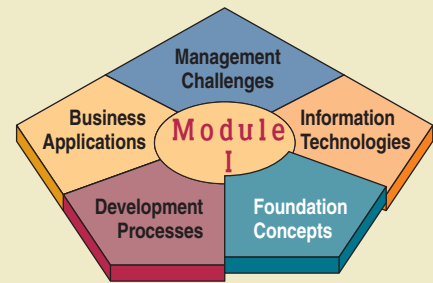


# CHAPTER 2



## COMPETING WITH INFORMATION TECHNOLOGY

### Chapter Highlights

#### Section I

#### Fundamentals of Strategic Advantage

Strategic IT

Competitive Strategy Concepts

**Real World Case:** GE, Dell, Intel, GM, and Others: The Competitive Advantage of Information Technology

Strategic Uses of Information Technology

Building a Customer-Focused Business

The Value Chain and Strategic IS

#### Section II

#### Using Information Technology for Strategic Advantage

**Real World Case:** The U.S. Department of Commerce: Using IT to Tap Experts' Know-How through Knowledge Management

Strategic Uses of IT

Reengineering Business Processes

Becoming an Agile Company

Creating a Virtual Company

Building a Knowledge-Creating Company

**Real World Case:** CDW, Harrah's Entertainment, and Others: Developing Strategic Customer-Loyalty Systems

### Learning Objectives

*After reading and studying this chapter, you should be able to:*

1. Identify several basic competitive strategies and explain how they can use information technologies to confront the competitive forces faced by a business.
2. Identify several strategic uses of Internet technologies and give examples of how they give competitive advantages to a business.
3. Give examples of how business process reengineering frequently involves the strategic use of Internet technologies.
4. Identify the business value of using Internet technologies to become an agile competitor or to form a virtual company.
5. Explain how knowledge management systems can help a business gain strategic advantages.

## SECTION I

# Fundamentals of Strategic Advantage

## Strategic IT

*Technology is no longer an afterthought in forming business strategy, but the actual cause and driver [17].*

This chapter will show you that it is important for you to view information systems as more than a set of technologies that support efficient business operations, workgroup and enterprise collaboration, or effective business decision making. Information technology can change the way businesses compete. You should also view information systems strategically, that is, as vital competitive networks, as a means of organizational renewal, and as a necessary investment in technologies that help a company adopt strategies and business processes that enable it to reengineer or reinvent itself to survive and succeed in today's dynamic business environment.

Section I of this chapter introduces fundamental competitive strategy concepts that underlie the strategic use of information systems. Section II then discusses several major strategic applications of information technology used by many companies today.

Read the Real World Case regarding the competitive advantage of IT. We can learn a lot about the strategic business uses of information technologies from this case. See Figure 2.1.

## Competitive Strategy Concepts

In Chapter 1, we emphasized that a major role of information systems applications in business is to provide effective support of a company's strategies for gaining competitive advantage. This strategic role of information systems involves using information technology to develop products, services, and capabilities that give a company major advantages over the competitive forces it faces in the global marketplace.

This is accomplished through a strategic information architecture—the collection of **strategic information systems** that support or shape the competitive position and strategies of a business enterprise. So a strategic information system can be any kind of information system (TPS, MIS, DSS, etc.) that uses information technology to help an organization gain a competitive advantage, reduce a competitive disadvantage, or meet other strategic enterprise objectives. Let's look at several basic concepts that define the role of such strategic information systems.

## Competitive Forces and Strategies

How should a business professional think about competitive strategies? How can competitive strategies be applied to the use of information systems by a business? Figure 2.2 illustrates an important conceptual framework for understanding forces of competition and the various competitive strategies employed to balance them.

A company can survive and succeed in the long run only if it successfully develops strategies to confront five **competitive forces** that shape the structure of competition in its industry. In Michael Porter's classic model of competition, any business that wants to survive and succeed must develop and implement strategies to effectively counter (1) *the rivalry of competitors within its industry*, (2) *the threat of new entrants into an industry and its markets*, (3) *the threat posed by substitute products which might capture market share*, (4) *the bargaining power of customers*, and (5) *the bargaining power of suppliers* [21].

Competition is a positive characteristic in business, and competitors share a natural, and often healthy, rivalry. This rivalry encourages and sometimes requires a constant effort to gain competitive advantage in the marketplace. This ever-present competitive force requires significant resources on the part of a firm.

Guarding against the threat of new entrants also expends significant organizational resources. Not only do firms need to compete with the other firms in the marketplace, but they must also work to create significant barriers to the entry of new competition.

## REAL WORLD CASE

# 1

## GE, Dell, Intel, GM, and Others: The Competitive Advantage of Information Technology

There's nothing like a punchy headline to get an article some attention. A piece in the *Harvard Business Review* (May 2003), shockingly labeled "IT Doesn't Matter," garnered the magazine more buzz than at any time since the Jack Welch affair. The article was approvingly cited in *The New York Times*, analyzed in Wall Street reports, and e-mailed around the world. But without such a dramatic and reckless title, the article probably would have received little notice. It's a sloppy mix of ersatz history, conventional wisdom, moderate insight, and unsupportable assertions. And it is dangerously wrong.

Author Nicholas Carr's main point is that information technology is nothing more than the infrastructure of modern business, similar to railroads, electricity, or the internal combustion engineering advances that have become too commonplace for any company to wangle a strategic advantage from them. Once-innovative applications of information technology have now become merely a necessary cost. Thus, Carr thinks today's main risk is not underusing IT but overspending on it.

But before we get any further, let's have a reality check. First, let's ask Jeff Immelt, the CEO of General Electric Co., one of the premier business corporations in the world, "How important is information technology to GE?" Immelt's answer: "It's a business imperative. We're primarily a service-oriented company, and the lifeblood for productivity is more about tech than it is about investing in plants and equipment. We tend to get a 20 percent return on tech investments, and we tend to invest about \$2.5 billion to \$3 billion a year."

Then let's ask Dell Corp. CEO Michael Dell "What's your take on Nick Carr's thesis that technology no longer gives corporate buyers a competitive advantage?" His an-

swer: "Just about anything in business can be either a sinkhole or a competitive advantage if you do it really, really bad or you do it really, really well. And information technology is an often misunderstood field. You've got a lot of people who don't know what they're doing and don't do it very well. For us, IT is a huge advantage. For Wal-Mart, GE, and many other companies, technology is a huge advantage and will continue to be. Does that mean that you just pour money in and gold comes out? No, you can screw it up really bad."

Finally, let's ask Andy Grove, former CEO and now chairman of Intel Corp., "Nicholas Carr's recent *Harvard Business Review* article says: 'IT Doesn't Matter.' Is information technology so pervasive that it no longer offers companies a competitive advantage?" Grove says: "In any field, you can find segments that are close to maturation and draw a conclusion that the field is homogeneous. Carr is saying commercial-transaction processing in the United States and some parts of Europe has reached the top parts of an S-curve. But instead of talking about that segment, he put a provocative spin on it—that information technology doesn't matter—and suddenly the statement is grossly wrong. It couldn't be further from the truth. It's like saying: I have an old three-speed bike, and Lance Armstrong has a bike. So why should he have a competitive advantage?"

So, basically, Carr misunderstands what information technology is. He thinks it's merely a bunch of networks and computers. He notes, properly, that the price of those has plummeted and that companies bought way too much in recent years. He's also right that the hardware infrastructure of business is rapidly becoming commoditized and, even more important, standardized. Computers and networks per se are just infrastructure. However, one of the article's most glaring flaws is its complete disregard for the centrality of software and the fact that human knowledge or information can be mediated and managed by software.

Charles Fitzgerald, Microsoft's general manager for platform strategy, says that Carr doesn't put enough emphasis on the *I* in IT. "The source of competitive advantage in business is what you do with the information that technology gives you access to. How do you apply that to some particular business problem? To say IT doesn't matter is tantamount to saying that companies have enough information about their operations, customers, and employees. I have never heard a company make such a claim."

Paul Strassman, who has spent 42 years as a CIO—at General Foods, Xerox, the Pentagon, and most recently NASA—was more emphatic. "The hardware—the stuff everybody's fascinated with—isn't worth a damn," he says. "It's just disposable. Information technology today is a knowledge-capital issue. It's basically a huge amount of labor and software." Says he: "Look at the business powers—most of all Wal-Mart, but also companies like Pfizer or FedEx. They're all waging information warfare."

FIGURE 2.1



Modern global organizations know that skillful management and use of their investments in information technology give them a competitive advantage.

But one person with a truly unique set of qualifications with which to assess the article is Ralph Szygenda, CIO of General Motors. “Nicholas Carr may ultimately be correct when he says IT doesn’t matter,” Szygenda says. “Business-process improvement, competitive advantage, optimization, and business success do matter and they aren’t commodities. To facilitate these business changes, IT can be considered a differentiator or a necessary evil. But today, it’s a must in a real-time corporation.”

Szygenda did concur with one of Carr’s corollary recommendations: spend less. In the HBR article, Carr stated, “It’s getting much harder to achieve a competitive advantage through an IT investment, but it is getting much easier to put your business at a cost disadvantage.” Szygenda’s reaction: “I also agree on spending the minimum on IT to reach desired business results. Precision investment on core infrastructure and process-differentiation IT systems is called for in today’s intensely cost-conscious business versus the shotgun approach sometimes used in the past.”

The real message: Spend what is required but no more to achieve essential differentiation via business processes and the IT systems that support them.

The CIO of GM continues with another agreement, although one with a significant qualification: “Yes, IT has

aspects of commoditization. PCs, telecommunications, software components such as payroll, benefit programs, business-process outsourcing, and maybe even operating systems and database-management systems are examples. But the application of information systems in a corporation’s product design, development, distribution, customer understanding, and cost-effective Internet services is probably at the fifth-grade level.”

And, in conclusion, Szygenda’s thoughts on the commodity claim: “After being a part of the IT industry for 35 years, I have heard similar pronouncements during the introduction of the integrated circuit, microprocessor, PCs, office systems, ERP systems, and the Internet. Nicholas Carr and others need to be careful not to overstate the speed of the information-management journey or they may make the same mistake that Charles H. Duell, the director of the U.S. Patent Office, did in 1899 when he said, ‘Everything that can be invented has been invented.’”

