
STRATEGIC USE OF INFORMATION RESOURCES¹

Zara is a Spanish manufacturer with a business model that provides them a significant strategic advantage in the highly competitive retail and apparel industry. At the heart of their model is a set of business processes and a simple, some might call outdated, information system that links demand to manufacturing and manufacturing to distribution. The strategy at Zara stores is simply to have a continuous flow of new products that are typically in limited supply. As a result, regular customers visit their stores often—on an average of 17 times a year, whereas most stores can only entice their customers inside on an average of four times a year. If customers see something they like, they buy it on the spot because they know it will probably be gone the next time they visit the store. The result is a very loyal and satisfied customer base and a wildly profitable business model.

How can this be? It is in part made possible because Zara aligns its information system strategy with its business strategy. The entire process from factory to shop floor is coordinated from Zara's headquarters using information systems. The point-of-sale system records the information from each sale, and the information is transmitted to headquarters at the end of each business day. The Zara shop managers also report back daily to the designers at headquarters to let them know what has sold and what the customers wanted but couldn't find. The information is used to determine which product lines and colors should be kept and which should be altered or dropped. The designers communicate directly with the production staff to plan for the incredible number of designs—more than 11,000—that will be manufactured every year.

The shop managers have the option of ordering new designs twice a week using handheld computers. Before ordering, they can use their handheld computers to check out the new designs. Once an order is received at the manufacturing plant at headquarters, a large computer-controlled piece of equipment calculates how

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

to position patterns to minimize scrap and cut up to 100 layers of fabric at a time. The cut fabric is then sent from Zara factories to external workshops for sewing. The completed products are sent to distribution centers, where miles of automated conveyor belts are used to sort the garments and recombine them into shipments for each store. Zara's information technology (IT) department wrote the applications controlling the conveyors, often in collaboration with vendors of the conveyor equipment.

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

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 an 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.

	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.

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 the firm’s resources, including financial, production, human, and information resources, and to consider external resources such as the Internet and opportunities in the global arena. Information resources are more than just the infrastructure. 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. Information resources can

either be assets or capabilities. An **IT asset** is anything, tangible or intangible, that can be used by a firm in its processes for creating, producing, and/or offering its products (goods or services). An **information technology (IT) capability** is something that is learned or developed over time for the firm to create, produce, or offer its products. An IT capability makes it possible for a firm to use its IT assets effectively.²

An IS infrastructure (a concept that is discussed in detail in Chapter 6) is an IT asset. It includes each of an information resource's constituent components (i.e., data, technology, people, and processes). The infrastructure provides the foundation for the delivery of a firm's products or services. Another IT asset is an information repository, which is logically related data that is captured, organized, and retrievable by the firm.

In the ever-expanding **Web 2.0** space, the view of IT assets is broadening to include potential resources that are available to the firm, but that are not necessarily owned by the firm. These additional information resources are often available as a service, rather than as a system to be procured and implemented internally. For example, a Web-based software such as Salesforce.com offers managers the opportunity to find new ways to manage their customer information with an externally based IT resource. Social networking systems such as Facebook or Linked-In offer managers the opportunity to find expertise or an entire network of individuals ready to participate in the innovation processes of the corporate using relatively little capital or expense.

The three major categories of IT capabilities are technical skills, IT management skills, and relationship skills. Technical skills are applied to designing, developing, and implementing information systems. IT management skills are critical for managing the IT function and IT projects. They include an understanding of business processes and the ability to oversee the development and maintenance of systems to support these processes effectively. Relationship skills can either be externally focused or spanning across departments. An externally focused relationship skill includes the ability to respond to the firm's market and to work with customers and suppliers. The relationship between a firm's IS managers and its business managers is a spanning relationship skill. Even though it focuses on relationships in the firm, it requires spanning beyond the IT department. Relationship skills develop over time and require mutual respect and trust. They, like the other information resources, can create a unique advantage for a firm. Figure 2.2 summarizes the different types of information resources and provides examples of each.

Committing and developing information resources require substantial financial resources. Therefore, a general manager evaluating an information resource might

² G. Piccoli and B. Ives, "IT-Dependent Strategic Initiatives and Sustained Competitive Advantage: A Review and Synthesis of the Literature," *MIS Quarterly* 29, no. 4 (2005), 747–776.

