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# STRATEGIC USE OF INFORMATION RESOURCES<sup>1</sup>

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Dell Computer Corporation formally stopped selling personal computers (PCs) in retail stores because reaching customers in this way was expensive, time consuming, and did not fit with Michael Dell's vision of the direct business model. Information technology (IT) enabled this vision. The Internet, combined with Dell's well-designed information systems (IS) infrastructure, allowed customers to electronically contact Dell who would then design a PC for a customer's specific needs. Dell's ordering system is integrated with its production system and shares information automatically with each supplier of PC components. This IS enables the assembly of the most current computers without the expense of storing large inventories. Cost savings are passed on to the customer, and this business model allows Dell to focus its production capacity on building only the most current products. With small profit margins and new products arriving quickly to replace existing products, this creative use of IS is critical to Dell's strategic leadership. This strategic use of IS ultimately results in cost savings, reflected in the price of systems. In addition, Dell executives achieve a strategic advantage in reducing response time, building custom computers for one of the industry's lowest costs, and eliminating inventories that could become obsolete before they are sold.

Dell used its information resources to achieve high volumes without the high costs of the industry's traditional distribution channels. This approach led to continued profitable results and a competitive advantage. As with most strategic advantages, other companies followed suit and adopted Dell's direct-to-the-customer model, but antiquated IS make this task difficult, if not an impossible. As the competitive landscape of the PC industry changes, Dell continues to innovate using information resources and now offers customized order configuring, sales inventory management, kiosks in shopping malls, and technical support directly from the Internet.

As the Dell example illustrates, innovative use of a firm's information resources can provide companies with substantial advantages over competitors. This chapter uses

<sup>1</sup> The authors wish to acknowledge and thank W. Thomas Cannon, MBA 1999 for his help in researching and writing earlier drafts of this chapter.

the business strategy foundation from Chapter 1 to help general managers visualize how to use information resources for competitive advantage. This chapter briefly recounts the evolving strategic use of information resources, and highlights the difference between simply using IS and using IS strategically. Then, this chapter explores the use of information resources to support the strategic goals of an organization.

The material in this chapter enables a general manager to understand the link between business strategy and information strategy on the Information Systems Strategy Triangle. General managers want to find answers to questions: Does using information resources provide a sustainable competitive advantage? What tools are available to help shape their strategic use? What are the risks of using information resources to gain strategic advantage?

## ► EVOLUTION OF INFORMATION RESOURCES

The Eras model shows how organizations have used IS over the past decades. Figure 2.1 summarizes this view and provides a road map for a general manager to use in thinking strategically about the current use of information resources within the firm.

	Era I 1960s	Era II 1970s	Era III 1980s	Era IV 1990s	Era V 2000+
Primary role of IT	Efficiency	Effectiveness	Strategic	Strategic	Value creation
	Automate existing paper-based processes	Solve problems and create opportunities	Increase individual and group effectiveness	Transform industry/organization	Create collaborative partnerships
Justify IT expenditures	ROI	Increasing productivity and better decision quality	Competitive position	Competitive position	Adding value
Target of systems	Organization	Organization/group	Individual manager/group	Business processes ecosystem	Customer/supplier ecosystem
Information models	Application specific	Data-driven	User-driven	Business-driven	Knowledge-driven
Dominate technology	Mainframe, “centralized intelligence”	Minicomputer, mostly “centralized intelligence”	Microcomputer, “decentralized intelligence”	Client Server, “distributed intelligence”	Internet, global “ubiquitous intelligence”
Basis of value	Scarcity	Scarcity	Scarcity	Plentitude	Plentitude
Underlying economics	Economics of information bundled with economics of things	Economics of information bundled with economics of things	Economics of information bundled with economics of things	Economics of information separated from economics of things	Economics of information separated from economics of things

**FIGURE 2.1** Eras of information usage in organizations.

IS strategy from the 1960s to the 1990s was driven by internal organizational needs. First came the need to lower existing transaction costs. Next was the need to provide support for managers by collecting and distributing information. An additional need was to redesign business processes. As competitors built similar systems, organizations lost any advantages they held from their IS, and competition within a given industry once again was driven by forces that existed prior to the new technology. As each era begins, organizations adopt a strategic role for IS to address not only the firm's internal circumstances but its external circumstances as well. Thus, in the ubiquitous era, companies seek those applications that again provide them with advantage over competition. They also seek applications that keep them from being outgunned by start-ups with innovative business models or traditional companies entering new markets. For example, a plethora of "dot-coms" challenged all industries and traditional businesses by entering the marketplace armed with Internet-based innovative systems. The Information System Strategy Triangle introduced in Chapter 1 reflects the link between IS strategy and organizational strategy and the internal requirements of the firm. The link between IS strategy and business strategy reflects the firm's external requirements. Maximizing the effectiveness of the firm's business strategy requires that the general manager be able both to identify and use information resources. This chapter looks at how information resources can be used strategically by general managers.

## ► INFORMATION RESOURCES AS STRATEGIC TOOLS

Crafting a strategic advantage requires the general manager to cleverly combine all of the firm's resources, including financial, production, human, and information resources. Information resources are more than just the infrastructures. This generic term, **information resources**, is defined as the available data, technology, people, and processes within an organization to be used by the manager to perform business processes and tasks. Seen in this way, an IS infrastructure (a concept that is discussed in detail in Chapter 6) is an information resource, as is each of its constituent components. The relationship between a firm's IS managers and its business managers is another type of information resource. This relationship can create a unique advantage for a firm. The following list highlights some of the information resources available to a firm:

- IS infrastructure (hardware, software, network, and data components)
- Information and knowledge
- Proprietary technology
- Technical skills of the IT staff
- End users of the IS
- Relationship between IT and business managers
- Business processes

Committing and developing information resources require substantial financial resources. Therefore, a general manager evaluating an information resource might consider the following questions to better understand the type of advantage the information resource can create:<sup>2</sup>