Source: Adapted from David Kirkpatrick, “Stupid-Journal Alert: Why HBR’s View of Tech Is Dangerous,” *Fortune*, June 9, 2003, p. 190; Robert Hoff, “Andy Grove: We Can’t Even Glimpse the Potential,” *BusinessWeek*, August 25, 2003, pp. 86–88; “Speaking Out: View from the Top,” *BusinessWeek*, August 25, 2003, pp. 108–13; and Bob Evans, “Business Technology: IT is a Must, No Matter How You View It,” *InformationWeek*, May 19, 2003.

## CASE STUDY QUESTIONS

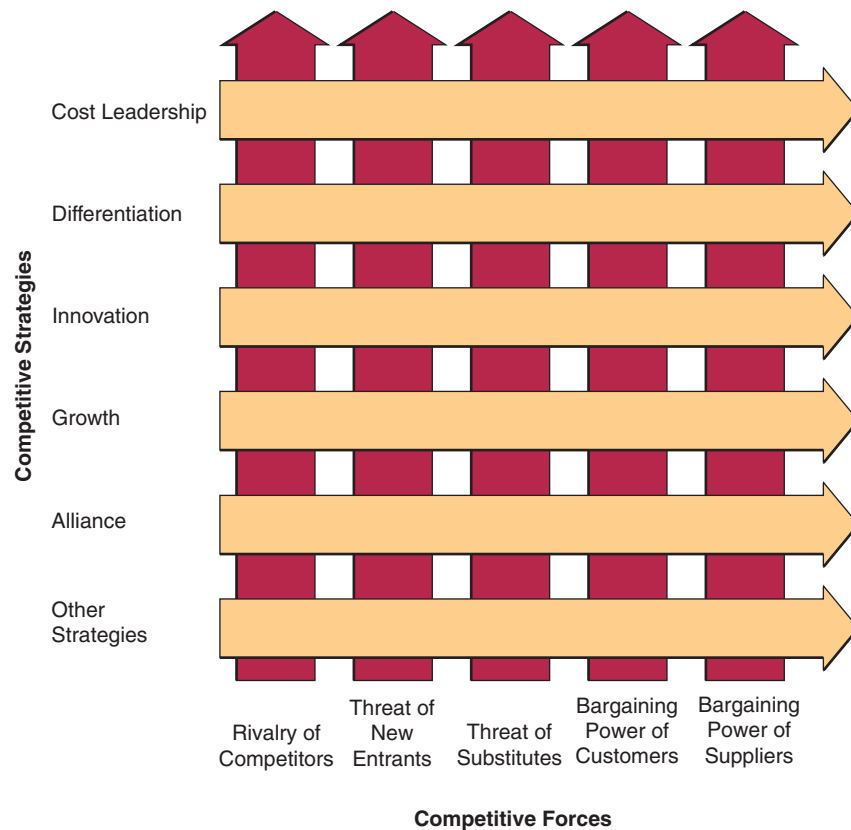
1. Do you agree with the argument made by Nicholas Carr to support his position that IT no longer gives companies a competitive advantage? Why or why not?
2. Do you agree with the argument made by the business leaders in this case in support of the competitive advantage that IT can provide to a business? Why or why not?
3. What are several ways that IT could provide a competitive advantage to a business? Use some of the companies mentioned in this case as examples. Visit their websites to gather more information to help you answer.

## REAL WORLD ACTIVITIES

1. Nicholas Carr’s article created a storm of debate that is still raging. Using the Internet, see if you can find Carr’s original article. Also, try to find some more opinions for and against Carr’s arguments beyond those provided in the case.
2. The core of Carr’s arguments has some significant implications for businesses. Break into small groups with your classmates and discuss your opinion of Carr’s arguments. What are some of the implications of the argument that come to mind? How might they serve to change the way we use computers to support corporate strategy?

FIGURE 2.2

Businesses can develop competitive strategies to counter the actions of the competitive forces they confront in the marketplace.



This competitive force has always been difficult to manage, but is even more so today. The Internet has created many ways for a new entrant to enter the marketplace quickly and with relatively low cost of entry. In the Internet world, a firm's biggest potential competitor may be one that is not yet in the marketplace but could emerge almost overnight.

The threat of substitutes is another competitive force confronting a business. The effect of this force is seen almost daily in a wide variety of industries. It is often at its strongest during periods of rising costs or inflation. When airline prices get too high, people substitute car travel on their vacations. When the cost of steak gets too high, people eat more hamburger and fish. Most products or services have some sort of substitute available to the consumer.

Finally, a business must guard against the often opposing forces of customer and supplier bargaining powers. If the customers' bargaining power gets too strong, they can drive prices to unmanageably low levels or simply refuse to buy the product or service. If a key supplier's bargaining power gets too strong, it can force the price of goods and services to unmanageably high levels or can simply starve a business by controlling the flow of parts or raw materials essential to the manufacture of a product.

Figure 2.2 also illustrates that businesses can counter the threats of competitive forces that they face by implementing five basic **competitive strategies**.

- **Cost Leadership Strategy.** Becoming a low-cost producer of products and services in the industry, or finding ways to help its suppliers or customers reduce their costs or to increase the costs of their competitors.
- **Differentiation Strategy.** Developing ways to differentiate a firm's products and services from its competitors' or to reduce the differentiation advantages of competitors. This may allow a firm to focus its products or services to give it an advantage in particular segments or niches of a market.

- **Innovation Strategy.** Finding new ways of doing business. This may involve the development of unique products and services, or entry into unique markets or market niches. It may also involve making radical changes to the business processes for producing or distributing products and services that are so different from the way a business has been conducted that they alter the fundamental structure of an industry.
- **Growth Strategies.** Significantly expanding a company's capacity to produce goods and services, expanding into global markets, diversifying into new products and services, or integrating into related products and services.
- **Alliance Strategies.** Establishing new business linkages and alliances with customers, suppliers, competitors, consultants, and other companies. These linkages may include mergers, acquisitions, joint ventures, forming of "virtual companies," or other marketing, manufacturing, or distribution agreements between a business and its trading partners.

One additional point concerning the above strategies is that they are not mutually exclusive. This means that an organization may make use of one, some, or all of the strategies in varying degrees to manage the forces of competition. Because of this, a given activity could fall into one or more of the categories of competitive strategy. For example, implementing a system that allows customers to track their order or shipment online could be considered a form of differentiation if the other competitors in the marketplace do not offer this service. If they do offer the service, however, then online order tracking would not serve to differentiate one organization from another.

If an organization offers their online package tracking system in a manner that allows their customers to access shipment information not only via a computer, but via a mobile phone as well, then such an action could fall into both the differentiation and innovation strategy categories. Think of it this way: Not everything innovative will serve to differentiate one organization from another. Likewise, not everything that serves to differentiate organizations is necessarily viewed as innovative. These types of observations are true for any combination of the competitive strategies, thus making them complementary to each other rather than mutually exclusive.

## Strategic Uses of Information Technology

How can business managers use investments in information technology to directly support a firm's competitive strategies? Figure 2.3 answers this question with a summary of the many ways that information technology can help a business implement the five basic competitive strategies. Figure 2.4 provides examples of how specific companies have used strategic information systems to implement each of these five basic strategies for competitive advantage. Note the major use of Internet technologies for electronic business and commerce applications. In the rest of this chapter, we will discuss and provide examples of many strategic uses of information technology.

## Other Competitive Strategies

There are many competitive strategies in addition to the five basic strategies of cost leadership, differentiation, innovation, growth, and alliance. Let's look at several key strategies that are also implemented with information technology. They include locking in customers or suppliers, building switching costs, raising barriers to entry, and leveraging investment in information technology.

Investments in information technology can allow a business to **lock in customers and suppliers** (and lock out competitors) by building valuable new relationships with them. These business relationships can become so valuable to customers or suppliers that it deters them from abandoning a company for its competitors, or intimidating it into accepting less-profitable business arrangements. Early attempts to use information systems technology in these relationships focused on significantly improving the quality of service to customers and suppliers in a firm's distribution, marketing, sales, and service activities. More recent projects characterize a move toward more innovative uses of information technology.

FIGURE 2.3

A summary of how information technology can be used to implement the five basic competitive strategies. Many companies are using Internet technologies as the foundation for such strategies.

Basic Strategies in the Business Use of Information Technology	
<b>Lower Costs</b>	<ul style="list-style-type: none"> <li>• Use IT to substantially reduce the cost of business processes.</li> <li>• Use IT to lower the costs of customers or suppliers.</li> </ul>
<b>Differentiate</b>	<ul style="list-style-type: none"> <li>• Develop new IT features to differentiate products and services.</li> <li>• Use IT features to reduce the differentiation advantages of competitors.</li> <li>• Use IT features to focus products and services at selected market niches.</li> </ul>
<b>Innovate</b>	<ul style="list-style-type: none"> <li>• Create new products and services that include IT components.</li> <li>• Develop unique new markets or market niches with the help of IT.</li> <li>• Make radical changes to business processes with IT that dramatically cut costs, improve quality, efficiency, or customer service, or shorten time to market.</li> </ul>
<b>Promote Growth</b>	<ul style="list-style-type: none"> <li>• Use IT to manage regional and global business expansion.</li> <li>• Use IT to diversify and integrate into other products and services.</li> </ul>
<b>Develop Alliances</b>	<ul style="list-style-type: none"> <li>• Use IT to create virtual organizations of business partners.</li> <li>• Develop interenterprise information systems linked by the Internet and extranets that support strategic business relationships with customers, suppliers, subcontractors, and others.</li> </ul>

### Wal-Mart and Others Get Innovative

Wal-Mart realized early on the benefits of using information technology to improve service. In 1983 it invested in an elaborate satellite network linking the point-of-sale terminals in all of its stores. In a few years this system grew into a complex communication network that connected all Wal-Mart stores, its headquarters and distribution centers, and all of its major suppliers. The most innovative aspect of the system was the facilitation of a modified just-in-time process of inventory control, a feat virtually unheard of in general merchandise retailing. When an item is sold by a store, a message is immediately sent to the supplier of that item. This alerts the supplier to include a replacement in the next scheduled shipment (often the same day) to the nearest distribution hub. This tight connectivity allowed Wal-Mart's immediate response to inventory needs while significantly reducing the amount of inventory required. The innovation didn't stop there, however. Wal-Mart realized the operational efficiency of its system and used it to offer lower cost, better quality products and services, as well as to differentiate itself from its competitors.