Type of Information Resource	Definition	Example
IT ASSET	Anything that can be used by a firm in its processes for creating, producing, and/or offering its products (goods or services)	
IS infrastructure	Base foundation of the IT portfolio shared through the firm ³	Hardware, software, network, data components, proprietary technology, Web-based services
Information repository	Data that is logically related and organized in a structured form accessible and usable for decision making purposes.	Critical information about customers that can be used to gain strategic advantage. Much of this information is increasingly available on the Web.
IT CAPABILITY	Something that is learned or developed over time and used by the firm to create, produce, or offer its products using IT assets	
Technical skill	Ability applied to designing, developing, and implementing information systems	Proficiency in systems analysis and design; programming skills
IT management skills	Ability to manage IT function and IT projects	Being knowledgeable about business processes and managing systems to support them; evaluating technology options; envisioning creative IS solutions to business problems
Relationship skills	Ability of IS specialists to work with parties outside the IS department.	Spanning: having a good relationship between IT and business managers. Externally focused: have a good relationship with an outsourcing vendor

FIGURE 2.2 Information resources.⁴

consider the following questions to better understand the type of advantage the information resource can create:⁵

- *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,

³ Adapted from M. Broadbent, P. Weill, and D. St. Clair, “The Implications of Information Technology Infrastructure for Business Process Redesign,” *MIS Quarterly* 23, no. 2 (1999), 163.

⁴ Adapted from Piccoli and Ives, “IT-Dependent Strategic Initiatives,” 755.

⁵ 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.

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 plenitude. **Network effects** offer a reason for value derived from plenitude. The value of a network node to a person or organization in the network increases when others join the network. For example, an e-mail account has no value without another e-mail account that could receive the e-mail. As e-mail accounts become relatively ubiquitous, the value of having an e-mail account increases as its potential for use increases. Further, copying additional people on an e-mail is done at a very low cost (virtually zero) highlighting that 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.⁶ Therefore, 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 on 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. The resource-based view describes the attributes of information resources that make it possible for them to create and sustain competitive advantage.
- *Is the information resource equally distributed across firms?* At the beginning of the life cycle of a new technology, early adopters may experience a competitive advantage from using an information resource. For example, a manager who has mastered the value from internal wikis may find uses for them that give his or her firm a momentary advantage. However in the longer term, a general manager is unlikely to possess a resource that is completely unique. But the experience gained when using the information resource may cause inequities between firms. By surveying the firms within an industry, he or she may establish that the value received by 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 will leave the firm, taking the resource with them. Developing unique

⁶ Kevin Kelly, "New Rules for the New Economy," *Wired* (September 1997), http://www.wired.com/wired/5.09/newrules_pr.html.

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?* “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 advantage. 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 2.3, along with some examples of how information resources can be applied to influence each force. This view reminds the general manager that competitive forces result from more than just the actions of direct competitors. Each force now will be explored in 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, Massachusetts Mutual Life Insurance Company created an IS infrastructure that connects the local sales agent with comprehensive information about products and

