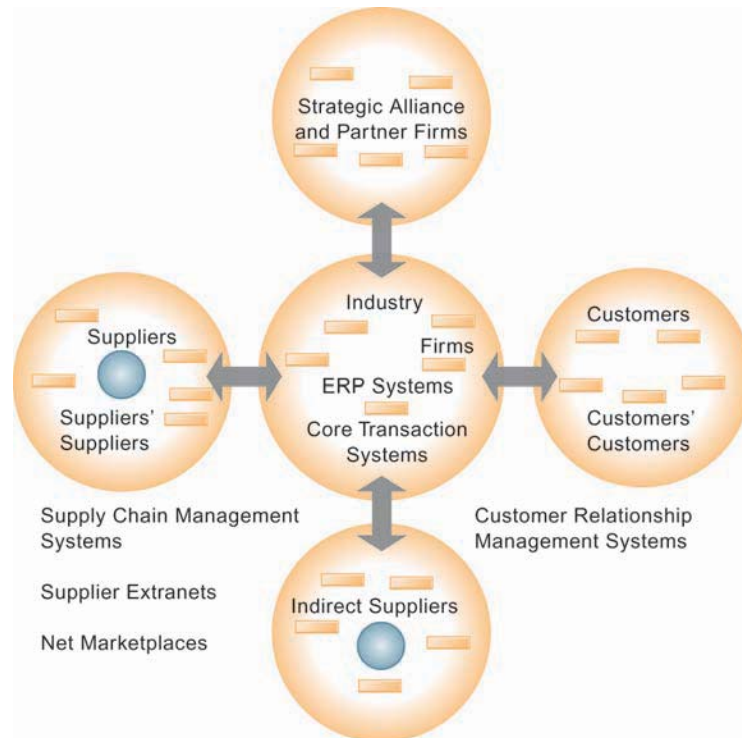
## CASE STUDY QUESTIONS

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

- Make it easy for suppliers to display goods and open stores on the Amazon site
- Make it easy for customers to pay for goods
- Develop systems that coordinate the shipment of goods to customers
- Develop shipment tracking systems for customers

Internet technology has made it possible to create highly synchronized industry value chains called value webs. A **value web** is a collection of independent firms that use information technology to coordinate their value chains to produce a product or service for a market collectively. It is more customer driven and operates in a less linear fashion than the traditional value chain.



**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.

Figure 3.10 shows that this value web synchronizes the business processes of customers, suppliers, and trading partners among different companies in an industry or in related industries. These value webs are flexible and adaptive to changes in supply and demand. Relationships can be bundled or unbundled in response to changing market conditions. Firms will accelerate time to market and to customers by optimizing their value web relationships to make quick decisions on who can deliver the required products or services at the right price and location.

## SYNERGIES, CORE COMPETENCIES, AND NETWORK-BASED STRATEGIES

A large corporation is typically a collection of businesses. Often, the firm is organized financially as a collection of strategic business units and the returns to the firm are directly tied to the performance of all the strategic business units. Information systems can improve the overall performance of these business units by promoting synergies and core competencies.

### Synergies

The idea of synergies is that when the output of some units can be used as inputs to other units, or two organizations pool markets and expertise, these relationships lower costs and generate profits. Recent bank and financial firm mergers, such as the merger of JPMorgan Chase and Bank of New York as well as Bank of America and Countrywide Financial Corporation occurred precisely for this purpose.

One use of information technology in these synergy situations is to tie together the operations of disparate business units so that they can act as a whole. For example, acquiring Countrywide Financial enabled Bank of America to extend its mortgage lending business and to tap into a large pool of new customers who might be interested in its credit card, consumer banking, and other financial products. Information systems would help the merged companies consolidate operations, lower retailing costs, and increase cross-marketing of financial products.

### Enhancing Core Competencies

Yet another way to use information systems for competitive advantage is to think about ways that systems can enhance core competencies. The argument is that the performance of all business units will increase insofar as these business units develop, or create, a central core of competencies. A **core competency** is an activity for which a firm is a world-class leader. Core competencies may involve being the world's best miniature parts designer, the best package delivery service, or the best thin-film manufacturer. In general, a core competency relies on knowledge that is gained over many years of practical field experience with a technology. This practical knowledge is typically supplemented with a long-term research effort and committed employees.

Any information system that encourages the sharing of knowledge across business units enhances competency. Such systems might encourage or enhance existing competencies and help employees become aware of new external knowledge; such systems might also help a business leverage existing competencies to related markets.