Companies have begun to follow Wal-Mart's example by extending their networks to customers and suppliers and by adopting continuous inventory replenishment systems that serve to lock in business. These interenterprise information systems use the Internet and other networks to electronically link the business processes of a company with its customers and suppliers, resulting in new business alliances and partnerships. Extranets between a business and its suppliers are prime examples of such strategic linkages. One of the most innovative uses for these network linkages is the concept of *stockless* inventory replenishment systems. Such systems work for Wal-Mart and for Procter & Gamble, a major supplier of personal care products. Using the network, Procter & Gamble automatically replenishes Wal-Mart's stock of all Procter & Gamble products [18, 29].

FIGURE 2.4 Examples of how companies have used information technology to implement five competitive strategies for strategic advantage.

Strategy	Company	Strategic Use of Information Technology	Business Benefit
<b>Cost Leadership</b>	Dell Computer	Online build to order	Lowest cost producer
	Priceline.com	Online seller bidding	Buyer-set pricing
	eBay.com	Online auctions	Auction-set prices
<b>Differentiation</b>	AVNET Marshall	Customer/supplier e-commerce	Increase in market share
	Moen Inc.	Online customer design	Increase in market share
	Consolidated Freightways	Customer online shipment tracking	Increase in market share
<b>Innovation</b>	Charles Schwab & Co.	Online discount stock trading	Market leadership
	Federal Express	Online package tracking and flight management	Market leadership
	Amazon.com	Online full-service customer systems	Market leadership
<b>Growth</b>	Citicorp	Global intranet	Increase in global market
	Wal-Mart	Merchandise ordering by global satellite network	Market leadership
	Toys 'Я' Us Inc.	POS inventory tracking	Market leadership
<b>Alliance</b>	Wal-Mart/Procter & Gamble	Automatic inventory replenishment by supplier	Reduced inventory cost/increased sales
	Cisco Systems	Virtual manufacturing alliances	Agile market leadership
	Staples Inc. and Partners	Online one-stop shopping with partners	Increase in market share

A major emphasis in strategic information systems has been to find ways to build **switching costs** into the relationships between a firm and its customers or suppliers. That is, investments in information systems technology, such as those mentioned in the Wal-Mart example, can make customers or suppliers dependent on the continued use of innovative, mutually beneficial interenterprise information systems. Then they become reluctant to pay the costs in time, money, effort, and inconvenience that it would take to switch to a company's competitors.

By making investments in information technology to improve its operations or promote innovation, a firm could also erect **barriers to entry** that would discourage or delay other companies from entering a market. Typically, this happens by increasing the amount of investment or the complexity of the technology required to compete in an industry or a market segment. Such actions would tend to discourage firms already in the industry and to deter external firms from entering the industry.

Investing in information technology enables a firm to build strategic IT capabilities that allow it to take advantage of strategic opportunities when they arise. In many cases, this results when a company invests in advanced computer-based information systems to improve the efficiency of its own business processes. Then, armed with this strategic technology platform, the firm can **leverage investment in information technology** by developing new products and services that would not be possible without a strong IT capability. An important current example is the development of corporate intranets and extranets by many companies, which enables them to leverage their previous investments in Internet browsers, PCs, servers, and client/server networks. Figure 2.5 summarizes the additional strategic uses of IT we have just discussed.

FIGURE 2.5 Additional ways that information technology can be used to implement competitive strategies.

Other Strategic Uses of Information Technology
<ul style="list-style-type: none"> <li>• Develop interenterprise information systems whose convenience and efficiency create switching costs that lock in customers or suppliers.</li> <li>• Make major investments in advanced IT applications that build barriers to entry against industry competitors or outsiders.</li> <li>• Include IT components in products and services to make substitution of competing products or services more difficult.</li> <li>• Leverage investment in IS people, hardware, software, databases, and networks from operational uses into strategic applications.</li> </ul>

### Competitive Advantage and Competitive Necessity

The constant struggle to achieve a measurable competitive advantage in an industry or marketplace occupies a significant portion of an organization's time and money. Creative and innovative marketing, research and development, and process reengineering, among many other activities, are used to gain that elusive and sometimes indescribable competitive advantage over rival firms. The real problem with a competitive advantage, however, is that it normally doesn't last very long and is generally not sustainable over the long term. Once a firm figures out how to gain an advantage over its competitors, the competitors figure out how it was done, and they do the same thing. What was once a competitive advantage is now a competitive necessity. Once a strategy or action becomes a competitive necessity, instead of it creating an advantage, the strategy or action becomes necessary simply to compete and do business in the industry. And when this happens, someone has to figure out a new way to gain a competitive edge, and the cycle starts over again.

Every organization is looking for a way to gain competitive advantage, and many have been successful in using strategic information systems to assist them in achieving it. The important point to remember is that competitive advantage doesn't last forever. Arie de Geus, head of strategic planning for Royal Dutch Shell, thinks there may be one way to sustain it, however: "The ability to learn faster than your competitors may be the only sustainable competitive advantage in the future."

### Building a Customer-Focused Business

*The driving force behind world economic growth has changed from manufacturing volume to improving customer value. As a result, the key success factor for many firms is maximizing customer value [6].*

For many companies, the chief business value of becoming a customer-focused business lies in its ability to help them keep customers loyal, anticipate their future needs, respond to customer concerns, and provide top-quality customer service. This strategic focus on **customer value** recognizes that quality, rather than price, has become the primary determinant in a customer's perception of value. Companies that consistently offer the best value from the customer's perspective are those that keep track of their customers' individual preferences; keep up with market trends; supply products, services, and information anytime, anywhere; and provide customer services tailored to individual needs [6]. So Internet technologies have created a strategic opportunity for companies, large and small, to offer fast, responsive, high-quality products and services tailored to individual customer preferences.

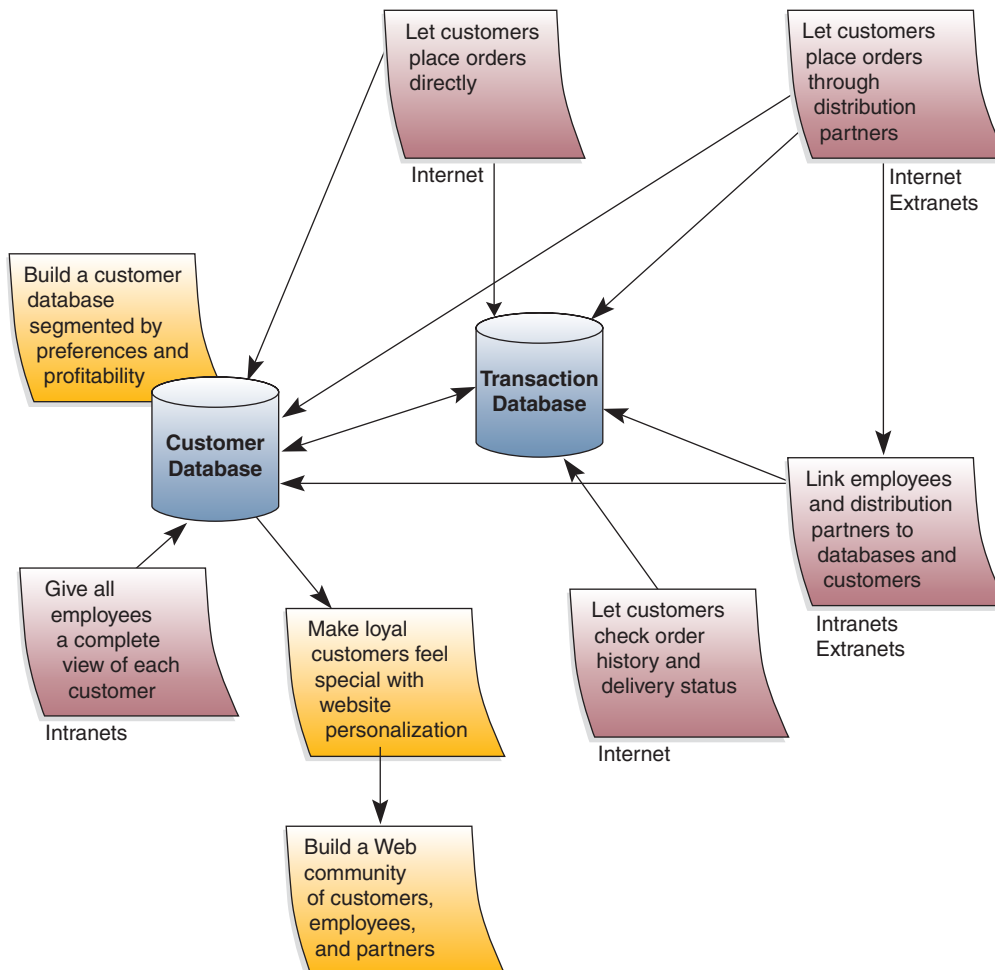
Internet technologies can make customers the focal point of customer relationship management (CRM) and other e-business applications. CRM systems and Internet, intranet, and extranet websites create new channels for interactive communications

within a company, with customers, and with the suppliers, business partners, and others in the external environment. This enables continual interaction with customers by most business functions and encourages cross-functional collaboration with customers in product development, marketing, delivery, service, and technical support [6]. We will discuss CRM systems in Chapter XX.

Typically, customers use the Internet to ask questions, lodge complaints, evaluate products, request support, and make and track their purchases. Using the Internet and corporate intranets, specialists in business functions throughout the enterprise can contribute to an effective response. This encourages the creation of cross-functional discussion groups and problem-solving teams dedicated to customer involvement, service, and support. Even the Internet and extranet links to suppliers and business partners can be used to enlist them in a way of doing business that ensures prompt delivery of quality components and services to meet a company's commitments to its customers [13]. This is how a business demonstrates its focus on customer value.

Figure 2.6 illustrates the interrelationships in a customer-focused business. Intranets, extranets, e-commerce websites, and Web-enabled internal business processes form the invisible IT platform that supports this e-business model. This enables the business to focus on targeting the kinds of customers it really wants, and on "owning" the customer's total business experience with the company. A successful business

**FIGURE 2.6** How a customer-focused business builds customer value and loyalty using Internet technologies.



streamlines all business processes that impact their customers, and develops customer management relationship systems that provide its employees with a complete view of each customer, so they have the information they need to offer their customers top-quality personalized service. A customer-focused business helps their e-commerce customers to help themselves, while also helping them do their jobs. Finally, a successful business nurtures an online community of customers, employees, and business partners that builds great customer loyalty, while fostering cooperation to provide an outstanding customer experience [24]. Let's review a real world example.