- *What makes the information resource valuable?* In Eras I through III, the value of information was tied to the physical delivery mechanisms. In these eras, value was derived from scarcity reflected in the cost to produce the information. Information, like diamonds, gold, and MBA degrees, was more valuable because it was found in limited quantities. However, the networked economy prevalent in Era IV drives a new model of value—value from plentitude. **Network externality** offers a reason for value derived from plentitude. The value of a network node to a person or organization in the network increases when another joins the network. For example, a single fax machine has no value without another fax machine that could receive the fax. As fax machines become relatively ubiquitous, the individual fax machine is driven up in value as its potential for use increases. As the cost of producing an additional copy of an information product becomes trivial, the value of the network that invents, manufactures, and distributes it increases.<sup>3</sup> Rather than using the extremely low production costs to guide the determination of price, information products or services must be priced to reflect their value to the buyer. Different organizational buyers have different information needs depending upon their competitive position within an industry.
- *Who appropriates the value created by the information resource?* The value chain model can help determine where a resource's value lies and how the appropriation can be improved in a firm's favor.
- *Is the information resource equally distributed across firms?* A general manager is unlikely to possess a resource that is completely unique. However, by surveying the firms within an industry, he or she may establish that such a resource is distributed unequally. The value of a resource that is unequally distributed tends to be higher because it can create strategic advantage. The value of information mushrooms under conditions of information asymmetries. The possessor of information may use it against, or sell it to, companies or individuals who are not otherwise able to access the information.
- *Is the information resource highly mobile?* A reliance on the individual skills of IT professionals exposes a firm to the risk that key individuals

<sup>2</sup> Adapted from: David J. Collis and Cynthia A. Montgomery, "Competing on Resources: Strategy in the 1990s." *Harvard Business Review*, July-August 1995, reprint no. 95403.

<sup>3</sup> Kevin Kelly, "New Rules for the New Economy," *Wired* (September 1997), available at [http://www.wired.com/wired/5.09/newrules\\_pr.html](http://www.wired.com/wired/5.09/newrules_pr.html).

will leave the firm, taking the resource with them. Developing unique knowledge-sharing processes and creating an organizational memory can help reduce the impact of the loss of a mobile employee. Recording the lessons learned from all team members after the completion of each project is one attempt at lowering this risk.

- *How quickly does the information resource become obsolete?* As noted in Chapter 1, “things” wear out, whereas information does not. However, information can become obsolete, untrue, or even unfashionable. Like most other assets, information resources lose value over time. A general manager should understand the rate of this decline of value, as well as what factors may speed or slow it. For example, consider a database of customer information. How long, on average, is the current address of each customer valid? What events in the customers’ lives might change their purchasing pattern and reduce the forecasting capability of the current information?

Information resources exist in a company alongside other resources. The general manager is responsible for organizing all resources so that business goals are met. Understanding the nature of the resources at hand is a prerequisite to using them effectively. By aligning the organization’s IS strategy with its business strategy, the general manager maximizes its profit potential. Meanwhile, the firm’s competitors are working to do the same. In this competitive environment, how should the information resources be organized and applied to enable the organization to compete most effectively?

## ► HOW CAN INFORMATION RESOURCES BE USED STRATEGICALLY?

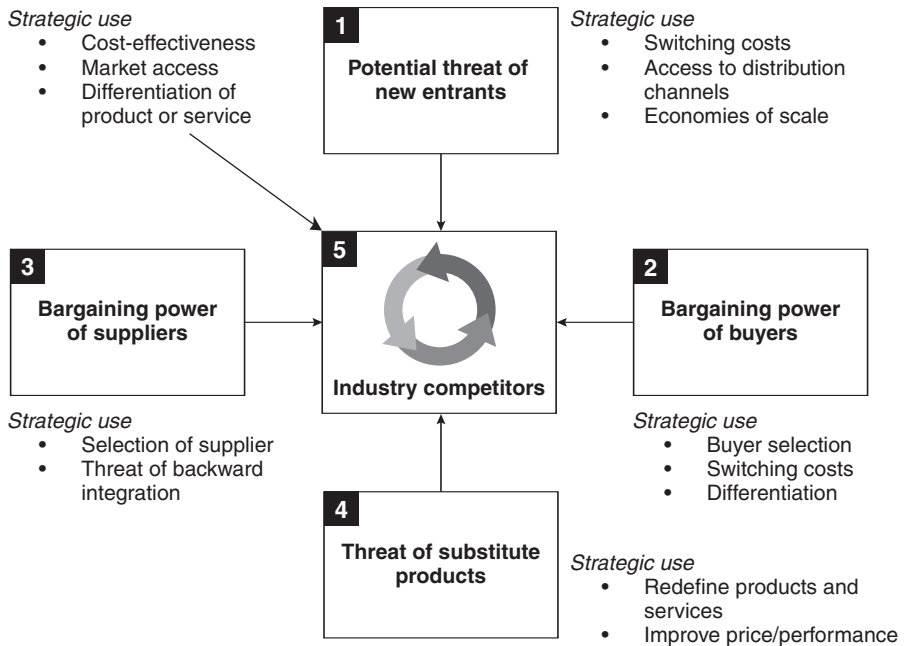
The general manager confronts many elements that influence the competitive environment of his or her enterprise. Overlooking a single element can bring about disastrous results for the firm. This slim tolerance for error requires the manager to take multiple views of the strategic landscape. We discuss three such views that can help a general manager align IS strategy with business strategy. The first view uses the five competitive forces model by Michael Porter to look at the major influences on a firm’s competitive environment. Information resources should be directed strategically to alter the competitive forces to benefit the firm’s position in the industry. The second view uses Porter’s value chain model to assess the internal operations of the organization and partners in its supply chain. Information resources should be directed at altering the value-creating or value-supporting activities of the firm. This chapter explores this view further to consider the value chain of an entire industry to identify opportunities for the organization to gain competitive advantage. The third view specifically focuses on the types of IS resources needed to gain and sustain competitive advantages. These three views provide a general manager with varied perspectives from which to identify strategic opportunities to apply the firm’s information resources.

## Using Information Resources to Influence Competitive Forces

Porter provides the general manager with a classic view of the major forces that shape the competitive environment of a firm. These five competitive forces are shown in Figure 2.2, along with some examples of how information resources can be applied to influence each force. This view reminds the general manager that competitive forces do not derive only from the actions of direct competitors. Each force now will be explored in more detail from an IS perspective.