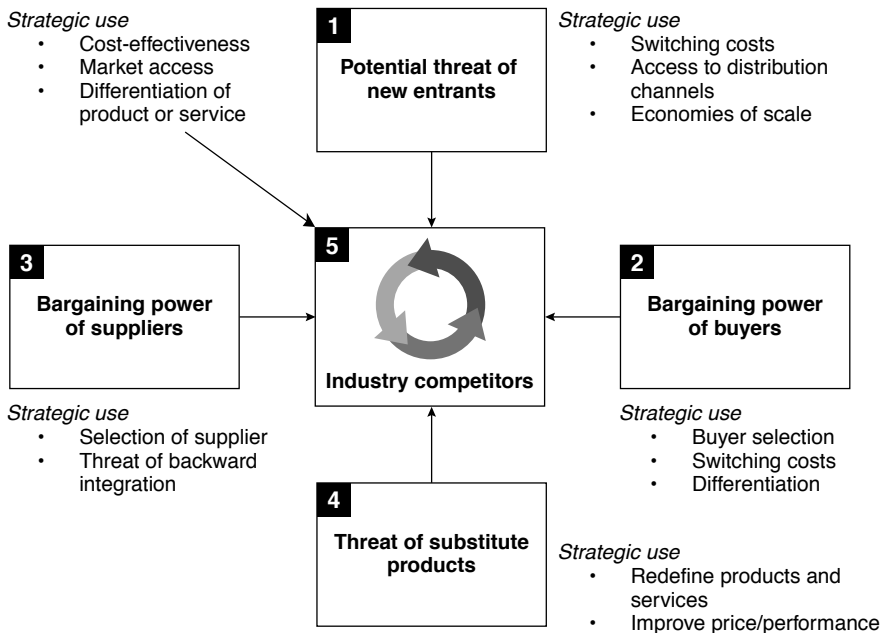


FIGURE 2.3 Five competitive forces with potential strategic use of information resources. Source: Adapted from Michael Porter, *Competitive Strategy* (New York: The Free Press, 1998); and Lynda M. Applegate, F. Warren McFarlan, and James L. McKenney, *Corporate Information Systems Management: The Issues Facing Senior Executives*, 4th ed. (Homewood, IL: Richard D. Irwin, 1996).

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. Similarly, Apple's iTunes simple-to-use interface and proprietary software on the iPod make it difficult for customers to use other formats and technologies than the iPod.

Another good example of the power of buyers can be found at Facebook. On November 6, 2007, Facebook announced an exciting new service, Beacon. Press releases from Facebook shouted that "users gain ability to share their actions from 44 participating sites with their friends on Facebook." The concept was called "Social Distribution" and gave Facebook information from the participating sites that would be posted on the Facebook customer's page. Customers erupted in protest, and one month later, on December 6, CEO Mark Zuckerberg, personally issued an apology for the way Facebook handled the new feature. "We simply did a bad job with this release, and I apologize for it. While I'm disappointed with our mistakes, we appreciate all the feedback we have received from our users. I'd like to discuss what we have learned and how we have improved Beacon." Zuckerberg continued by sharing why they built Beacon in the first place (to let people share with their friends a lot of information across sites) and why it was designed the way it was (to be as easy to use as possible and so users "didn't have to touch it to make it work."). But the blogosphere quickly lit up with issues of privacy, control, and security as well as general dislike of the strategy, forcing the company to respond.

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. One example is eBay's acquisition of PayPal, the system used to transact payment for goods and services all over the Web.

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. For example, Internet auction site eBay used innovative IT to create a set of services for their small businesses, a major source of revenue for the online auctioneer. At a time when customers were beginning to complain, sellers were wondering about the fees, and competition was trying to lure them both away, eBay brought out ProStores, a service to help all sellers build their own Web site. eBay managers noticed that many sellers did not have any Web presence other than eBay, and the move was another way to lock in these customers to the eBay environment. "The more those sellers are locked into an eBay environment, the less likely they will work with rivals," according to one Web site.⁷ It seemed to work. One seller, a Tennessee-based, wholesale distributor of ball bearings and chains, reportedly doubled its eBay sales four months after its ProStores site was launched.⁸ For competitors to be successful, they needed to offer not just a substitute, but also a better service to these sellers. So far none has.

Substitutes that cause a threat are not just products offered from the initial company or products that are similar but offered by a competitor. The threat often comes from potentially new innovations that make the previous product obsolete. Consider how digital cameras have made film (and the cameras that use them) obsolete. CDs and more recently digitally based MP3 files have made vinyl records (and the record players that use them) obsolete. Free Web-based applications are a threat to software vendors who charge for their products and who do not have Web-based delivery. Managers must watch for potential substitutes from many different sources to fully manage this competitive threat.

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

⁷ Evan Shumann, StorefrontBacktalk.com, <http://www.storefrontbacktalk.com/story/062605ebay.php>

⁸ Gwen Moran, "The Pros of Opening an eBay ProStore," www.entrepreneur.com, March 24, 2006.

products have lost differentiation. Under these circumstances, the firm must focus on the competitive actions of a rival to protect market share. Intense rivalry in an industry ensures 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 enterprisewide systems such as those of SAP and Oracle—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. Figure 2.4 summarizes these five forces working simultaneously at the retailer and manufacturer Zara.

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. Consider an example of a large grocery retailer. Because of many factors, including the number of items on the shelves of the store, the complexity of managing customers, and the logistics necessary to keep inventory moving and reordered as necessary, these retailers are no longer able to compete without information systems. The basis of competition has changed in part because of the innovative use of information systems by industry leaders. Keeping track of inventory is a given, but large chains must also intimately know their customers and find new ways to provide innovative services to keep their loyalties. The entire industry has changed from one of locally providing groceries to one of managing information about every aspect of their business. The alternative perspective presented in the next section provides the general manager with an opportunity to select the proper mix of