### Hilton Hotels: e-Business with the Customer in Mind

Hilton Hotels, via Carrollton, Texas-based Hilton Reservations Worldwide (HRW), prides itself in having one of the fastest reservation services in the world. For the more than 2,400 hotels located in 65 countries worldwide, HRW handles more than 31 million calls and generates more than 9 million reservations annually. Despite this incredible volume, the average time to complete a reservation is less than two minutes. This high level of efficiency and customer service is the direct result of Hilton's innovative application of information technology.

Here's how the system works: When a call comes in to HRW, the Dialed Number Identification Services (DNIS) immediately identifies the Hilton brand the customer is calling. The call is then passed to a reservation specialist for that brand, who uses Hilton's reservation front-end client to assist in locating the hotel brand reservation and room availability information. This information is immediately displayed on the reservation specialist's desktop as the call is being transferred. If accommodations are not available for the caller's choice of hotel, the specialist can click an onscreen button to start a search of other reservation databases. Within seconds, the reservation specialist can cross-sell an alternate Hilton property.

Innovative applications of IT have also been used to completely automate specific portions of the reservation system, further enabling agents to handle additional transactions and reducing the time and agent expense associated with each call. This is where the interactive voice response (IVR) system enters the picture. Once an agent books the reservation, the customer is transferred to the IVR system. The IVR reads back and confirms the customer's reservation information, freeing the reservation specialist for the next customer. Callers can select their next option from the IVR—including being transferred back to an agent if required—or hang up to complete the transaction.

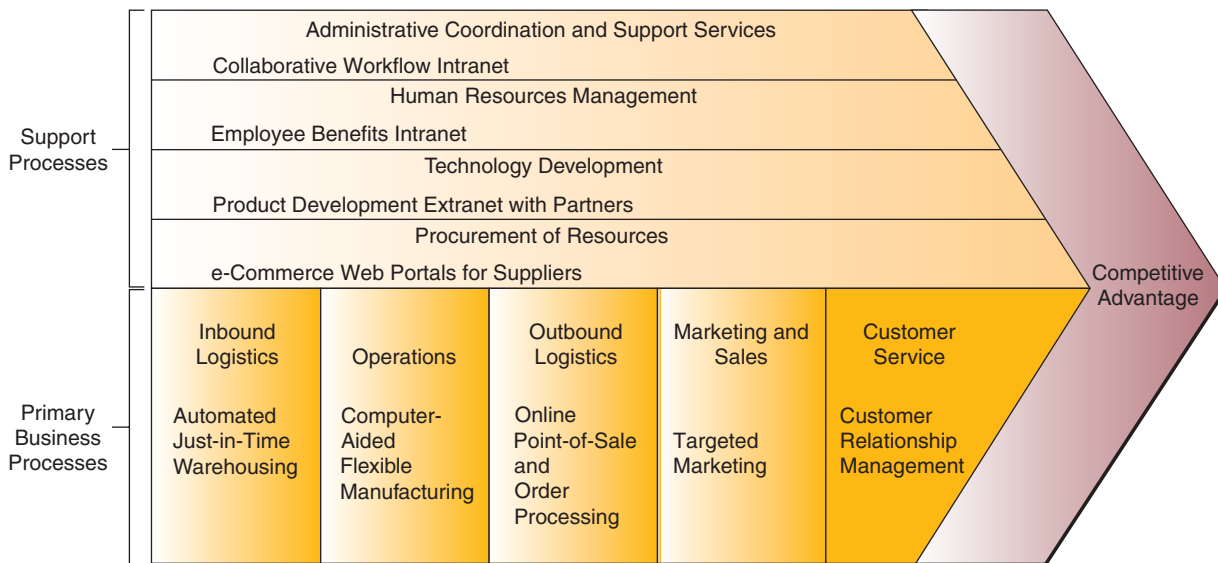
Hilton has also streamlined the reservation process for those who wish to use their Hilton.com website. Frequent guests have services automatically tailored to their last visit, and meeting planners access the website for group reservations and floor plans of venues. The Hilton website is designed for multiple customer segments as part of Hilton's direct-to-customer business model. Every customer segment—the business traveler, the tourist, the meeting planner, and the travel agent—has been accommodated.

To implement this e-business initiative, Hilton integrates workflows, reservation system, call centers, and business process with the common goal of obtaining more finely segmented customer data [16, 30].

## The Value Chain and Strategic IS

Let's look at another important concept that can help you identify opportunities for strategic information systems. The **value chain** concept was developed by Michael Porter [21] and is illustrated in Figure 2.7. It views a firm as a series, chain, or network of basic activities that add value to its products and services, and thus add a margin of value both to the firm and its customers. In the value chain conceptual framework, some business activities are primary processes; others are support processes. *Primary processes* are those business activities that are directly related to the manufacturing of

**FIGURE 2.7** The value chain of a firm. Note the examples of the variety of strategic information systems that can be applied to a firm's basic business processes for competitive advantage.



products or the delivering of services to the customer. In contrast, *support processes* are those business activities that help support the day-to-day running of the business and that indirectly contribute to the products or services of the organization. This framework can highlight where competitive strategies can best be applied in a business. That is, managers and business professionals should try to develop a variety of strategic uses of Internet and other technologies for those basic processes that add the most value to a company's products or services, and thus to the overall business value of the company.

### Value Chain Examples

Figure 2.7 provides examples of how and where information technologies can be applied to basic business processes using the value chain framework. For example, the figure illustrates that collaborative workflow intranets can increase the communications and collaboration required to dramatically improve administrative coordination and support services. An employee benefits intranet can help the human resources management function provide employees with easy self-service access to their benefits information. Extranets enable a company and its global business partners to use the Web to jointly design products and processes. Finally, e-commerce Web portals can dramatically improve procurement of resources by providing online marketplaces for a firm's suppliers.

Examples of strategic applications of information systems technology to primary business processes are also identified by the value chain model in Figure 2.7. These include automated just-in-time warehousing systems to support inbound logistic processes involving storage of inventory, computer-aided flexible manufacturing systems for manufacturing operations, and online point-of-sale and order processing systems to improve outbound logistics processes that process customer orders. Information systems can also support marketing and sales processes by developing an interactive targeted marketing capability on the Internet and the Web. Finally, customer service can be dramatically improved by a coordinated and integrated customer relationship management system.

Thus, the value chain concept can help you identify where and how to apply the strategic capabilities of information technology. It shows how various types of information technologies might be applied to specific business processes to help a firm gain competitive advantages in the marketplace.

## SECTION II

# Using Information Technology for Strategic Advantage

## Strategic Uses of IT

Organizations may view and use information technology in many ways. For example, companies may choose to use information systems strategically, or they may be content to use IT to support efficient everyday operations. But if a company emphasized strategic business uses of information technology, its management would view IT as a major competitive differentiator. They would then devise business strategies that would use IT to develop products, services, and capabilities that would give the company major advantages in the markets in which it competes. In this section, we will provide many examples of such strategic business applications of information technology. See Figure 2.8.

Read the Real World Case about the strategic importance of knowledge management systems. We can learn a lot about the competitive advantage gained through knowledge management systems.

## Reengineering Business Processes

One of the most important implementations of competitive strategies is **business process reengineering** (BPR), most often simply called reengineering. Reengineering is a fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in cost, quality, speed, and service. So BPR combines a strategy of promoting business innovation with a strategy of making major improvements to business processes so that a company can become a much stronger and more successful competitor in the marketplace.

However, Figure 2.9 points out that while the potential payback of reengineering is high, so is its risk of failure and level of disruption to the organizational environment [10]. Making radical changes to business processes to dramatically improve efficiency and effectiveness is not an easy task. For example, many companies have used cross-functional enterprise resource planning (ERP) software to reengineer, automate, and integrate their manufacturing, distribution, finance, and human resource business processes. While many companies have reported impressive gains with such ERP reengineering projects, many others have experienced dramatic failures or have failed to achieve the improvements they sought (as we saw in the Real World Examples in Chapter 1).

Many companies have found that *organizational redesign* approaches are an important enabler of reengineering, along with the use of information technology. For example, one common approach is the use of self-directed cross-functional or multidisciplinary *process teams*. Employees from several departments or specialties including engineering, marketing, customer service, and manufacturing may work as a team on the product development process. Another example is the use of *case managers*, who handle almost all tasks in a business process, instead of splitting tasks among many different specialists.

## The Role of Information Technology

Information technology plays a major role in reengineering most business processes. The speed, information processing capabilities, and connectivity of computers and Internet technologies can substantially increase the efficiency of business processes, as well as communications and collaboration among the people responsible for their operation and management. For example, the order management process illustrated in Figure 2.10 is vital to the success of most companies [6]. Many of them are reengineering this process with enterprise resource planning software and Web-enabled electronic business and commerce systems, as outlined in Figure 2.11. Let's take a look at an example.

## REAL WORLD CASE

# 2

## The U.S. Department of Commerce: Using IT to Tap Experts' Know-How through Knowledge Management

The U.S. government is using basic knowledge management techniques to offer timely and valuable advice about how to do business abroad.

At the Department of Commerce (DoC), a commercial service called the DOC Insider is adopting technology for knowledge capture and management from Bellevue, Washington-based AskMe Corp. The service uses the technology to accelerate the counseling it offers to U.S. companies seeking to engage in international trade. Key capabilities of the AskMe system include automated best practices, automatic experts' profile creation, addition of numerous methods for accessing and delivering knowledge, integrated real-time collaborative services, and comprehensive analytic capabilities.

The DOC Insider has been using Web-based technology to create a knowledge network connecting its 100 offices in the United States, another 150 in 80 countries overseas, and a group of approximately 1,700 U.S. trade specialists who have expertise in what it takes to succeed abroad. These specialists can tell you what trade show to attend if you're interested in selling medical equipment in Germany, what papers to file if you're trying to expand your software business into Japan, what local laws must be considered if you're considering moving your global call centers to Bangladesh, or who your competition is likely to be if you want to sell your line of automobile accessories in the Pacific Rim.

In the past, there was no way to organize what these experts knew, or even how to get in touch with them once they were identified.

Laura McCall, program manager for the DOC Insider, says using AskMe's system is part of the department's fulfill-

ment of its mandate to help U.S. businesses compete abroad. "We have a dispersed, worldwide organization with pockets of information everywhere," she says. The DOC Insider's aim is to help U.S. companies do things such as perform international market research or locate overseas partners. "We want to sit down and make sure you've identified a good market and that you are export-ready," she says.