For example, Procter & Gamble, a world leader in brand management and consumer product innovation, uses a series of systems to enhance its core competencies. An intranet called InnovationNet helps people working on similar problems share ideas and expertise. InnovationNet connects those working in research and development (R&D), engineering, purchasing, marketing, legal affairs, and business information systems around the world, using a portal to provide browser-based access to documents, reports, charts, videos, and other data from various sources. It includes a directory of subject matter experts who can be tapped to give advice or collaborate on problem solving and product development, and links to outside research scientists and entrepreneurs who are searching for new, innovative products worldwide.

### Network-Based Strategies

The availability of Internet and networking technology have inspired strategies that take advantage of firms' abilities to create networks or network with each other. Network-based strategies include the use of network economics, a virtual company model, and business ecosystems.

**Network Economics.** Business models based on a network may help firms strategically by taking advantage of **network economics**. In traditional economics—the economics of factories and agriculture—production experiences 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. This is the law of diminishing returns, and it is the foundation for most of modern economics.

In some situations, the law of diminishing returns does not work. For instance, in a network, the marginal costs of adding another participant are about zero, whereas the marginal gain is much larger. The larger the number

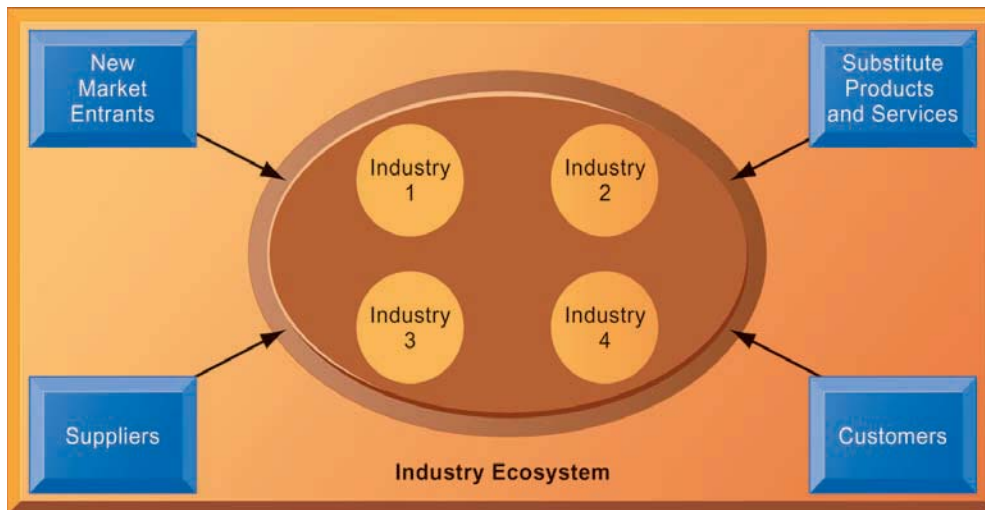
of subscribers in a telephone system or the Internet, the greater the value to all participants because each user can interact with more people. It is not much more expensive to operate a television station with 1,000 subscribers than with 10 million subscribers. The value of a community of people grows with size, whereas the cost of adding new members is inconsequential.

From this network economics perspective, information technology can be strategically useful. Internet sites can be used by firms to build communities of users—like-minded customers who want to share their experiences. This builds customer loyalty and enjoyment, and builds unique ties to customers. EBay, the giant online auction site, and iVillage, an online community for women, are examples. Both businesses are based on networks of millions of users, and both companies have used the Web and Internet communication tools to build communities. The more people offering products on eBay, the more valuable the eBay site is to everyone because more products are listed, and more competition among suppliers lowers prices. Network economics also provides strategic benefits to commercial software vendors. The value of their software and complementary software products increases as more people use them, and there is a larger installed base to justify continued use of the product and vendor support.

**Virtual Company Model.** Another network-based strategy uses the model of a virtual company to create a competitive business. A **virtual company**, also known as a virtual organization, uses networks to link people, assets, and ideas, enabling it to ally with other companies to create and distribute products and services without being limited by traditional organizational boundaries or physical locations. One company can use the capabilities of another company without being physically tied to that company. The virtual company model is useful when a company finds it cheaper to acquire products, services, or capabilities from an external vendor or when it needs to move quickly to exploit new market opportunities and lacks the time and resources to respond on its own.