Competitive Force	IT Influence on Competitive Force
Threat of New Entrant	Zara's IT supports its tightly knit group of designers, market specialists, production managers, and production planners. New entrants are unlikely to provide IT to support relationships that have been built over time. Further, it has a rich information repository about customers that would be hard to replicate.
Bargaining Power of Buyers	With its constant infusion of new products, buyers are drawn to Zara stores. Zara boasts more than 11,000 new designs a year, whereas competitors typically offer only 2,000–4,000. Further, because of the low inventory that the Zara stores stock, the regular customers buy products they like when they see them because they are likely to be gone the next time they visit the store. More recently Zara has employed laser technology to measure 10,000 women volunteers so that it can add the measurements of “real” customers into its information repositories. This means that the new products will be more likely to fit Zara customers.
Bargaining Power of Suppliers	Its computer-controlled cutting machine cuts up to 1000 layers at a time. It then sends the cut materials to suppliers who sew the pieces together. The suppliers' work is relatively simple, and many suppliers can do the sewing. Thus, the pool of suppliers is expanded, and Zara has greater flexibility in choosing the sewing companies. Further, because Zara dyes 50% of the fabric in its plant, it is less dependent on suppliers and can respond more quickly to midseason changes in customer color preferences.
Industry Competitors	Industry competitors long marketed the desire of durable, classic lines. Zara focuses on meeting customer preferences for trendy, low-cost fashion. It has the highest sales per square foot of any of its competitors. It does so with virtually no advertising and only 10% of stock is unsold. It keeps its inventory levels very low and offers new products at an amazing pace for the industry (i.e., 15 days from idea to shelves). Zara has extremely efficient manufacturing and distribution operations.
Threat of Substitute Products	IT helps Zara offer extremely fashionable lines that are only expected to last for approximately 10 wears. IT enables Zara to offer trendy, appealing apparel at hard-to-beat prices, making substitutes difficult.

FIGURE 2.4 Application of five competitive forces model for zara.

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

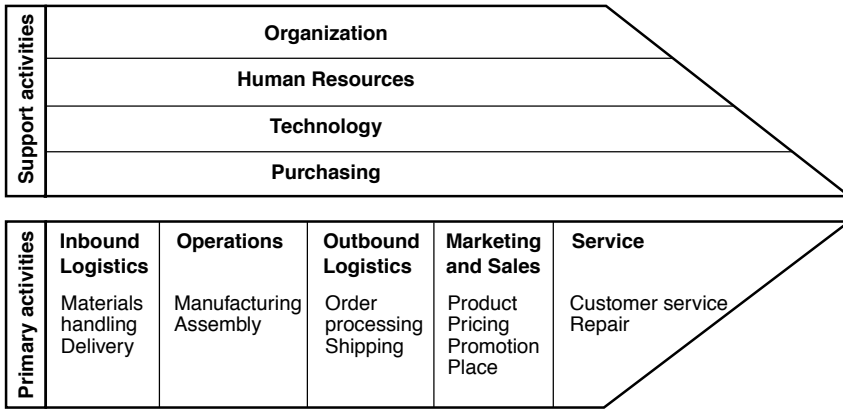


FIGURE 2.5 Value chain of the firm.

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

categories, as shown in Figure 2.5: support and primary activities. Primary activities relate directly to the value created in a product or service, whereas 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 achieves an 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 as a way 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, and where can improvements be made? Improving customer service when its products fail was 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 the response is fast, 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 2.6, to include the firm in a larger value system. This value system is a collection of firm value chains connected through a business relationship and through technology. 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 new opportunities 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 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