### Potential Threat of New Entrants

Existing firms within an industry often try to reduce the threat of new entrants to the marketplace by erecting barriers to entry. Barriers to entry help the firm create a stronghold by offering products or services that are difficult to displace in the eyes of customers based on apparently unique features. Such barriers include controlled access to limited distribution channels, public image of a firm, and government regulations of an industry. Information resources also can be used to build barriers that discourage competitors from entering the industry. For example,



**FIGURE 2.2** Five competitive forces with potential strategic use of information resources. Source: Adapted from Michael Porter, *Competitive Strategy* (New York: The Free Press, 1998); and Applegate, McFarlan, and McKenney, *Corporate Information Systems Management: The Issues Facing Senior Executives*, 4<sup>th</sup> ed. (Homewood, IL: Richard D. Irwin, 1996).

Massachusetts Mutual Life Insurance Company created an IS infrastructure that connects the local sales agent with comprehensive information about products and customers. An insurance company entering the marketplace would have to spend millions of dollars to build the telecommunications and IS required to provide its sales force with the same competitive advantage. Therefore, the system at Mass Mutual may be a barrier to entry for new companies.

### **Bargaining Power of Buyers**

Customers often have substantial power to affect the competitive environment. This power can take the form of easy consumer access to several retail outlets to purchase the same product or the opportunity to purchase in large volumes at superstores like Wal-Mart. Information resources can be used to build switching costs that make it less attractive for customers to purchase from competitors. Switching costs can be any aspect of a buyer's purchasing decision that decreases the likelihood of "switching" his or her purchase to a competitor. Such an approach requires a deep understanding of how a customer obtains the product or service. For example, Amazon.com's One Click encourages return purchases by making buying easier. Amazon.com stores buyer information including contact information and credit card numbers so that it can be accessed with one click, saving consumers the effort of data reentry. Honeywell hopes to "lock in" building industry customers with the increased responsiveness, better service, and streamlined record keeping made available through its Field Automation Service Technology (FAST) initiative. Honeywell is equipping 1,400 building system service technicians across North America with handheld computers so that they can make sure that repairs are done right the first time and that customers have up-to-date, accurate information about equipment status.

### **Bargaining Power of Suppliers**

Suppliers' bargaining power can reduce a firm's profitability. This force is strongest when a firm has few suppliers from which to choose, the quality of supplier inputs is crucial to the finished product, or the volume of purchases is insignificant to the supplier. For example, steel firms lost some of their power over the automobile industry because car manufacturers developed technologically advanced quality control systems. Manufacturers can now reject steel from suppliers when it does not meet the required quality levels. Through the Internet, firms continue to provide information for free as they attempt to increase their share of visitors to their Web sites. This decision reduces the power of information suppliers and necessitates finding new ways for content providers to develop and distribute information. Many Internet firms are integrating backward within the industry by creating their own information supply and reselling it to other Internet sites. Well-funded firms simply acquire these content providers, which is often quicker than building the capability from scratch.

### **Threat of Substitute Products**

The potential of a substitute product in the marketplace depends on the buyers' willingness to substitute, the relative price-to-performance of the substitute, and the level of switching costs a buyer faces. Information resources can create advantages by reducing the threat of substitution. In the financial services industry, Merrill Lynch used innovative IS to create a product called the Cash Management Account. This account combined the benefits of a brokerage account, a money market account, a Visa credit card, and a checking account into a single product. Other firms lacking Merrill Lynch's IS were unable to provide all these services in a single account. The Cash Management Account helped attract 450,000 new brokerage accounts and allowed Merrill Lynch to build customer relationships that helped retain each account. Customers and potential customers could not easily find substitutes. Other brokerage firms took years to develop similar products. Even when substitutes became available, Merrill Lynch still enjoyed an advantage because competitors had to overcome the cost to the customer of switching accounts. For competitors to be successful, they needed to offer not just a substitute, but a better product. So far none has.

### **Industry Competitors**

Rivalry among the firms competing within an industry is high when it is expensive for a firm to leave the industry, the growth rate of the industry is declining, or products have lost differentiation. Under these circumstances, the firm must focus on the competitive actions of a rival in order to protect market share. Intense rivalry in an industry assures that competitors respond quickly to any strategic actions. The banking industry illustrates this point. When a large Philadelphia-based bank developed an ATM network, several smaller competitors joined forces and shared information resources to create a competing network. The large bank was unable to create a significant advantage from its system and had to carry the full costs of developing the network by itself. Information resources were committed quickly to achieve neutralizing results due to the high level of rivalry that existed between the local bank competitors in Philadelphia.

As firms within an industry begin to implement standard business processes and technologies—often using enterprise-wide systems such as those of SAP and PeopleSoft—the industry becomes more attractive to consolidation through acquisition. Standardizing IS lowers the coordination costs of merging two enterprises and can result in a less competitive environment in the industry.

One way competitors differentiate themselves with an otherwise undifferentiated product is through creative use of IS. Information provides advantages in such competition when added to an existing product. For example, FedEx adds information to its delivery service helping it differentiate its offerings from those of other delivery services. FedEx customers are able to track their packages, know exactly



where their package is in-transit, see who signed for the package, and know exactly when it was delivered. Competitors offer some of the same information, but FedEx was able to take an early lead by using information to differentiate their services.

Let's look at an example of these five competitive forces at work simultaneously. The five competitive forces model could be applied by a grocery chain that is considering the use of shopping cards and automated checkouts. Shopping cards allow the grocery chain to compete on price by offering its regular customers reduced rates. They make it possible for the chain to track individual buying habits, fine-tune buying based upon the analysis of sales, and offer card-holding customers the ability to check themselves out at automated checkout lines. Figure 2.3 demonstrates how the five competitive forces could shape the grocery chain's competitive environment through the application of these information technologies. These technologies may be especially helpful in responding to regular customers' needs and locking them in. Although this example conceivably could affect all forces, other technologies or IS may affect only some of these forces, though their impact could be major.