Fashion companies, such as GUESS, Ann Taylor, Levi Strauss, and Reebok, enlist Hong Kong-based Li & Fung to manage production and shipment of their garments. Li & Fung handles product development, raw material sourcing, production planning, quality assurance, and shipping. Li & Fung does not own any fabric, factories, or machines, outsourcing all of its work to a network of more than 15,000 suppliers in 40 countries all over the world. Customers place orders to Li & Fung over its private extranet. Li & Fung then sends instructions to appropriate raw material suppliers and factories where the clothing is produced. The Li & Fung extranet tracks the entire production process for each order. Working as a virtual company keeps Li & Fung flexible and adaptable so that it can design and produce the products ordered by its clients in short order to keep pace with rapidly changing fashion trends.

**Business Ecosystems: Keystone and Niche Firms.** The Internet and the emergence of digital firms call for some modification of the industry competitive forces model. The traditional Porter model assumes a relatively static industry environment; relatively clear-cut industry boundaries; and a relatively stable set of suppliers, substitutes, and customers, with the focus on industry players in a market environment. Instead of participating in a single industry, some of today's firms are much more aware that they participate in industry sets—collections of industries that provide related services and products (see Figure 3.11). **Business ecosystem** is another term for these loosely coupled but interdependent networks of suppliers, distributors, outsourcing

**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.

firms, transportation service firms, and technology manufacturers (Iansiti and Levien, 2004).

The concept of a business ecosystem builds on the idea of the value web described earlier, the main difference being that cooperation takes place across many industries rather than many firms. For instance, both Microsoft and Walmart provide platforms composed of information systems, technologies, and services that thousands of other firms in different industries use to enhance their own capabilities. Microsoft has estimated that more than 40,000 firms use its Windows platform to deliver their own products, support Microsoft products, and extend the value of Microsoft's own firm. Walmart's order entry and inventory management system is a platform used by thousands of suppliers to obtain real-time access to customer demand, track shipments, and control inventories.

Business ecosystems can be characterized as having one or a few keystone firms that dominate the ecosystem and create the platforms used by other niche firms. Keystone firms in the Microsoft ecosystem include Microsoft and technology producers such as Intel and IBM. Niche firms include thousands of software application firms, software developers, service firms, networking firms, and consulting firms that both support and rely on the Microsoft products.

Information technology plays a powerful role in establishing business ecosystems. Obviously, many firms use information systems to develop into keystone firms by building IT-based platforms that other firms can use. In the digital firm era, we can expect greater emphasis on the use of IT to build industry ecosystems because the costs of participating in such ecosystems will fall and the benefits to all firms will increase rapidly as the platform grows.

Individual firms should consider how their information systems will enable them to become profitable niche players in larger ecosystems created by keystone firms. For instance, in making decisions about which products to build or which services to offer, a firm should consider the existing business

ecosystems related to these products and how it might use IT to enable participation in these larger ecosystems.

A powerful, current example of a rapidly expanding ecosystem is the mobile Internet platform. In this ecosystem there are four industries: device makers (Apple iPhone, RIM BlackBerry, Motorola, LG, and others), wireless telecommunication firms (AT&T, Verizon, T-Mobile, Sprint, and others), independent software applications providers (generally small firms selling games, applications, and ring tones), and Internet service providers (who participate as providers of Internet service to the mobile platform).

Each of these industries has its own history, interests, and driving forces. But these elements come together in a sometimes cooperative, and sometimes competitive, new industry we refer to as the mobile digital platform ecosystem. More than other firms, Apple has managed to combine these industries into a system. It is Apple's mission to sell physical devices (iPhones) that are nearly as powerful as today's personal computers. These devices work only with a high-speed broadband network supplied by the wireless phone carriers. In order to attract a large customer base, the iPhone had to be more than just a cell phone. Apple differentiated this product by making it a "smart phone," one capable of running 700,000 different, useful applications. Apple could not develop all these applications itself. Instead it relies on generally small, independent software developers to provide these applications, which can be purchased at the iTunes store. In the background is the Internet service provider industry, which makes money whenever iPhone users connect to the Internet.

### **3.4 USING SYSTEMS FOR COMPETITIVE ADVANTAGE: MANAGEMENT ISSUES**

Strategic information systems often change the organization as well as its products, services, and operating procedures, driving the organization into new behavioral patterns. Successfully using information systems to achieve a competitive advantage is challenging and requires precise coordination of technology, organizations, and management.