Each trade expert accesses the knowledge network via the Web and answers those questions assigned to him or her. "That way, we're able to identify the people and the resources to help clients solve problems," says McCall.

Before selecting AskMe, McCall reviewed the department's business processes to see where the gaps in information counseling existed. "We have a handful of trade specialists who know everything about export documentation, for example," says McCall. "But if they're located in Minnesota and you weren't in their local office, you'd never know they existed."

Now these experts can post answers according to different subject categories, upload documents, or even direct businesses to specialized publications online. The information is reusable and is in an ever-expanding database. By mid-2004, over 1,200 people had used the system so far, saving about 750 hours of repetitive work. There's also a reporting tool that managers can use to track the technology's return on investment and to identify topics that are popular so they can beef up their expertise in those areas.

Here's an example of how the system works. On a Tuesday afternoon in May 2004, Brad Anderson, an international trade specialist for the U.S. Commercial Service division at the Department of Commerce, found himself stumped. A U.S.-based software company called with a question, and he didn't know what to advise. The company wanted to close a deal with a customer in Poland, but the buyer wanted to charge the U.S. company a 20 percent withholding tax, a tax it attributed to Poland's recent admission into the European Union. Was the tax legitimate?

To find out, Anderson turned to the DOC Insider. After typing in his question, Anderson first found some documents that were related to his query, but they didn't explain the EU tax code completely. Anderson next asked the system to search the 1,700-strong Commercial Service for a real "live" expert, and, within seconds, he was given a list of 80 people in the department who might be able to help him. He chose the six people he felt were most qualified and then forwarded his query.

Before the DOC Insider was in place, Anderson says, it would have taken him about three days to find an answer to the same question. "You'd have to make a million phone calls and deal with time zones," he says. Thanks to the expertise location system, however, he had three responses within minutes, a complete answer within an hour, and the sale went through the following morning. Anderson estimates

FIGURE 2.8



Modern organizations realize that treating their information as a valuable resource serves to facilitate the sharing and management of knowledge.

that he now uses the system for roughly 40 percent of the work he does.

The DOC Insider is an invaluable tool, Anderson says, and it's helping his division meet its mandate. In 2002 the organization conducted 150,000 counseling sessions with U.S. companies and helped orchestrate more than \$23 billion in business. In fiscal 2003 those figures increased to 165,000 and \$34 billion, respectively—and demand has continued to grow in 2004. The DoC won't say how much of its increased business the DOC Insider supports, but program director Laura McCall thinks the tool is vital enough to provide to

other units at the agency. In the first nine months the system has been in place, she says, it has saved her department more than 1,000 man-hours.

With the huge trade deficit that plagues the United States, a knowledge management system that helps boost U.S. exports by making it easier to tap experts' know-how is a clear competitive advantage. Similar expertise lies hidden away inside most companies.

Source: Adapted from Pimm Fox, "Using IT to Tap Experts' Know-How," *Computerworld*, March 15, 2004. Copyright © 2004 by Computerworld, Inc., Framingham, MA 01701. All rights reserved.

## CASE STUDY QUESTIONS

1. What are the key business challenges facing companies in supporting their global marketing and expansion efforts? How is the AskMe knowledge management system helping to meet this challenge? Explain.
2. How can the AskMe system help to identify weaknesses in global business knowledge within the Department of Commerce?
3. What other global trade situations could the AskMe system provide information about? Provide some examples.

## REAL WORLD ACTIVITIES

1. Knowledge management is considered by many to be an essential element in gaining sustainable competitive advantage in today's marketplace. Using the Internet, see if you can find information on how organizations like the Department of Commerce are making use of knowledge management technologies. Start your investigation with the company that helped the DOC at [www.askmecorp.com](http://www.askmecorp.com).
2. Much of the knowledge in an organization takes the form of tacit knowledge—knowledge that is used regularly but not necessarily in a conscious fashion. An interesting exercise in tacit knowledge can be found on the Internet at [www.sveiby.com/articles/TacitTest.htm](http://www.sveiby.com/articles/TacitTest.htm). Take the test and then break into small groups with your classmates and discuss the outcome of the test. Do you think tacit knowledge can be captured? Discuss this with your classmates.

**FIGURE 2.9**  
Some of the key ways that business process reengineering differs from business improvement.

	Business Improvement	Business Process Reengineering
<b>Level of Change</b>	Incremental	Radical
<b>Process Change</b>	Improved new version of process	Brand-new process
<b>Starting Point</b>	Existing processes	Clean slate
<b>Frequency of Change</b>	One-time or continuous	Periodic one-time change
<b>Time Required</b>	Short	Long
<b>Typical Scope</b>	Narrow, within functions	Broad, cross functional
<b>Horizon</b>	Past and present	Future
<b>Participation</b>	Bottom-up	Top-down
<b>Path to Execution</b>	Cultural	Cultural, structural
<b>Primary Enabler</b>	Statistical control	Information technology
<b>Risk</b>	Moderate	High

Source: Adapted from Howard Smith and Peter Fingar, *Business Process Management: The Third Wave* (Tampa, FL: Meghan-Kiffer Press, 2003), p. 118.

**Agilent Technologies:  
Bad News Leads to Good News**

The good news is that the ERP system at Agilent Technologies Inc. ([www.agilent.com](http://www.agilent.com)) is stable. The bad news is their system got that way via a rocky ERP reengineering project that cost the company \$105 million in revenue and \$70 million in profits. To make matters worse, the losses incurred were due to just one week's lost production.

In mid-August 2002, the multinational communications and life sciences company, formerly a part of Hewlett-Packard Co., said problems with the ERP components in Oracle's newly installed e-Business Suite software froze production for the equivalent of a week, leading to the massive losses. Now complete, the new system will handle about half of the company's worldwide production of test, measurement, and monitoring products and almost all of its financial operations, as well as functions such as order handling and shipping.

The new ERP system at Agilent has enabled simplification and standardization of processes across the entire company. Real-time information about inventory and order status, easier-to-understand invoicing and pricing, and improved visibility on product delivery lead time are just some of the benefits being realized by Agilent customers, suppliers, and vendors [1, 29].

**FIGURE 2.10** The order management process consists of several business processes and crosses the boundaries of traditional business functions.

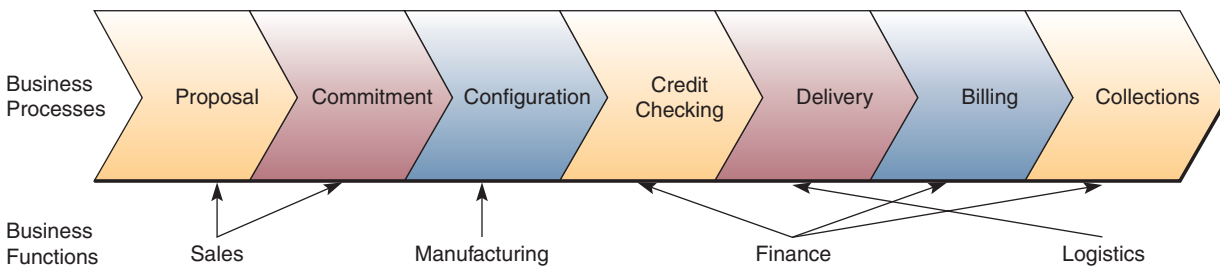


FIGURE 2.11

Examples of information technologies that support reengineering the order management processes.

Reengineering Order Management
• Customer relationship management systems using corporate intranets and the Internet.
• Supplier managed inventory systems using the Internet and extranets.
• Cross-functional ERP software for integrating manufacturing, distribution, finance, and human resource processes.
• Customer-accessible e-commerce websites for order entry, status checking, payment, and service.
• Customer, product, and order status databases accessed via intranets and extranets by employees and suppliers.

## Becoming an Agile Company

*We are changing from a competitive environment in which mass-market products and services were standardized, long-lived, information-poor, and exchanged in one-time transactions, to an environment in which companies compete globally with niche market products and services that are individualized, short-lived, information-rich, and exchanged on an ongoing basis with customers [12].*

Agility in business performance is the ability of a company to prosper in rapidly changing, continually fragmenting global markets for high-quality, high-performance, customer-configured products and services. An **agile company** can make a profit in markets with broad product ranges and short model lifetimes, and can produce orders individually and in arbitrary lot sizes. It supports *mass customization* by offering individualized products while maintaining high volumes of production. Agile companies depend heavily on Internet technologies to integrate and manage business processes, while providing the information processing power to treat masses of customers as individuals.

To be an agile company, a business must implement four basic strategies. First, customers must perceive the products or services of an agile company as solutions to their individual problems. Thus, products can be priced based on their value as solutions, not on their cost to produce. Second, an agile company cooperates with customers, suppliers, and other companies, and even with their competitors. This allows a business to bring products to market as rapidly and cost-effectively as possible, no matter where resources are located or who owns them. Third, an agile company organizes so that it thrives on change and uncertainty. It uses flexible organizational structures keyed to the requirements of different and constantly changing customer opportunities. Finally, an agile company leverages the impact of its people and the knowledge they possess. By nurturing an entrepreneurial spirit, an agile company provides powerful incentives for employee responsibility, adaptability, and innovation [12].

Figure 2.12 summarizes another useful way to think about agility in business. This framework emphasizes the roles customers, business partners, and information technology can play in developing and maintaining the strategic agility of a company. Notice how information technology can enable a company to develop relationships with its customers in virtual communities that help it be an agile innovator. And as we will see repeatedly throughout this text, information technologies enable a company to partner with its suppliers, distributors, contract manufacturers, and others via collaborative portals and other Web-based supply chain systems that significantly improve its agility in exploiting innovative business opportunities [23].

## Creating a Virtual Company

In today's dynamic global business environment, forming a **virtual company** can be one of the most important strategic uses of information technology. A virtual company (also called a *virtual corporation* or *virtual organization*) is an organization that uses information technology to link people, organizations, assets, and ideas.

Figure 2.13 illustrates that virtual companies typically form virtual workgroups and alliances with business partners that are interlinked by the Internet, intranets, and extranets. Notice that this company has organized internally into clusters of process and

FIGURE 2.12 How information technology can help a company be an agile competitor with the help of customers and business partners.