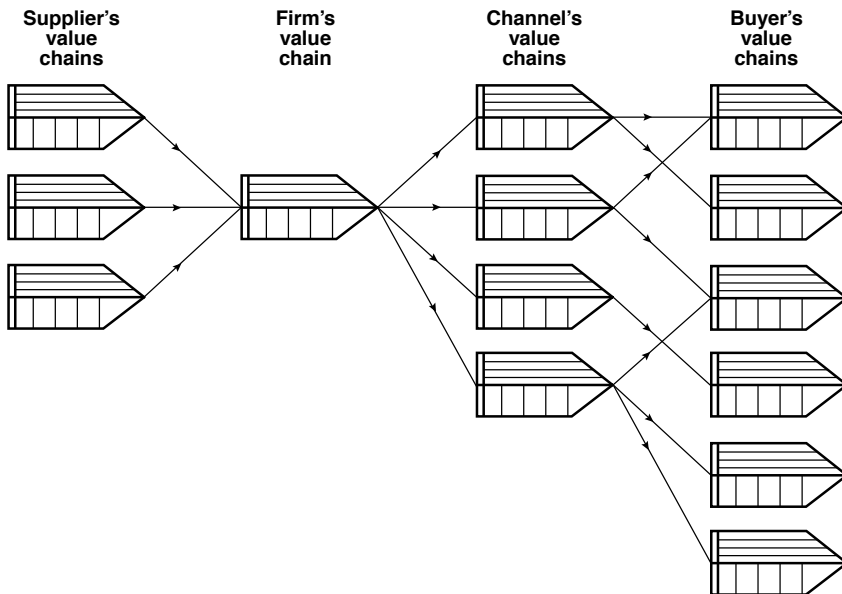


FIGURE 2.6 The value system: interconnecting relationships between organizations.

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 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 Zara example discussed earlier in the chapter, Figure 2.7 describes the value added to primary and support activities provided by information systems at Zara. The focus in Figure 2.7 is on value added to Zara's processes, but suppliers and customers in its supply chain also realize the value added by information systems. Most notably, the customer is better served as a result of the information systems. For example, the stores place orders twice a week over personal digital assistants (PDAs). Each night, managers use their PDAs to learn about newly available garments. The orders are received and promptly processed and delivered. In this way Zara can be very timely in responding to customer preferences.

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-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 partners, 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

Activity	Zara's Value Chain
PRIMARY ACTIVITIES	
Inbound Logistics	IT-enabled Just-in-Time (JIT) strategy results in inventory being received when needed. Most dyes are purchased from its own subsidiaries to better support JIT strategy and reduce costs.
Operations	Information systems support decisions about the fabric, cut, and price points. Cloth is ironed and products are packed on hangers so they don't need ironing when they arrive at stores. Price tags are already on the products. Zara produces 60% of its merchandise in-house. Fabric is cut and dyed by robots in 23 highly automated Spanish factories.
Outbound Logistics	Clothes move on miles of automated conveyor belts at distribution centers and reach stores within 48 hours.
Marketing and Sales	Limited inventory allows low percentage of unsold inventory (10%); POS at stores linked to headquarters to track how items are selling; customers ask for what they want, and this information is transmitted daily from stores to designers over handheld computers.
Service	No focus on service on products
SUPPORT ACTIVITIES	
Organization	IT supports tightly knit collaboration among designers, store managers, market specialists, production managers, and production planners.
Human Resources	Managers are trained to monitor what's selling and report data to designers ever day. The manager is key to making customers feel listened to, and to communicating with headquarters to keep each store and the entire Zara clothing line at the cutting edge of fashion.
Technology	Technology is integrated to support all primary activities. Zara's IT staff works with vendors to develop automated conveyor to support distribution activities.
Purchasing	Vertical integration reduces amount of purchasing needed.

FIGURE 2.7 Application of value chain model to Zara.

(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.”

In some cases the collaboration does not pay off equally for all parties in the supply chain. Although Wal-Mart realized operational efficiencies from its use of radio frequency identification (RFID) technology, it will not realize the greatest benefits until all its distribution centers install the technology. Nonetheless, Wal-Mart switched course and decided to first complete the installations of RFID technology in its stores so that it can better collaborate with suppliers that need to monitor the flow of inventory and respond to problems or spikes in demand. Further, it subsidized its smaller suppliers by offering an RFID solution for less than \$5,000. Because of economies of scale, Wal-Mart reaped far more benefit from RFID technology than many of its smaller suppliers. Thus, Wal-Mart made it enticing for its more hesitant supply chain partners to adopt RFID by offering them information from its stores or subsidizing their purchase of the technology.⁹

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 the Resource-Based View to Attain and Sustain Competitive Advantage

The **resource-based view**¹⁰ is useful in determining whether a firm’s strategy has created value. Unlike Porter’s competitive forces framework, this view maintains that competitive advantage comes from the information and other resources of the firm. On the other hand, Porter’s competitive forces framework argues that aspects of the firm’s industry create sources of competitive advantage. Like the value chain model, the resource-based view concentrates on what adds value to the firm. However, whereas the value chain model focuses on a firm’s activities, the resource-based view focuses on the resources that it can manage.

⁹ Marc L. Songini, Wal-Mart Shifts RFID plans (2007, February 26), Computer World: <http://www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=284115> (accessed April 28, 2008).