#### **SUSTAINING COMPETITIVE ADVANTAGE**

The competitive advantages that strategic systems confer do not necessarily last long enough to ensure long-term profitability. Because competitors can retaliate and copy strategic systems, competitive advantage is not always sustainable. Markets, customer expectations, and technology change; globalization has made these changes even more rapid and unpredictable. The Internet can make competitive advantage disappear very quickly because virtually all companies can use this technology. Classic strategic systems, such as American Airlines's SABRE computerized reservation system, Citibank's ATM system, and FedEx's package tracking system, benefited by being the first in their industries. Then rival systems emerged. Amazon was an e-commerce leader but now faces competition from eBay, Yahoo, and Google. Information systems alone cannot provide an enduring business advantage. Systems originally intended to be strategic frequently become tools for survival, required by every firm to stay in business, or they may inhibit organizations from making the strategic changes essential for future success.



## ALIGNING IT WITH BUSINESS OBJECTIVES

The research on IT and business performance has found that (a) the more successfully a firm can align information technology with its business goals, the more profitable it will be, and (b) only one-quarter of firms achieve alignment of IT with the business. About half of a business firm's profits can be explained by alignment of IT with business (Luftman, 2003).

Most businesses get it wrong: Information technology takes on a life of its own and does not serve management and shareholder interests very well. Instead of business people taking an active role in shaping IT to the enterprise, they ignore it, claim not to understand IT, and tolerate failure in the IT area as just a nuisance to work around. Such firms pay a hefty price in poor performance. Successful firms and managers understand what IT can do and how it works, take an active role in shaping its use, and measure its impact on revenues and profits.

### Management Checklist: Performing a Strategic Systems Analysis

To align IT with the business and use information systems effectively for competitive advantage, managers need to perform a strategic systems analysis. To identify the types of systems that provide a strategic advantage to their firms, managers should ask the following questions:

1. What is the structure of the industry in which the firm is located?
  - What are some of the competitive forces at work in the industry? Are there new entrants to the industry? What is the relative power of suppliers, customers, and substitute products and services over prices?
  - Is the basis of competition quality, price, or brand?
  - What are the direction and nature of change within the industry? From where are the momentum and change coming?
  - How is the industry currently using information technology? Is the organization behind or ahead of the industry in its application of information systems?
2. What are the business, firm, and industry value chains for this particular firm?
  - How is the company creating value for the customer—through lower prices and transaction costs or higher quality? Are there any places in the value chain where the business could create more value for the customer and additional profit for the company?
  - Does the firm understand and manage its business processes using the best practices available? Is it taking maximum advantage of supply chain management, customer relationship management, and enterprise systems?
  - Does the firm leverage its core competencies?
  - Is the industry supply chain and customer base changing in ways that benefit or harm the firm?
  - Can the firm benefit from strategic partnerships and value webs?
  - Where in the value chain will information systems provide the greatest value to the firm?
3. Have we aligned IT with our business strategy and goals?
  - Have we correctly articulated our business strategy and goals?
  - Is IT improving the right business processes and activities to promote this strategy?
  - Are we using the right metrics to measure progress toward those goals?



## MANAGING STRATEGIC TRANSITIONS

Adopting the kinds of strategic systems described in this chapter generally requires changes in business goals, relationships with customers and suppliers, and business processes. These sociotechnical changes, affecting both social and technical elements of the organization, can be considered **strategic transitions**—a movement between levels of sociotechnical systems.

Such changes often entail blurring of organizational boundaries, both external and internal. Suppliers and customers must become intimately linked and may share each other's responsibilities. Managers will need to devise new business processes for coordinating their firms' activities with those of customers, suppliers, and other organizations. The organizational change requirements surrounding new information systems are so important that they merit attention throughout this text. Chapter 14 examines organizational change issues in more detail.

## LEARNING TRACK MODULE

The following Learning Track provides content relevant to topics covered in this chapter.

1. The Changing Business Environment for Information Technology

## Review Summary

1. *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?*

All modern organizations are hierarchical, specialized, and impartial, using explicit routines to maximize efficiency. All organizations have their own cultures and politics arising from differences in interest groups, and they are affected by their surrounding environment. Organizations differ in goals, groups served, social roles, leadership styles, incentives, types of tasks performed, and type of structure. These features help explain differences in organizations' use of information systems.