Type of Agility	Description	Role of IT	Example
<b>Customer</b>	Ability to co-opt customers in the exploitation of innovation opportunities <ul style="list-style-type: none"> <li>• As sources of innovation ideas</li> <li>• As cocreators of innovation</li> <li>• As users in testing ideas or helping other users learn about the idea</li> </ul>	Technologies for building and enhancing virtual customer communities for product design, feedback, and testing	eBay customers are its de facto product development team because they post an average of 10,000 messages each week to share tips, point out glitches, and lobby for changes.
<b>Partnering</b>	Ability to leverage assets, knowledge, and competencies of suppliers, distributors, contract manufacturers, and logistics providers in the exploration and exploitation of innovation opportunities	Technologies facilitating interfirm collaboration, such as collaborative platforms and portals, supply-chain systems, etc.	Yahoo! has accomplished a significant transformation of its service from a search engine into a portal by initiating numerous partnerships to provide content and other media-related services from its website.
<b>Operational</b>	Ability to accomplish speed, accuracy, and cost economy in the exploitation of innovation opportunities	Technologies for modularization and integration of business processes	Ingram Micro, a global wholesaler, has deployed an integrated trading system allowing its customers and suppliers to connect directly to its procurement and ERP systems.

Source: Adapted from V. Sambamurthy, Anandhi Bharadwaj, and Varun Grover. "Shaping Agility Through Digital Options: Reconceptualizing the Role of Information Technology in Contemporary Firms," MIS Quarterly, June 2003, p. 246.

cross-functional teams linked by intranets. It has also developed alliances and extranet links that form **interenterprise information systems** with suppliers, customers, subcontractors, and competitors. Thus, virtual companies create flexible and adaptable virtual workgroups and alliances keyed to exploit fast-changing business opportunities [2].

## Virtual Company Strategies

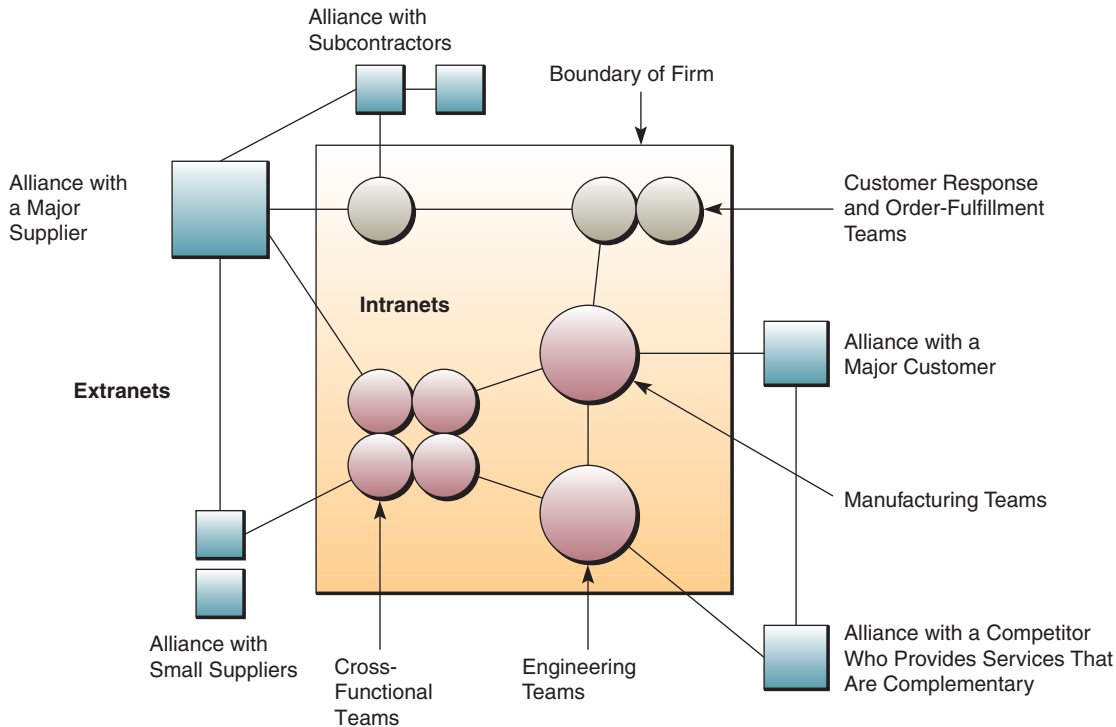
Why are people forming virtual companies? Several major reasons stand out and are summarized in Figure 2.14. People and corporations are forming virtual companies as the best way to implement key business strategies and alliances that promise to ensure success in today's turbulent business climate.

For example, to quickly exploit a new market opportunity, a business may not have the time or resources to develop the manufacturing and distribution infrastructure, people competencies, and information technologies needed. Only by quickly forming a virtual company through a strategic alliance of all-star partners can it assemble the components it needs to provide a world-class solution for customers and capture the market opportunity. Of course, today, the Internet, intranets, extranets, and a variety of other Internet technologies are vital components in creating such successful solutions.

### Cisco Systems: Virtual Manufacturing

Most people who have heard of Cisco Systems ([www.cisco.com](http://www.cisco.com)) would not be surprised to learn that Cisco is the world's largest supplier of telecommunications products. What they may be surprised with, however, is the answer to the question "What does Cisco manufacture?" Answer: Absolutely nothing! Cisco sells solutions

**FIGURE 2.13** A virtual company uses the Internet, intranets, and extranets to form virtual workgroups and to support alliances with business partners.



to their customers, but their products come from an innovative virtual manufacturing company arrangement with Jabil Circuit and Hamilton Standard, two large electronics suppliers and manufacturers. Let's look at an example of how these three companies collaborate to bring a Cisco solution to market.

An order placed for a Cisco product arrives simultaneously at Cisco in San Jose, California, and Jabil in St. Petersburg, Florida, via Cisco's online ordering system. Jabil immediately starts to build the product by drawing parts from any or all of three on-site inventories: one owned by Jabil, one belonging to Cisco, and one owned and controlled by Hamilton Standard. When the manufacturing process is completed, the product is tested and checked against the order in St. Petersburg by computers in San Jose, then shipped directly to the customer by Jabil. The shipment triggers the generation of a Cisco invoice sent to the customer and electronic bills from both Jabil and Hamilton Standard sent to Cisco in San Jose. Cisco's virtual manufacturing company alliance with Jabil Circuit and Hamilton Standard gives them an agile, build-to-order capability in the fiercely competitive telecommunications equipment industry [26].

**FIGURE 2.14** The basic business strategies of virtual companies.

Strategies of Virtual Companies
• Share infrastructure and risk with alliance partners.
• Link complementary core competencies.
• Reduce concept-to-cash time through sharing.
• Increase facilities and market coverage.
• Gain access to new markets and share market or customer loyalty.
• Migrate from selling products to selling solutions.

## Building a Knowledge-Creating Company

*In an economy where the only certainty is uncertainty, the one sure source of lasting competitive advantage is knowledge. When markets shift, technologies proliferate, competitors multiply, and products become obsolete almost overnight, successful companies are those that consistently create new knowledge, disseminate it widely throughout the organization, and quickly embody it in new technologies and products. These activities define the “knowledge-creating” company, whose sole business is continuous innovation [20].*

To many companies today, lasting competitive advantage can only be realized if they become **knowledge-creating companies** or *learning organizations*. That means consistently creating new business knowledge, disseminating it widely throughout the company, and quickly building the new knowledge into their products and services.

Knowledge-creating companies exploit two kinds of knowledge. One is *explicit knowledge*—data, documents, and things written down or stored on computers. The other kind is *tacit knowledge*—the “how-tos” of knowledge, which reside in workers. Tacit knowledge can often represent some of the most important information within an organization. Often, longtime employees of a company “know” many things about how to manufacture a product, deliver the service, deal with a particular vendor, or operate an essential piece of equipment. This tacit knowledge is not recorded or codified anywhere because it has evolved in the employee’s mind through years of experience. Further, much of this tacit knowledge is never shared with anyone who might be in a position to record it in a more formal way because there is often little incentive to do so or simply, “Nobody ever asked.”

As illustrated in Figure 2.15, successful **knowledge management** creates techniques, technologies, systems, and rewards for getting employees to share what they know and to make better use of accumulated workplace and enterprise knowledge. In that way, employees of a company are leveraging knowledge as they do their jobs [20].

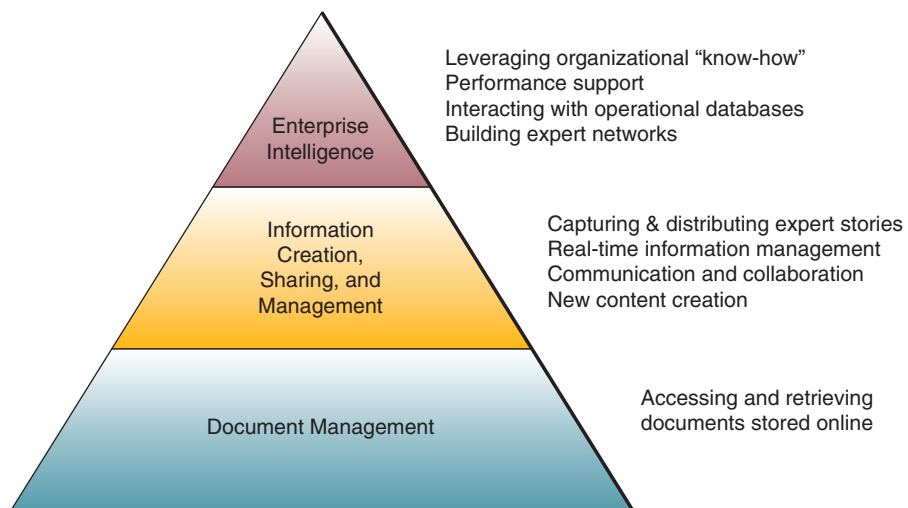
## Knowledge Management Systems

*Making personal knowledge available to others is the central activity of the knowledge-creating company. It takes place continuously and at all levels of the organization [20].*

Knowledge management has thus become one of the major strategic uses of information technology. Many companies are building **knowledge management systems** (KMS) to manage organizational learning and business know-how. The goal of such systems is to help knowledge workers create, organize, and make available important business knowledge, wherever and whenever it’s needed in an organization. This includes processes, procedures, patents, reference works, formulas, “best practices,” forecasts, and fixes. As you will see in Chapter •••, Internet and intranet websites,

FIGURE 2.15

Knowledge management can be viewed as three levels of techniques, technologies, and systems that promote the collection, organization, access, sharing, and use of workplace and enterprise knowledge.