General managers can use the five competitive forces model to identify the key forces currently affecting competition, to recognize uses of information resources to influence forces, and to consider likely changes in these forces over time. The changing forces drive both the business strategy and IS strategy, and this model provides a way to think about how information resources can create competitive advantage for a business unit and, even more broadly, for the firm. They also can reshape a whole industry—compelling general managers to take actions to help their firm gain or sustain competitive advantage. The alternative perspective presented in the next section provides the general manager with an opportunity to select the proper mix of information resources and to apply them to achieve strategic advantage by altering key activities.

### **Using Information Resources to Alter the Value Chain**

The value chain model addresses the activities that create, deliver, and support a company's product or service. Porter divided these activities into two broad categories, as shown in Figure 2.4: support and primary activities. Primary activities relate directly to the value created in a product or service, while support activities make it possible for the primary activities to exist and remain coordinated. Each activity may affect how other activities are performed, suggesting that information resources should not be applied in isolation. For example, more efficient IS for repairing a product may increase the possible number of repairs per week, but the customer does not receive any value unless his or her product is repaired, which requires that the spare parts be available. Changing the rate of repair also affects the rate of spare parts ordering. If information resources are focused too narrowly on a specific activity, then the expected value increase may not be realized, as other parts of the chain are not adjusted.

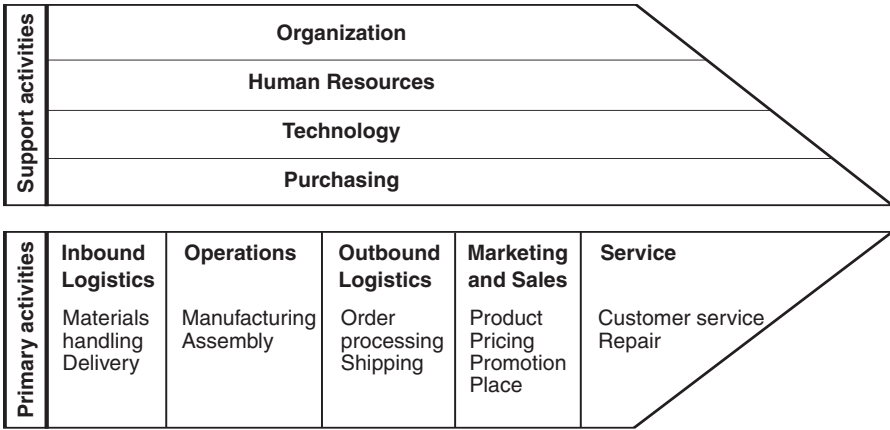
The value chain framework suggests that competition stems from two sources: lowering the cost to perform activities and adding value to a product or service so that buyers will pay more. To achieve true competitive advantage, a firm requires accurate information on elements outside itself. Lowering activity costs only

Competitive Force	IT Influence on Competitive Force
Threat of New Entrant	Automated checkout technology is expensive to implement. A new entrant might be Peapod, a Web-based delivery service directly connected to the customers through the Internet.
Bargaining Power of Buyers	Card “locks in” customer because of low prices; analysis of buying patterns derived from card use can lead the chain to localize inventory purchases to better fit the buying patterns of regular customers (i.e., stores near new affordable subdivisions with young families may stock more diapers and baby food, or stores near universities may purchase more Oriental or Indian foods, etc.); analysis of buying patterns may allow individual stores to better identify “loss leaders” and target marketing campaigns; analysis of buying patterns may lead store to introduce items that are well received in other stores in the chain where the customers share similar demographics; automated checkouts may lower “switching costs” of customers who like the shorter checkout lines with the automated technology.
Bargaining Power of Suppliers	Analysis of buying patterns derived from card use helps chain to fine-tune its inventory needs, allowing chain to be more specific and to reap economies of scale for items that are more heavily purchased across the chain; buying patterns can be shared with leading suppliers so that they can better manage their inventories.
Threat of Substitute Products	Improved price/performance makes other stores look less appealing to regular customers.
Industry Competitors	Card and automated checkout allows chain to compete on the basis of price for regular customers; automated checkout offers operational efficiencies; analysis of buying patterns allows chain to differentiate its offerings for regular customers.

**FIGURE 2.3** Application of five competitive forces model.

achieves advantage if the firm possesses information about its competitors’ cost structures. Even though reducing isolated costs can improve profits temporarily, it does not provide a clear competitive advantage unless a firm can lower its costs below a competitor’s. Doing so enables the firm to lower its prices so as to grow its market share.

Adding value can be used to gain strategic advantage only if a firm possesses accurate information regarding its customer. Which product attributes are valued,



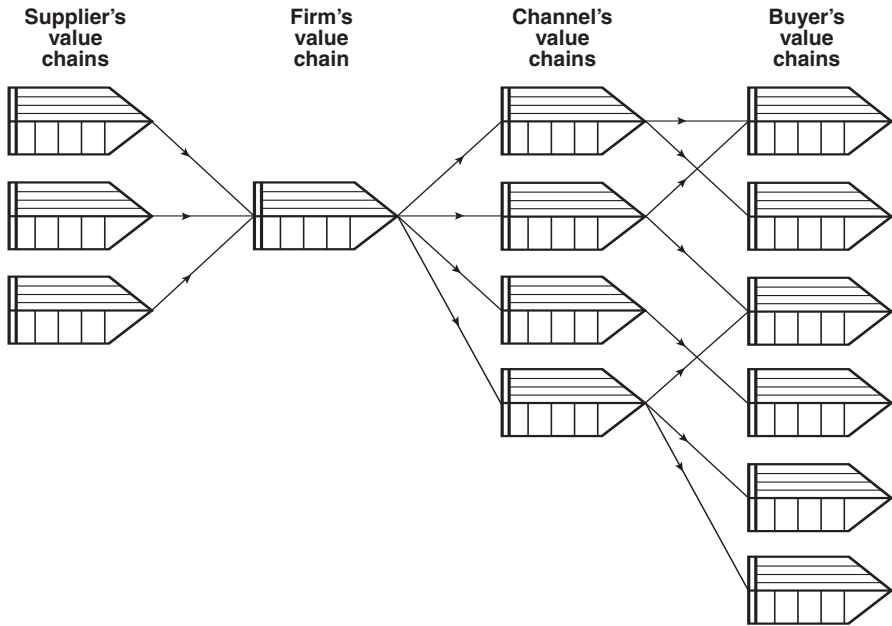
**FIGURE 2.4** Value chain of the firm.