Information systems and the organizations in which they are used interact with and influence each other. The introduction of a new information system will affect organizational structure, goals, work design, values, competition between interest groups, decision making, and day-to-day behavior. At the same time, information systems must be designed to serve the needs of important organizational groups and will be shaped by the organization's structure, business processes, goals, culture, politics, and management. Information technology can reduce transaction and agency costs, and such changes have been accentuated in organizations using the Internet. New systems disrupt established patterns of work and power relationships, so there is often considerable resistance to them when they are introduced.

2. *How does Porter's competitive forces model help companies develop competitive strategies using information systems?*

In Porter's competitive forces model, the strategic position of the firm, and its strategies, are determined by competition with its traditional direct competitors, but they are also greatly affected by new market entrants, substitute products and services, suppliers, and customers. Information systems help companies compete by maintaining low costs, differentiating products or services, focusing on market niche, strengthening ties with customers and suppliers, and increasing barriers to market entry with high levels of operational excellence.

3. *How do the value chain and value web models help businesses identify opportunities for strategic information system applications?*

The value chain model highlights specific activities in the business where competitive strategies and information systems will have the greatest impact. The model views the firm as a series of primary and support activities that add value to a firm's products or services. Primary activities are directly related to production and distribution, whereas support activities make the delivery of primary activities possible. A firm's value chain can be linked to the value chains of its suppliers, distributors, and customers. A value web consists of information systems that enhance competitiveness at the industry level by promoting the use of standards and industry-wide consortia, and by enabling businesses to work more efficiently with their value partners.

4. *How do information systems help businesses use synergies, core competencies, and network-based strategies to achieve competitive advantage?*

Because firms consist of multiple business units, information systems achieve additional efficiencies or enhance services by tying together the operations of disparate business units. Information systems help businesses leverage their core competencies by promoting the sharing of knowledge across business units. Information systems facilitate business models based on large networks of users or subscribers that take advantage of network economics. A virtual company strategy uses networks to link to other firms so that a company can use the capabilities of other companies to build, market, and distribute products and services. In business ecosystems, multiple industries work together to deliver value to the customer. Information systems support a dense network of interactions among the participating firms.

5. *What are the challenges posed by strategic information systems and how should they be addressed?*

Implementing strategic systems often requires extensive organizational change and a transition from one sociotechnical level to another. Such changes are called strategic transitions and are often difficult and painful to achieve. Moreover, not all strategic systems are profitable, and they can be expensive to build. Many strategic information systems are easily copied by other firms so that strategic advantage is not always sustainable.

## Key Terms

*Agency theory, 120*

*Benchmarking, 133*

*Best practices, 133*

*Business ecosystem, 138*

*Competitive forces model, 124*

*Core competency, 137*

*Disruptive technologies, 117*

*Efficient customer response system, 126*

*Mass customization, 127*

*Network economics, 137*

*Organization, 112*

*Primary activities, 132*

*Product differentiation, 125*

*Routines, 114*

*Strategic transitions, 142*

*Support activities, 132*

*Switching costs, 128*

*Transaction cost theory, 119*

*Value chain model, 131*

*Value web, 135*

*Virtual company, 138*

## Review Questions

- 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?
  - Define an organization and compare the technical definition of organizations with the behavioral definition.
  - Identify and describe the features of organizations that help explain differences in organizations' use of information systems.
  - Describe the major economic theories that help explain how information systems affect organizations.

- Describe the major behavioral theories that help explain how information systems affect organizations.
  - Explain why there is considerable organizational resistance to the introduction of information systems.
  - Describe the impact of the Internet and disruptive technologies on organizations.
2. How does Porter's competitive forces model help companies develop competitive strategies using information systems?
    - Define Porter's competitive forces model and explain how it works.
    - Describe what the competitive forces model explains about competitive advantage.
    - List and describe four competitive strategies enabled by information systems that firms can pursue.
    - Describe how information systems can support each of these competitive strategies and give examples.
    - Explain why aligning IT with business objectives is essential for strategic use of systems.
  3. How do the value chain and value web models help businesses identify opportunities for strategic information system applications?
    - Define and describe the value chain model.
    - Explain how the value chain model can be used to identify opportunities for information systems.
    - Define the value web and show how it is related to the value chain.
    - Explain how the value web helps businesses identify opportunities for strategic information systems.
    - Describe how the Internet has changed competitive forces and competitive advantage.
  4. How do information systems help businesses use synergies, core competences, and network-based strategies to achieve competitive advantage?
    - Explain how information systems promote synergies and core competencies.
    - Describe how promoting synergies and core competencies enhances competitive advantage.
    - Explain how businesses benefit by using network economics.
    - Define and describe a virtual company and the benefits of pursuing a virtual company strategy.
  5. What are the challenges posed by strategic information systems and how should they be addressed?
    - List and describe the management challenges posed by strategic information systems.
    - Explain how to perform a strategic systems analysis.