Source: Adapted from Marc Rosenberg, *e-Learning: Strategies for Delivering Knowledge in the Digital Age* (New York: McGraw-Hill, 2001), p. 70.

groupware, data mining, knowledge bases, and online discussion groups are some of the key technologies that may be used by a KMS.

Knowledge management systems facilitate organizational learning and knowledge creation. They are designed to provide rapid feedback to knowledge workers, encourage behavior changes by employees, and significantly improve business performance. As the organizational learning process continues and its knowledge base expands, the knowledge-creating company works to integrate its knowledge into its business processes, products, and services. This helps the company become a more innovative and agile provider of high-quality products and customer services, and a formidable competitor in the marketplace [22]. Now let's close this chapter with an example of knowledge management strategies from the real world.

### BAE Systems PLC: Managing Their Intellectual Capital



It's elusive, complex, and strategically essential to every modern organization: the capture of the seemingly infinite amount of intellectual capital that's carried by tens of thousands of employees around the world and then using it to achieve competitive advantage. London-based BAE Systems PLC, formerly British Aerospace, found their holy grail in their highly successful knowledge management (KM) intranet. The system is used by thousands of BAE engineers located in 110 offices across five continents to both search for vital information related to ongoing strategic initiatives and to identify and eliminate redundant project work.

In early 1999, BAE Systems invested roughly \$150,000 to study its global operations to determine whether they had the right information to support decision-making processes and if BAE employees had the right learning systems to help them support their daily activities. The results were remarkably revealing. The study showed that nearly two-thirds of BAE's top 120 decision makers didn't have the right information at key phases of the decision process. Further, they found that 80 percent of BAE employees were "wasting" an average of 30 minutes each day simply trying to locate the information they needed to do their jobs. Yet another 60 percent were spending an hour or more duplicating the work of others. Finally, one of the biggest problems revealed by the study was the large-scale information overload on the company intranets. The information itself was often unstructured, and the search engines were inadequate for conducting keyword searches to find information.

After testing several search engine technologies, BAE incorporated the best performer into the knowledge management application on its corporate intranet. The system paid for itself in just seven months. The first demonstration of its effectiveness came in late 1999 when two different groups of BAE engineers in the United Kingdom were working on wing construction issues for the company's Harrier 2 military aircraft. After using the KM system to search for wing specification information across the company's intranet, one of the engineering groups discovered that the other group was working on the same problem. Catching this redundancy early in the cycle saved BAE millions—more than enough to pay for the entire new system! Within one year, BAE estimated the new KM system reduced the time needed to retrieve information from its intranet by 90 percent. Even a company that specializes in building things that go very fast above the ground can learn how to do things faster on the ground [15, 28].

- **Strategic Uses of Information Technology.**

Information technologies can support many competitive strategies. They can help a business cut costs, differentiate and innovate in its products and services, promote growth, develop alliances, lock in customers

and suppliers, create switching costs, raise barriers to entry, and leverage its investment in IT resources. Thus, information technology can help a business gain a competitive advantage in its relationships with customers, suppliers, competitors, new entrants, and

producers of substitute products. Refer to Figures 2.3 and 2.5 for summaries of the uses of information technology for strategic advantage.

- **Building a Customer-Focused Business.** A key strategic use of Internet technologies is to build a company that develops its business value by making customer value its strategic focus. Customer-focused companies use Internet, intranet, and extranet e-commerce websites and services to keep track of their customers' preferences; to supply products, services, and information anytime, anywhere; and to provide services tailored to the individual needs of their customers.
- **Reengineering Business Processes.** Information technology is a key ingredient in reengineering business operations because it enables radical changes to business processes that dramatically improve their efficiency and effectiveness. Internet technologies can play a major role in supporting innovative changes in the design of workflows, job requirements, and organizational structures in a company.
- **Becoming an Agile Company.** A business can use information technology to help it become an agile company. Then it can prosper in rapidly changing markets with broad product ranges and short model lifetimes in which it must process orders in arbitrary lot sizes, and can offer its customers customized products while maintaining high volumes of production. An agile company depends heavily on Internet technologies to help it be responsive to its customers with solutions customized to their needs and to cooperate with its customers, suppliers, and other businesses to bring products to market as rapidly and cost-effectively as possible.
- **Creating a Virtual Company.** Forming virtual companies has become an important competitive strategy in today's dynamic global markets. Internet and other information technologies play a key role in providing computing and telecommunications resources to support the communications, coordination, and information flows needed. Managers of a virtual company depend on IT to help them manage a network of people, knowledge, financial, and physical resources provided by many business partners to quickly take advantage of rapidly changing market opportunities.
- **Building a Knowledge-Creating Company.** Lasting competitive advantage today can only come from innovative use and management of organizational knowledge by knowledge-creating companies and learning organizations. Internet technologies are widely used in knowledge management systems to support the creation and dissemination of business knowledge and its integration into new products, services, and business processes.

## Key Terms and Concepts

These are the key terms and concepts of this chapter. The page number of their first explanation is in parentheses.

- |  |   |   |
|--|---|---|
| 1. Agile company (••)                  | 7. Interenterprise information systems (••) | 11. Locking in customers and suppliers (••) |
| 2. Business process reengineering (••) | 8. Knowledge-creating company (••)          | 12. Raising barriers to entry (••)          |
| 3. Competitive forces (••)             | 9. Knowledge management system (••)         | 13. Strategic information systems (••)      |
| 4. Competitive strategies (••)         | 10. Leveraging investment in IT (••)        | 14. Value chain (••)                        |
| 5. Creating switching costs (••)       |   | 15. Virtual company (••)                    |
| 6. Customer value (••)                 |   |   |

Match one of the key terms and concepts listed previously with one of the brief examples or definitions that follow. Try to find the best fit for answers that seem to fit more than one term or concept. Defend your choices.

- |  |  |
|--|--|
| _____ 1. A business must deal with customers, suppliers, competitors, new entrants, and substitutes. | _____ 5. Time, money, and effort needed for customers or suppliers to change to a firm's competitors.  |
| _____ 2. Cost leadership, differentiation of products, and new product innovation are examples.      | _____ 6. Information systems that reengineer business processes or promote business innovation are examples.   |
| _____ 3. Using investment in technology to keep firms out of an industry.                            | _____ 7. This strategic focus recognizes that quality, rather than price, has become the primary determinant in customers choosing a product or service. |
| _____ 4. Making it unattractive for a firm's customers or suppliers to switch to its competitors.    |  |

- 8. Highlights how strategic information systems can be applied to a firm's business processes and support activities for competitive advantage.
- 9. A business finding strategic uses for the computing and telecommunications capabilities it has developed to run its operations.
- 10. Information technology helping a business make radical improvements in business processes.
- 11. A business can prosper in rapidly changing markets while offering its customers individualized solutions to their needs.
- 12. A network of business partners formed to take advantage of rapidly changing market opportunities.
- 13. Learning organizations that focus on creating, disseminating, and managing business knowledge.
- 14. Information systems that manage the creation and dissemination of organizational knowledge.
- 15. Using the Internet and extranets to link a company's information systems to those of its customers and suppliers.

## Discussion Questions

1. Suppose you are a manager being asked to develop computer-based applications to gain a competitive advantage in an important market for your company. What reservations might you have about doing so? Why?
2. How could a business use information technology to increase switching costs and to lock in its customers and suppliers? Use business examples to support your answers.
3. How could a business leverage its investment in information technology to build strategic IT capabilities that serve as a barrier to new entrants into its markets?
4. Refer to the Real World Case on GE, Dell, Intel, GM, and Others in the chapter. Can information technology give a competitive advantage to a small business? Why or why not? Use an example to illustrate your answer.
5. What strategic role can information play in business process reengineering?
6. How can Internet technologies help a business form strategic alliances with its customers, suppliers, and others?
7. How could a business use Internet technologies to form a virtual company or become an agile competitor?
8. Refer to the Real World Case on the U.S. Department of Commerce in the chapter. Is the AskMe system intended to help the DoC become a knowledge-creating organization? Why or why not?
9. Information technology can't really give a company a strategic advantage, because most competitive advantages don't last more than a few years and soon become strategic necessities that just raise the stakes of the game. Discuss.
10. MIS author and consultant Peter Keen says: "We have learned that it is not technology that creates a competitive edge, but the management process that exploits technology." What does he mean? Do you agree or disagree? Why?

### 1. Customer Focused Business

Visit the top-rated websites of Dell Computer ([www.dell.com](http://www.dell.com)) and Hilton Hotels ([www.hilton.com](http://www.hilton.com)), which are highlighted in the chapter as examples of customer-focused companies. Check out many of their website features and e-commerce services.

- a. Which site provided you with the best quality of service as a prospective customer? Explain.
- b. How could these companies improve their website design and marketing to offer even better services to their customers and prospective customers?

### 2. Sabre's Travelocity and American Airlines: Competing for e-Travel Services

Visit the top-rated website of Travelocity ([www.travelocity.com](http://www.travelocity.com)), which is 70 percent owned by

Sabre and American Airlines ([www.aa.com](http://www.aa.com)), the former corporate owner of Sabre. Check out their website features and e-commerce services.

- a. How do their e-commerce websites and business models seem to differ?
- b. Refer to the summaries of strategic uses of IT in Figures 2.3 and 2.5. Which strategies can you see each company using? Explain.
- c. How has the new entrant to this market, Orbitz ([www.orbitz.com](http://www.orbitz.com)), sought to gain a competitive advantage among its well-established competitors?
- d. What strategies might traditional travel agents adopt in order to compete?

### 3. Assessing Strategy and Business Performance

Recent annual figures for eBay.com's net revenue, stock price, and earnings per share at the time of publication of this book are shown in Table 2.1. eBay™ is one of the firms identified in Figure 2.4 as following a cost leadership strategy.

**Table 2.1 eBay's Financial Performance**

Year	Net Revenue (in millions)	Earnings per Share (basic)	Stock Price (at year end)
1998	86.129	.07	\$40.21
1999	224.724	.04	62.60
2000	431.424	.19	33.00
2001	748.821	.34	66.90
2002	1,214.100	.87	67.82

Stock price source: *Yahoo Finance*.