Source: Adapted from Michael Porter and Victor Millar, “How Information Gives You Competitive Advantage,” *Harvard Business Review* (July–August 1985, reprint no. 85415).

and where can improvements be made? Improving customer service when its product fails is a goal behind Otis Elevator’s Otisline system. The customer’s service call is automatically routed to the field technician with the skill and knowledge to complete the repair. Otis Elevator knows that customers value a fast response to minimize the downtime of the elevator. This goal is achieved by using information resources to move the necessary information between activities. When customers call for service, their requests are automatically and accurately entered and stored in the customer service database and communicated to the technician linked to that account. This technician is then contacted immediately over the wireless handheld computer network and told of the problem. That way the service technician can make sure he or she has both the parts and knowledge to make repairs. This approach provides Otis with an advantage because no time is wasted and the technician arrives at the job properly prepared to fix the problem.

Although the value chain framework emphasizes the activities of the individual firm, it can be extended, as in Figure 2.5, to include the firm in a larger value system. This value system is a collection of firm value chains connected through a business relationship. From this perspective a variety of strategic opportunities exist to use information resources to gain a competitive advantage. Understanding how information is used within each value chain of the system can lead to the formation of new businesses designed to change the information component of value-added activities. It can also lead to shakeouts within the industry as the firms that fail to provide value are forced out and as new business models are adopted by the surviving firms.

Opportunity also exists in the transfer of information across value chains. Amazon.com began by selling books directly to customers over the Internet and bypassing the traditional industry channels. Customers who valued the time saved by shopping from home rather than driving to physical retail outlets flocked to



**FIGURE 2.5** The value system: interconnecting relationships between organizations.

Amazon.com's Web site to buy books. Industry competitors Barnes and Noble and Borders Books were forced to develop their own Web sites, thus driving up their cost of doing business. The new paradigm for Barnes and Noble and Borders means rethinking how their value chain works with the value offered to their customers through their traditional business.

CRM is a natural extension of applying the value chain model to customers. **Customer relationship management (CRM)** includes management activities performed to obtain, enhance relationships with, and retain customers. CRM is a coordinated set of activities designed to learn more about customers' needs and behaviors in order to develop stronger relationships with them and to enhance their value chains. CRM consists of technological components, as well as a process that brings together many pieces of information about customers, sales, marketing effectiveness, responsiveness, and market trends. CRM can lead to better customer service, more efficient call centers, product cross-selling, simplified sales and marketing efforts, more efficient sales transactions, and increased customer revenues. In Chapter 1 we described the Ritz-Carlton's CRM, Class, which captures information about guest preferences and enables providing enhanced customized service during future visits.

In an application of the value chain model to the grocery chain example discussed earlier in the chapter, Figure 2.6 describes the value added to primary and support activities from the shopping card and automated checkout for the grocery chain and its suppliers. A number of activities in the value chains of both the grocery chain and its suppliers may benefit from the shopping cards and automated

Activity	Grocery Chain's Value Chain	Supplier's Value Chain
Primary Activities		
Inbound Logistics	Analysis of buying patterns suggests items that should be stocked at local stores, including amounts and optimum delivery times.	Analysis of buying patterns can aid grocery chain in better determining demand, leading to better forecasting of demand for both the chain and its supplier.
Operations	Automated checkout can speed checkout operations; may lead to reduced staffing of registers and lower operational costs.	Analysis of buying patterns can help the grocery chain reduce "last-minute" orders and improve suppliers processing of orders.
Outbound Logistics		Sharing analysis of buying patterns by grocery chain can aid supplier in scheduling deliveries.
Marketing and Sales	Analysis of buying patterns can aid chain in developing promotional strategies and marketing campaigns at the local stores; analysis of buying patterns can highlight products to be stocked to best meet customer preferences.	Supplier may be able to offer economies of scale in its purchases.
Service	Automated checkout lanes shorten customers' waiting time.	Sharing analysis of buying patterns allows supplier to offer better service to grocery chain.
Secondary Activities		
Organization	Shopping card can provide data to help grocery chain plan for trends and demographic changes in its target market.	Shopping card can provide data to help supplier plan for trends and demographic changes in its target market.
Human Resources	Staffing needs for cash registers may be reduced with automated checkout.	
Technology	Shopping card can provide data for market research.	Grocery chain can provide information to help supplier's marketing research.
Purchasing	Grocery chain may be able to capture more discounts for volume purchases.	Supplier chain may be able to capture more discounts for volume purchases.

**FIGURE 2.6** Application of value chain model.

checkout. In addition to the value chains of the grocery chain and its supplier, these systems can add value to the customers' inbound logistics. Because of the analysis of buying patterns, the items that the customers may wish to purchase are more likely to be in stock—and at lower prices.

Unlike the five competitive forces model, the focus of the value chain is on activities. Yet, in applying the value chain, competitive forces may be affected to the extent that the proposed technology may add value to suppliers, customers, or even competitors and potential new entrants.

### **Using Information Resources to Attain and Sustain Competitive Advantage**

The Resource-Based View<sup>4</sup> (RBV) has been applied in the area of Information Systems to help identify two subsets of information resources: those that enable a firm to *attain* competitive advantage and those that enable a firm to *sustain* the advantage over the long-term. In the first subset are both valuable and rare resources that firms must leverage to establish a superior resource position. A resource is considered valuable when it enables the firm to become more efficient or effective. It is rare when other firms do not possess it. For example, many banks today would not think of doing business without ATMs. ATMs are very valuable to the banks in terms of their operations. A bank's customers expect it to provide ATMs in many convenient locations. However, because many other banks also have ATMs, they are not a rare resource and they do not offer a strategic advantage. Many systems in Eras I and II, and especially Era III, were justified on their ability to provide a rare and valuable resource.