## Discussion Questions

1. It has been said that there is no such thing as a sustainable strategic advantage. Do you agree? Why or why not?
2. It has been said that the advantage that leading-edge retailers such as Dell and Walmart have over their competition isn't technology; it's their management. Do you agree? Why or why not?
3. What are some of the issues to consider in determining whether the Internet would provide your business with a competitive advantage?

## Hands-On MIS Projects

The projects in this section give you hands-on experience identifying information systems to support a business strategy and to solve a customer retention problem, using a database to improve decision making about business strategy, and using Web tools to configure and price an automobile.

## Management Decision Problems

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1. Macy's, Inc., through its subsidiaries, operates approximately 800 department stores in the United States. Its retail stores sell a range of merchandise, including apparel, home furnishings, and housewares. Senior management has decided that Macy's needs to tailor merchandise more to local tastes, and that the colors, sizes, brands, and styles of clothing and other merchandise should be based on the sales patterns in each individual Macy's store. How could information systems help Macy's management implement this new strategy? What pieces of data should these systems collect to help management make merchandising decisions that support this strategy?
2. Despite aggressive campaigns to attract customers with lower mobile phone prices, T-Mobile has been losing large numbers of its most lucrative two-year contract subscribers. Management wants to know why so many customers are leaving T-Mobile and what can be done to entice them back. Are customers deserting because of poor customer service, uneven network coverage, wireless service charges, or competition from carriers with Apple iPhone service? How can the company use information systems to help find the answer? What management decisions could be made using information from these systems?

## Improving Decision Making: Using a Database to Clarify Business Strategy

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Software skills: Database querying and reporting; database design

Business skills: Reservation systems; customer analysis

In this exercise, you will use database software to analyze the reservation transactions for a hotel and use that information to fine-tune the hotel's business strategy and marketing activities.

In MyMISLab, you will find a database for hotel reservation transactions developed in Microsoft Access with information about The President's Inn in Cape May, New Jersey. At the Inn, 10 rooms overlook side streets, 10 rooms have bay windows that offer limited views of the ocean, and the remaining 10 rooms in the front of the hotel face the ocean. Room rates are based on room choice, length of stay, and number of guests per room. Room rates are the same for one to four guests. Fifth and sixth guests must pay an additional \$20 charge each per person per day. Guests staying for seven days or more receive a 10 percent discount on their daily room rates.

The owners currently use a manual reservation and bookkeeping system, which has caused many problems. Use the database to develop reports on average length of stay, average visitors per room, base revenue per room (i.e., length of visit multiplied by the daily rate), and strongest customer base. After answering these questions write a brief report about the Inn's current business situation and suggest future strategies.

## Improving Decision Making: Using Web Tools to Configure and Price an Automobile

---

Software skills: Internet-based software

Business skills: Researching product information and pricing

In this exercise, you will use software at car Web sites to find product information about a car of your choice and use that information to make an important purchase decision. You will also evaluate two of these sites as selling tools.

You are interested in purchasing a new Ford Escape (or some other car of your choice). Go to the Web site of CarsDirect ([www.carsdirect.com](http://www.carsdirect.com)) and begin your investigation. Locate the Ford Escape. Research the various Escape models, choose one you prefer in terms of price, features, and safety ratings. Locate and read at least two reviews. Surf the Web site of the manufacturer, in this case Ford ([www.ford.com](http://www.ford.com)). Compare the information available on Ford's Web site with that of CarsDirect for the Ford Escape. Try to locate the lowest price for the car you want in a local dealer's inventory. Suggest improvements for CarsDirect.com and Ford.com.

## Video Cases

Video Cases and Instructional Videos illustrating some of the concepts in this chapter are available. Contact your instructor to access these videos.

## Collaboration and Teamwork Project

In MyMISLab, you will find a Collaboration and Teamwork Project dealing with the concepts in this chapter. You will be able to use Google Sites, Google Docs, and other open-source collaboration tools to complete the assignment.