Update the data for eBay™ if more recent annual figures are available, and get comparable data for at least one other firm from the set of firms listed in Figure 2.4. (You can get financial data about most companies by looking on their website for a link called "investor relations" or "about the company." If necessary, search the index or site map.)

- Create a spreadsheet based on these data. Your spreadsheet should include measures of percentage change in revenues, earnings per share, and stock price. You should also compute the price/earnings (PE) ratio, which is stock price divided by earnings per share. Note that some companies may have no earning for a particular year so that the PE ratio cannot be computed for that year. Rather than display "DIV/0" in the calculated cell when this happens, savvy spreadsheet developers will write a formula to display a text message such as "No Earnings" instead.
- Create appropriate graphs highlighting trends in the performance of each company.
- Write a brief (one-page) report addressing how successful each company appears to be in maintaining strategic advantage. How important were general market conditions in affecting the financial performance of your companies?

### 4. Just-in-Time Inventory Systems for Pinnacle Manufacturing

Pinnacle Manufacturing is evaluating a proposal for the development of a new inventory management system that will allow it to use just-in-time techniques to manage the inventories of key raw materials. It is estimated that the new system will allow Pinnacle to operate with inventory levels for gadgets, widgets, and sprockets equaling 10 days of production and with inventories equaling only 5 days of production for cams and gizmos.

To estimate the inventory cost savings from this system, you have been asked to gather information about current inventory levels at all of Pinnacle's production facilities. You have received estimates of the current inventory level of each raw material used in

a typical production day and the average dollar value of a unit of each raw material. These estimates are shown in Table 2.2.

**Table 2.2 Pinnacle's Inventory Estimates**

Item	Inventory (units)	Units Used per Day	Cost per Unit
Gadget	2,437,250	97,645	\$2.25
Widget	3,687,450	105,530	0.85
Sprocket	1,287,230	29,632	3.25
Cam	2,850,963	92,732	1.28
Gizmo	6,490,325	242,318	2.60

- Create a spreadsheet based on Table 2.2. Your spreadsheet should include a column showing the number of days of inventory of each raw material currently held (inventory value divided by inventory used per production day). It should also include columns showing the inventory needed under the new system (inventory used per day times 10 or 5) and the reduction in inventory under the new system for each raw material. Finally, you should include columns showing the dollar value of existing inventories, the dollar value of inventories under the new system, and the reduction in dollar value of the inventories held.
- Assume that the annual cost of holding inventory is 10 percent times the level of inventory held. Add a summary column showing the overall annual savings for the new system.

### 5. Knowledge Management

Within large organizations, employees often receive a great deal of unstructured information in the form of e-mails. For example, employees may receive policies, announcements, and daily operational information via e-mail. However, e-mail systems typically make poor enterprisewide knowledge management systems. New employees don't have access to e-mails predating their start date. Employees typically aren't permitted to search others' e-mail files for needed information. Organizations lose productivity when each employee spends time reviewing and organizing his or her e-mail files. Lastly, the same information may find itself saved across thousands of different e-mail files, thereby ballooning e-mail file storage space requirements.

Microsoft's Exchange server, IBM's Domino server, and iManage's WorkSite, along with a wide variety of open-standard Web-based products, aim to address an organization's need to share unstructured information. These products provide common repositories for various categories of unstructured information. For example, management may use a "Policy" folder in Microsoft Exchange to store all their policy decisions. Likewise, sales representatives may use a "Competitive Intelligence" folder to store information obtained during the sales process about competing products, prices, or marketplace rumors. WorkSite users categorize and store all their electronic documents in a large, searchable, secured common repository.

Organizations using these systems can secure them, manage them, and make them available to the appropriate personnel. Managers can also appoint a few, specific employees requiring little technical experience to manage the content.

However, these systems cannot benefit an organization if its employees fail to contribute their knowledge, if they fail to use the system to retrieve information, or if the system simply isn't available where and when needed. To help managers better understand how employees use these systems,

knowledge management systems include usage statistics such as date/time, user name, reads, writes, and even specific document access information.

- a. What steps might a manager take to encourage his or her employees to use their organization's knowledge management system?
- b. Should managers set minimum quotas for system usage for each employee? Why or why not?
- c. Aside from employee quotas, how else might an organization benefit from usage statistics?

## REAL WORLD CASE

# 3

## CDW, Harrah's Entertainment, and Others: Developing Strategic Customer-Loyalty Systems

Customer satisfaction is good, but customer loyalty is even better. “A satisfied customer is one who sees you as meeting expectations,” says John Samuels, a senior manager in the marketing department at CDW Corp., a Vernon Hills, Illinois-based direct marketer of more than 50,000 hardware and software products, with net sales of \$4.3 billion. “A loyal customer, on the other hand, wants to do business with you again and will recommend you to others.”

Customer relationship management (CRM) packages may help measure satisfaction, but not all of them can be used to benchmark loyalty, and the link is tenuous. A good loyalty program, according to Bob Chatham, an analyst at Forrester Research Inc. in Cambridge, Massachusetts, combines customer feedback and business information with sophisticated analytics to produce actionable results. This is why IT has to take the lead in loyalty.

“IT is just about the only department that can coordinate between business processes, external data-analytic vendors and the executives who can translate output into action,” says Chatham.

Five years ago, CDW started working with Walker Information Inc., a 64-year-old market research firm in Indianapolis that focuses on customer loyalty, to gather customer experience data. “Initially, these were phone surveys” with cycle times of two months that were used to generate reports, says Samuels.

As a beta customer, CDW in April 2002 replaced the phone surveys with Walker's SmartLoyalty service, which includes an e-mail solicitation that directs willing customers to a website Walker cohosts with CDW. It dramatically reduced survey cycle times, and some reports are even generated in real time.

“It's not that difficult to do Web surveys,” says Harry Watkins, a research director at Aberdeen Group Inc. in Boston. “Walker's real value is that they have built validated, multivariate measures of loyalty into their software. As an ASP, Walker also acts as a consultant, helping companies determine the causal variables that determine loyalty.”

SmartLoyalty divides customers into four “buckets,” or categories, commonly used for analyzing customer loyalty. CDW compared a customer's purchasing behavior with his bucket and then in further testing saw that all the buckets lined up very well with customers' behavior. “In other words,” says Samuels, “we proved that the software-generated model was very predictive.”

In response, executives sought sales improvements. For example, the model told them that customers wanted more out of the website and from account managers. So CDW's CEO directed the CIO to develop a response plan, which led to a new search engine and a website that delivers more product information.

“And now our account managers are trained to provide more than just ‘speeds and feeds,’” says Samuels. “For example, they are trained in areas such as security and disaster recovery.” These changes are paying off, he says, adding, “Each year that we have used SmartLoyalty, we have seen the percentage of truly loyal customers increase.”

At Harrah's Entertainment Inc. in Las Vegas, CIO Tim Stanley says focusing on loyalty has helped push the casino chain's numbers in the right direction. In 1997, Harrah's launched a loyalty program that pulled all customer data into a centralized warehouse and provided sophisticated analytics. “We wanted to better understand the value of the investments we make in our customers,” says Stanley.

So in 1999, Stanley offloaded the analytics to Teradata, the NCR Corp. database designed for large data sets and parallel architectures. “And the performance improvement was stunning,” he says. Harrah's now does near-real-time analysis: As customers interact with slot machines, check into casinos, or buy meals, they receive reward offers based on the predictive analyses.

The data revealed other trends as well. For example, Stanley says Harrah's previously focused mostly on high rollers. But as executives further studied the analyses and reports, they realized that the person who visits a casino once or twice a week and spends modestly is a great investment. “This was a big ‘Aha!’ for us,” Stanley says. The result was a new rewards program tailored to low rollers.

“We have seen consistent growth in revenue and profits every quarter since 1999, when we implemented the new loyalty program,” says Stanley. “By cross-correlating questionnaire analysis with our revenue numbers, we estimate a steady 60% ROI year after year on our investment in customer loyalty.”

Online gift vendor 1-800-flowers.com Inc. chose software from SAS Institute Inc. for its customer loyalty system because of the price. “Analytical tools like SAS Enterprise Miner cost about \$150,000—a lot cheaper than the \$2 million you might spend on a Siebel campaign management system,” says Aaron Cano, director of customer knowledge at 1-800-flowers.com in Westbury, New York. After only a few months, he has already seen more orders in key segments. Cano uses the analyses to profile the behavior of customers who come back five or six times a year and identifies others with similar profiles for targeted marketing.

“In order to do this right, you need to use proven methods in statistical, experimental design,” says Radek Zapert, senior manager for the financial services unit at BearingPoint Inc. in McLean, Virginia. But new tools are making that easier to do.

“Five years ago, I would have said you needed a Ph.D. in statistics to really leverage a tool like SAS Enterprise Miner, but that is no longer the case,” says Cano. “Now all you need

is a good understanding of the business and an analytical mind-set.” And technology plays a critical role in turning that into action.

When CDW began using SmartLoyalty, Samuels already had a rich source of market research reports. “The problem was that all this information was on thousands of sheets of paper, and there was no way to get it quickly to the right decision-makers,” he explains.

That’s where IT closes the loop. Aberdeen’s Watkins puts it this way: “With good customer loyalty technology, IT can wire the voice of the customer back into the enterprise.”

Source: Adapted from Mark Leon, “Catering to True-Blue Customers,” *Computerworld*, August 11, 2003, p. 37. Copyright © 2003 by Computerworld, Inc., Framingham, MA 01701. All rights reserved.

## CASE STUDY QUESTIONS

1. Does CDW’s customer loyalty program give them a competitive advantage? Why or why not?
2. What is the strategic value of Harrah’s approach to determining and rewarding customer loyalty?
3. What else could CDW and Harrah’s do to truly become customer-focused businesses? Visit their websites to help you suggest several alternatives.

## REAL WORLD ACTIVITIES

1. We learned in this chapter that information technologies can be used to support organizational strategies including customer relationship management. Using the Internet, explore how other firms besides those discussed in the case are managing their customer relationships through information technologies. Start your investigation at [www.wan-press.org/rubrique127.html](http://www.wan-press.org/rubrique127.html).
2. Managing customers involves more than simply keeping track of their purchases with an information system. Break into small groups with your classmates, and discuss the details of customer relationship management from the customer’s perspective. What does an organization have to do to maintain their customers? How can information technologies be used to improve customer experience with an organization?