But as many firms moved into subsequent eras, they as quickly learned that gaining a competitive advantage does not mean that you can sustain it over the long term. The only way to do that is to protect against resource imitation, substitution, or transfer. For example, Wal-mart's logistic management is so complex and embedded in its operations and that of its suppliers that it is unlikely that other firms can easily imitate it. It was not easy for customers to find a substitute for Merrill Lynch's Cash Management Account discussed earlier in this chapter. Finally, in order to sustain competitive advantage, resources must be difficult to transfer, or relatively immobile. Some resources such as computer hardware and software can be easily bought and sold. However, technical knowledge, especially that relate to the firm's operation, a gung-ho company culture, and managerial experience in the firm's environment are less easy to obtain and, hence, are considered harder to transfer to other firms.

<sup>4</sup> The Resource-Based View was originally proposed by management researchers, most prominently Jay Barney: Barney, J. "Firm Resources and Sustained Competitive Advantage," *Journal of Management* (17:1), 1991, 99–120; Barney, J. "Is the Resource-based 'View' a Useful Perspective for Strategic Management Research? Yes," *Academy of Management Review* (26:1), 41–56. M. Wade and J. Hulland, ("Review: The Resource-Based View and Information Systems Research: Review, Extension and Suggestions for Future Research," *MIS Quarterly*, (28:1), 2004, 107–142) reviewed its application in the MIS literature and derived a framework to better understand its application to IS resources.

From the IS perspective,<sup>5</sup> some types of resources are better than others for creating those attributes (i.e., value, rarity, low substitutability, low mobility, low imitability) of IS resources that enable a firm to attain and sustain competitive value. Externally focused resources make it possible for a firm not only to gain competitive advantage, but also to keep it. In particular, externally oriented IS (outside-in) resources such as the ability to work with buyers and suppliers and the ability to read the market, and both internally and externally oriented (spanning) resources such as the ability of IS to manage partnerships with the business units and to plan and undertake change, tend to have more initial and enduring impact on the firm than internally-focused (inside-out) resources. It clearly is important for IS executives to manage inside-out resources such as IS infrastructure, IS technical skills, the ability to develop systems and run cost-effective IS operations, resources that are typically considered to be their responsibility. However, the message posed by the resource-based view is that these executives must also concentrate on cultivating resources that help the firm understand and work with its external stakeholders.

## ► STRATEGIC ALLIANCES

The value chain helps a firm focus on adding value to the chains of its partners. This latest era of Information Resources Evolution emphasizes the importance of collaborative partnerships. These partnerships can take many forms including joint ventures, joint projects, trade associations, buyer-supplier partnerships, or cartels. Often such partnerships use information technologies to support strategic alliances and integrate data across partners' information systems. A **strategic alliance** is an interorganizational relationship that affords one or more companies in the relationship a strategic advantage. IT can help produce the product developed by the alliance, share information resources across the partners' existing value systems, or facilitate communication and coordination among the partners. For example, Delta recently formed a strategic alliance with e-Travel Inc., a travel service software company that targets large corporations, to promote Delta's online reservations system. The alliance was strategic because it helped Delta reduce agency reservation fees and offered e-Travel new corporate leads. SCM is another frequently discussed type of IT-facilitated strategic alliances.

## Supply Chain Management

**Supply chain management (SCM)** is an approach that improves the way a company finds raw components it needs to make a product or service, manufactures that product or service, and delivers it to customers. Technology, especially Web-

<sup>5</sup> Ibid.

based technology, allows the supply chains of a company's customers and suppliers to be linked through a single network that optimizes costs and opportunities for all companies in the supply chain. By sharing information across the network, guesswork about order quantities for raw materials and products can be reduced and suppliers can make sure they have enough on hand if demand for their products unexpectedly rises.

Sharing information across firms requires collaboration and, increasingly, the IT to support its seamless processing across firm boundaries. If a firm wants to limit its collaboration with its trading partner, it can use technologies such as electronic marketplaces where only minimal information such as product characteristics, delivery addresses, and billing addresses need to be exchanged over the Internet. However, when firms start sharing information about production schedules, valued customers, or how complex systems work, a much higher level of collaboration (and trust) is needed. Such collaboration is often made possible by reengineering operations to mirror or complement each other and working extensively to make one company's computer system talk with the other's.

Collaboration paid off for supply-chain partners Wal-Mart and Procter & Gamble (P&G). Until these two giants linked their software systems in the 1980s, they shared little information. Now their integrated systems automatically alert P&G to ship more P&G products when Wal-Mart's distribution centers run low. The SCM system also allows P&G to monitor shelves at individual Wal-Mart stores through real-time satellite linkups that send messages to the factory whenever a P&G item is scanned at the register. This real-time information aids P&G in manufacturing, shipping, and displaying products for Wal-Mart. Invoicing and payments are automatically processed. Because of high volumes and operating efficiencies derived from the SCM software, P&G can offer discounted prices to help Wal-Mart offer its "low, everyday prices."

## Co-opetition

Clearly, not all strategic alliances are formed with suppliers or customers as partners. Rather, co-opetition is becoming increasingly popular alternative model. As defined by Brandenburger and Nalebuff in their book of the same name, **co-opetition** is a strategy whereby companies cooperate and compete at the same time with companies in its value net.<sup>6</sup> The value net includes a company and its competitors and complementors, as well as its customers and suppliers, and the interactions among all of them. A complementor is a company whose product or service is used in conjunction with a particular product or service to make a more useful set for the customer. For example, Goodyear is a complementor to Ford and GM because tires are a complementary product to automobiles. Likewise, hardware and software companies are complementors.

<sup>6</sup> A. Brandenburger and B. Nalebuff, *Co-opetition* (New York: Doubleday, 1996).