## Can This Bookstore Be Saved?

### CASE STUDY

**B**arnes & Noble (B&N) has been portrayed in the past as a big bully that drove small independent bookstores out of business with aggressive pricing tactics and an unbeatable inventory of books. Today, B&N finds its role reversed as the company fights a fierce battle to survive in the inevitable era of e-books. Booksellers were one of the many industries disrupted by the Internet and, more specifically, the rise of e-books and e-readers. B&N hopes to change its business model to adapt to this new environment before it suffers a similar fate as many of its competitors, like Borders, B. Dalton, and Crown Books, or their peers in other industries, like Blockbuster, Circuit City, and Eastman Kodak.

More than ever, consumers are reading books on electronic gadgets—e-readers, iPods, tablets, and PCs—instead of physical books. Although B&N still depends on its physical, brick-and-mortar stores to drive its business (B&N operates 691 bookstores in 50 states, as well as 641 college bookstores), the company has thrown its energies behind development and marketing of the Nook series of e-readers and tablets. Once simply a bookseller, B&N now styles itself as a seller of e-books, devices to read them on, and apps that enhance the reading experience. The company has had success gaining market share, but at a steep cost, and to stay afloat, it will need to contend with increased competition from Amazon, Apple, and Google—not exactly feeble opposition. B&N has a market capitalization of \$1 billion. Amazon, B&N's current top competitor, has a market capitalization of \$98 billion. How can B&N compete against these tech titans?

The answer remains to be seen. B&N was likely the only bookseller big enough to complete the considerable task of developing an e-reader, marketing it, and setting up manufacturing and retail operations for the device. Even if its competitors had been faster to react to consumer demand for e-books, it's unlikely they would have made the inroads that B&N has achieved into the e-book space. Reaction to the Nook has been positive, as B&N has grabbed a significant market share from Amazon and Apple in the e-book marketplace. In 2011, analysts estimated that B&N controlled approximately 27 percent of the digital book market (Amazon held 60 percent).

B&N's progress with e-books has come at a steep cost, however. The company incurred a loss of \$73.9

million in 2011, compared to a \$36.7 million profit the previous year. The investment required to launch and promote the Nook was the primary reason for the shortfall, and expenditures are expected to continue to climb. In response, B&N canceled its stock dividend. The key questions for B&N are whether the Nook will eventually bring in revenues that justify its steep development and marketing costs, as well as whether the Nook can help drive traffic to B&N's brick-and-mortar stores.

The economics of e-book sales are very different from traditional book sales. Customers who visit B&N's Web site buy three digital books for every one physical book, but booksellers still make more money on print books than e-books. Still, B&N's Nook business has been growing rapidly, and traditional bookstores are not. Total e-book sales were nearly \$970 million in 2011, more than double from the previous year, and the percentage of e-books within the total number of books sold is still on the rise, measuring 14 percent that same year. Ironically, one of the first companies to realize the potential of e-books was B&N itself. As early as 1998, the company had partnered with software companies like NuvoMedia to develop prototype e-reader called the Rocket, but in 2003 it nixed the project because there didn't appear to be any money in it. At the time, B&N was right, but technology has come a long way since 2003, and so too have e-books.

B&N clearly took notice of the fate of Borders, its chief rival. Borders stubbornly refused to adapt to the Internet, first handing over its entire Internet operations to Amazon, and waiting to relaunch its own Web site until 2008, at which point the company was already on the road to bankruptcy. Borders had a devoted following, but it wasn't enough to combat the company's \$350 million debt and dwindling profitability. B&N is the only national bookstore chain remaining in the United States, and while the company saw a bump in store traffic in the immediate aftermath of the Borders collapse, it also knew it would need to shake things up to avoid a similar fate.

Other companies also have a stake in B&N's transformation. Publishing companies have been forced to adjust their allocations of printed books and new titles for stores, and books are beginning to be released as apps in addition to physical books. Apps for books are adding more features all the



time, including the ability to manipulate and enlarge images, flip through photo albums, watch videos, read instant messages, and listen to the music of characters within the book. These books, called “enhanced e-books,” are considered to be the next step in the growth of digital books, but thus far, the performance of enhanced e-books has been mixed.