Co-opetition, then, is the strategy for creating the best possible outcome for a business by optimally combining competition and cooperation. It frequently creates competitive advantage by giving power in the form of information to other organizations or groups. For example, Covisint, the auto industry's e-marketplace, is backed by competitors General Motors, Ford, and DaimlerChrysler. Further, Nissan and Peugeot are equity partners. By addressing multiple automotive functional needs across the entire product life cycle, Covisint offers support for collaboration, supply chain management, procurement, and quality management. Thus, co-opetition as demonstrated by Covisint, not only streamlines the internal operations of its backers, but also has the potential to transform the automotive industry.

## ► RISKS

As demonstrated throughout this chapter, information resources may be used to gain strategic advantage, even if that advantage is fleeting. When information systems are chosen as the tool to outpace their firm's competitors, executives should be aware of the many risks that may surface. Some of these risks include the following:

- *Awaking a sleeping giant.* A firm can implement IS to gain competitive advantage, only to find that it nudged a larger competitor with deeper pockets into implementing an IS with even better features. FedEx offered its customers the ability to trace the transit and delivery of their packages online. FedEx's much larger competitor, UPS, rose to the challenge. UPS not only implemented the same services, but also added a new set of features. Both the UPS and FedEx sites passed through multiple Web site iterations as the dueling delivery companies continue to struggle for competitive advantage.
- *Demonstrating bad timing.* Sometimes customers are not ready to use the technology designed to gain strategic advantage. For example, Momenta Corp. experienced monumental failure when it attempted to sell pen-based technology in the early 1990s. A decade later Pen-based computing is well accepted by PDA users.
- *Implementing IS poorly.* Stories abound of information systems that fail because they are poorly implemented. Typically these systems are complex and often global in their reach. In its zeal to implement a system to streamline supply chain communications and lower operating costs, Nike's implementation team allegedly performed customization that extended beyond the recommendations of its software supplier, i2 Technologies. The resulting missed and duplicated orders may have cost Nike as much as a \$100 million. Another implementation fiasco took place at Hershey Foods when it attempted to implement its supply and inventory system. Hershey developers brought the complex system up too quickly, and then failed to test it adequately. Related systems prob-

lems crippled shipments during the critical Halloween shopping season, resulting in large declines in sales and net income.

- *Failing to deliver what users want.* Systems that do not meet the needs of the firm's target market are likely to fail. Streamline.com (also called Streamline Inc.) experienced this risk when using the Web to provide home delivery of groceries and pick-up/drop-off services for movie rentals, dry cleaning, and film. Streamline charged a \$30-per-month subscription fee and worked from "personal shopping lists" customers submitted through its Web site. But Streamline failed to convince a large number of shoppers that Streamline's services matched their lifestyle. Streamline may have failed because its once-a-week delivery was too infrequent, or because its customers wanted to inspect the produce when bags were dropped off.
- *Running afoul of the law.* Using IS strategically may promote litigation if the IS results in the violation of laws or regulations. Years ago, American Airlines' reservation system, Sabre, was challenged by American Airlines' competitors on the grounds that it violated antitrust laws. More recently Napster filed for bankruptcy as a consequence of BMG Entertainment, AOL Time Warner, EMI, Sony, and Vivendi International jointly suing it for copyright infringement. The suit led to Napster's court-ordered shutdown.

## ► FOOD FOR THOUGHT: TIME-BASED COMPETITIVE ADVANTAGE

In the Internet economy, the pace of technological change continues to accelerate. Classical strategic advantages are created and destroyed based on which actions competitors take, how soon they take them, and how long each action takes. Classic strategies take time to develop and implement. The twenty-first century will see organizations increasingly seeking to use technology to neutralize the competition as quickly as possible. Reaching individual customers and meeting their needs as close to instantaneously as possible will leave no time for competitive actions to change the customer's mind. The moment the need is expressed, the product or service offer and exchange take place. This focus on time-based competition has already begun. Consider the role that Dell Computers played in compressing the time between the customer wanting a specific computer system and receiving that exact system on the doorstep. Dell's process can be executed in as little as five days from the time the customer places an order until he or she receives a custom-built system.

At the strategic level, the organization is confronted with increasing flows of information between itself, its stakeholders, its environment, and its competitors. The combination of technology and information enables each of these information "partners" to quickly change its expectations of the future. The result is a change from one set of activities to another set that aligns more closely with the new expectations. Each of these realignments from an information partner requires a response from the

organization. Typical planning cycles are thrown out the window, because the organization needs to respond quickly to customer, competitor, and environmental changes. The speed at which an organization can adapt its business processes to these changes will dictate the true competitive advantage that it holds in the market.

Information resources are the key to achieving a time-based advantage. Understanding how to use them is critical to the strategic success of business today. For example, every company has been forced to build Web-based applications. Some, like Dell, embraced this opportunity as a chance to reinvent themselves to create a new business model—one that responds instantly. Others simply post a basic Web page with no thought of the lost window of opportunity. The latter group missed the point—time is of the essence and customers no longer accept slow, unresponsive service.

## ► SUMMARY

- Using IS for strategic advantage requires an awareness of the many relationships that affect both competitive business and information strategies.
- The five competitive forces model reminds us that more than just the local competitors influence the reality of the business situation. Analyzing the five competitive forces—new entrants, buyers, suppliers, industry competitors, and substitute products—from both a business view and an information view helps general managers use information resources to minimize the effect of these forces on the organization.
- The value chain highlights how information systems add value to the primary and support activities of a firm's internal operations, as well as to the activities of its customers, and other components of its supply chain.
- IT can facilitate strategic alliances. SCM is one example of a mechanism for creating strategic alliances.
- Numerous risks are associated with using information systems to gain strategic advantage: awaking a sleeping giant, demonstrating bad timing, implementing poorly, failing to deliver what customers want, and running afoul of the law.