Publishers and e-reader manufacturers both are teaming up on enhanced e-book projects. Penguin will release 50 enhanced e-books over the course of 2012. Apple is working with publishers to create interactive digital versions of textbooks. But do readers really need these features? Some publishers believe that these apps cost more money than they are worth, and worry that there is not a big enough market for enhanced e-books to justify the expenditure of time and money. However, this is the same line of thought that was used about e-books themselves in the early 2000s, and e-book skeptics turned out to be dead wrong.

Publishers are doing anything they can to support B&N's efforts to stay afloat, because the survival of physical book retailers is important to effectively market and sell books. Bookstores spur publisher sales with the “browsing effect.” Surveys have shown that only one-third of the people who visit a bookstore and walk out with a book actually arrived with the specific desire to purchase one. According to Madeline McIntosh, Random House president of sales, operations, and digital, a bookstore's display space is “one of the most valuable places that exists in this country for communicating to the consumer that a book is a big deal.” Brick-and-mortar retail stores are not only essential for selling physical books, but also stimulate sales of e-books and audio books. The more visibility a book has, the more likely readers will want to purchase it. With the demise of B. Dalton, Crown Books, and Borders, B&N is the only retailer offering an extensive inventory of physical books. Book publishers need a physical presence.

Without B&N, the likely candidate to fill the void is Amazon, and publishers are not eager for that to happen. Amazon's goal for e-books is to cut out the publishers and publish books directly, selling books at an extremely steep discount to drive sales of its Kindle devices. Editors, publicists, and other entities within the publishing business view Amazon as an enemy. Selling books at Amazon's prices is not a tenable business model for publishers in the long-term.

Publishers received even worse news in April 2012, as the U.S. Department of Justice (DOJ) sued Apple and five of the country's largest publishing

houses for colluding to fix e-book prices. In response to Amazon's aggressive pricing strategy, publishers and Apple had agreed to an “agency pricing” model, in which publishers set the price and retailers take a commission. (Under the wholesale arrangement with Amazon, the publishers received half of the list price, but this gave them no control over the pricing of their product.) Many books would be sold by Apple for about \$13, with Apple taking a 30 percent cut. By increasing the price of e-books by a dollar or two, publishers stood to gain an extra \$100 million. Even Amazon was under investigation for striking deals with publishers that forbade them from offering the same level of discounts provided by other e-reader manufacturers. The bottom line is that the DOJ action is bad news for publishers, who need B&N now more than ever.

Because the Nook was booming and brick-and-mortar stores had been stagnating, B&N has been considering spinning off its digital business from its fading bookstore business. On April 30, 2012, Microsoft announced that it would invest \$300 million for a 17.6 percent stake in a new company consisting of B&N's Nook tablet and e-reader business and its College division. As part of the deal, a Nook application would be included in Microsoft's Windows 8 operating system. This arrangement will provide B&N with additional points of distribution from hundreds of millions of Windows users around the world, and both companies will share revenues from sales of e-books and other content. B&N might eventually spin off this new company.

The deal also furthers Microsoft's strategy of investing in new businesses to move beyond its Windows and Office software franchises. A Nook e-reading app could also enhance Microsoft efforts to establish a digital storefront to market e-books, apps, and other content for Windows 8, which is critical to plans for entering the tablet market.

B&N has also experimented with ways to drive traffic to their physical stores using apps on the Nook. Although this is a seemingly impossible task, they are at least coming up with some inventive ideas. For example, if you connect to a Wi-Fi network in a B&N store with your Nook, you can get free extras in many apps and games like Angry Birds, where you can unlock a bonus character that normally costs a dollar. Other companies are using similar techniques to promote board games, toys, movies, and of course, physical books. B&N has also expanded its store space for toys and games and added new display space for its Nook devices. There

are also plans to experiment with slightly smaller stores.

These promotional campaigns probably won't be enough to stop B&N's dwindling in-store sales. What will the future hold? Will B&N be able to succeed as a digital company, and is there a future for its brick-and-mortar stores? Is there a way for e-books to help sell print books, just as print books have stimulated demand for their digital versions? Although B&N has made a spirited effort to revamp its business and go toe-to-toe with several tech titans, it's possible that it might be too tall an order for the storied bookseller.

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## CASE STUDY QUESTIONS

1. Use the value chain and competitive forces models to evaluate the impact of the Internet on book publishers and book retail stores such as B&N.
2. How are B&N and the book publishers changing their business models to deal with the Internet and e-book technology?
3. Will B&N's new strategy be successful? Explain your answer.
4. Is there anything else B&N and the book publishers should be doing to stimulate more business?