## ► KEY TERMS

customer relationship management (CRM) (p. 00)	network externalities (p. 00)
co-opetition (p. 00)	strategic alliance (p. 00)
information resources (p. 00)	supply chain management (SCM) (p. 00)

## ► DISCUSSION QUESTIONS

1. How can information itself provide a competitive advantage to an organization? Give two or three examples. For each example, describe its associated risks.
2. Use the five competitive forces model as described in this chapter to describe how information technology might be used to provide a winning position for each of these businesses:

- a. A global airline
  - b. A local dry cleaner
  - c. An appliance service firm (provides services to fix and maintain appliances)
  - d. A bank
3. Using the value chain model, describe how information technology might be used to provide a winning position for each of these businesses:
- a. A global airline
  - b. A local dry cleaner
  - c. An appliance service firm (provides services to fix and maintain appliances)
  - d. A bank
4. Some claim that no sustainable competitive advantages can be gained from IT other than the capability of the IT organization itself. Do you agree or disagree? Defend your position.
5. Cisco Systems has a network of component suppliers, distributors, and contract manufacturers that are linked through Cisco's extranet. When a customer orders a Cisco product at Cisco's Web site, the order triggers contracts to manufacturers of printed circuit board assemblies when appropriate and alerts distributors and component suppliers. Cisco's contract manufacturers are aware of the order because they can log on to Cisco's extranet and link up with Cisco's own manufacturing execution systems. What are the advantages of Cisco's strategic alliances? Does this Cisco example demonstrate SCM? Why or why not?
6. In March 2000, procurement software maker Ariba, a supply chain specialist, i2, and IBM's consulting division formed an alliance. It was agreed that IBM would provide the interface between Ariba's and i2's products to create an integrated software package. While proclaiming its allegiance to the alliance, Ariba tried to buy Agile, a supply chain vendor that competed with i2, and i2 bought RightWorks, a procurement software vendor that competed directly with Ariba. Further, i2 and Ariba actively competed for each other's customers. The shaky alliance ended in 2001. How does this case demonstrate the advantages and disadvantages of co-opetition?

## CASE STUDY 2-1

### LEAR WON'T TAKE A BACKSEAT

For decades, Lear Corp. made car seats. Today, with the help of virtual reality and other digital technologies, Lear makes a whole lot more—and makes it a whole lot faster. Lear Corp used virtual reality to envision the interior of the Chevrolet Express LT, a new luxury van that Lear helped design and build. Within two years, the first models started coming off a GM assembly line near St. Louis.

In the automotive world, that kind of turnaround time is almost impossibly quick. Even when the shell of a vehicle already exists, as it did in this case, the vehicle design schedule traditionally spans about three years. Between the initial concept and the production-ready design lies a painstaking clay-modeling process that typically involves at least a half-dozen costly iterations. But by shifting much of that process to a virtual reality environment, Lear cut the product development period to a year and a half.

GM awarded Lear the lucrative contract for the Express LT largely because of the speed and flexibility that Lear's use of technology makes possible. "We always thought of Lear as

a great seating company,” says Linda Cook, 45, GM’s planning director for commercial trucks and vans. “We didn’t realize how much else it could do. Lear really needed that technology to get our attention.”

Lear, based in Southfield, Michigan, has roots that go back to 1917. By the 1990s, it had become the world’s biggest manufacturer of automotive seating. (If you’ve sat in anything from a Chevy to a Ferrari recently, then you’ve probably enjoyed the comfort of a Lear product.) But in the mid-1990s, the auto parts industry entered a period of aggressive consolidation. Instead of relying on thousands of small vendors to make each part separately, automakers wanted to buy complete systems from a few big suppliers. So Lear snapped up smaller companies and combined them into an operation that was capable of making an entire vehicle interior. It also invested heavily in the latest computer-aided design (CAD) software and in other new technologies. By 2000, thanks to acquisitions and expansion into new product areas, sales had climbed to \$14.1 billion.

CAD first appeared in the auto industry in the late 1970s, but it didn’t reach a critical mass of power and capability until the mid-1990s. That’s when Lear decided to invest in an animated virtual reality package from Alias|Wavefront, a software subsidiary of Silicon Graphics. By 1998, the Reality Center was under construction, complete with a triple-projection screen and three digitized drawing boards. Out went the chisel; in came the cursor. Thanks to this technology, Lear has all but eliminated the slow, muck-filled process of building prototype after prototype from brownish-orange sculpting clay. However, Lear typically makes at least one physical prototype of every product that it develops in the Reality Center in order to test tactile issues.

In exploring new technologies, the Lear team was tempted at first by the prospect of using them to change long-standing ways of working together. Take the Internet. By digitizing much of the design process, Lear made it possible for designers to send their work back and forth over the Net—thereby creating a virtual workplace that brings together people from all around the world. In November 1998, for example, Rothkop traveled to a Volvo design center in Sweden and used the Net to work with colleagues at the Reality Center back in Southfield. Where the Internet extends or enhances communication, the Lear team has embraced it. For the most part, though, the real work of designing auto parts remains an up-close-and-personal business.

For that reason, when it came to building the Reality Center, Lear put a premium on creating an environment that would foster collaboration. The team considered a stereoscopic “cave,” a space in which people can sit and be completely surrounded by a screen. While that arrangement simulates being in a car, “it can kind of make people nauseated,” Rothkop says. Worse yet, only one or two people at a time can sit in the cave—a situation that has dismal implications for collaboration. Instead, the Lear team chose a simpler design for its virtual reality room, one that has a flatter screen and a more open space. There’s even room in front of the screen for a full-sized truck, so Lear designers can bring together the real and the virtual whenever their work calls for that.

Another temptation that Lear executives faced was to think that CAD and VR would let them break down traditional job barriers and combine the roles of designer, sculptor, and animator into a single worker. But, in Lear’s experience, the seemingly artificial barriers between jobs often turn out to be quite natural. So Lear drew back from the notion of combining jobs.

### **Discussion Questions**

1. What is the strategic advantage afforded to Lear from virtual reality? How does this technology help it compete?

2. How long is Lear's window of opportunity for the strategic advantage given by the virtual reality system? That is, do you think that competitors will follow suit and implement a similar system. If yes, when?
3. Do you think the CAD system offers Lear strategic advantage? Explain.
4. Apply the value chain to demonstrate how the virtual reality system adds value for Lear and for General Motors.
5. What other types of competitive advantages might Lear executives seek from IS in general?

Source: Fara Warner, "Lear Won't Take a Backseat," *Fast Company*, 47 (June 2001), pp. 178, available at <http://www.fastcompany.com/online/47/bestpractice.html>.