¹⁰ The resource-based view was originally proposed by management researchers, most prominently Jay Barney, “Firm Resources and Sustained Competitive Advantage,” *Journal of Management* 17, no. 1 (1991), 99–120; and J. Barney, “Is the Resource-Based ‘View’ a Useful Perspective for Strategic Management Research? Yes,” *Academy of Management Review* 26, no. 1 (2001), 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, no. 1 (2004), 107–142 reviewed its application in the MIS literature and derived a framework to better understand its application to IS resources.

The RBV has been applied in the area of IS 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 automatically mean that you can sustain it over the long term. The only way to do that is to continue to innovate or to protect against resource imitation, substitution, or transfer. For example, Wal-Mart's complex logistics management is deeply embedded in both its own and its supplier's operations that imitations by other firms is unlikely. It was not easy for eBay customers to find a substitute for ProStores, discussed earlier in this chapter. UPS was able to build a competing information system to the one FedEx uses, but by the time it was up and running, FedEx has innovated far beyond and continued to enjoy advantages. Finally, 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 relates to the firm's operation, a gung-ho company culture, and managerial experience in the firm's environment is less easy to obtain and, hence, considered harder to transfer to other firms.

From the IS perspective,¹¹ some types of resources are better than others for creating attributes that enable a firm to attain and sustain competitive value (i.e., value, rarity, low substitutability, low mobility, low imitability). For example, externally focused relationship skills can build advantages. Consider the ability to work with buyers and suppliers, the ability to read the market, the ability of IS to manage partnerships with the business units (spanning relationship management), and the ability to plan and work with the business units in undertaking change (IT management skills). These relationship resources that span departmental and organizational boundaries tend to have more initial and enduring impact on the firm than resources focused only within IT departments, such as IT infrastructure or technical skills. This is due, in part, because it takes time to develop the trust and respect underlying the relationship.

Some IT management skills are general enough in nature to make them easier to transfer and imitate relationship skills. Although it clearly is important for IS executives to manage internally oriented resources such as IS infrastructure,

¹¹ Ibid.

systems development, and running cost-effective IS operations, these skills can be acquired in many different forums. They are basic IT management skills possessed by virtually all good IS managers. Other skills, however, are unique to a firm and require considerable time and resources to develop. For example, it takes time to learn how the firm operates and to understand critical processes and socially complex working relationships. However, the message posed by the resource-based view is that IS executives must look beyond their own IT shop and concentrate on cultivating resources that help the firm understand changing business environments and allow them to work well with all their external stakeholders.

Even when considering internally oriented information resources, there are differences in the extent to which they add value. Many argue that IS personnel are willing to move, especially when offered higher salaries by firms needing these skills. Yet, some technical skills, such as knowledge of a firm's use of technology to support business processes and technology integration skills are not easily moved to another firm. Further, hardware and many software applications can be purchased or outsourced, making them highly imitable and transferrable, and not very rare over time. Because it is unlikely that two firms will have exactly the same strategic alternatives, resources at one firm have only moderate substitutability in the other firm.

It is harder to rate the value attributes of an information repository. Some information repositories are filled with internally oriented information designed to improve the firm's efficiency. Consistent with our earlier arguments, these repositories are of less value than those that tap the external environment and contain significant knowledge about the industry, the competitors, and the customers. Although most firms have these types of information repositories, not all firms use them effectively. They tend to be unique to the firm and thus less imitable, substitutable, or transferrable.

Figure 2.8 indicates the extent to which the attributes of each information resource may add value to Zara. Zara's advantage does not come from the specific hardware or software technologies they use. Management spends five to ten times less than its rivals on technology. It uses relatively old POS equipment to communicate over modems each night to headquarters. The handheld computers, automated conveyors, and large computer-controlled equipment to cut patterns are used skillfully by Zara, but they could eventually be purchased by or imitated by competitors. If the contractual arrangements exclude the option of selling to competitors, then this makes the externally focused skill more difficult to transfer, but not impossible. Hence, IT infrastructure in terms of value creation (i.e., value and rarity) has a moderate rating. It is easy to imitate and transfer and only moderately difficult to substitute, considering the automated conveyors; hence Zara's infrastructure would not be a particular good resource for maintaining strategic value. The technical skills, although not exceptionally valuable or rare, may offer some sustainable value because they are used to integrate across Zara's range of systems and would thus not be overly easy to imitate, substitute, or transfer.

In contrast, Zara has created considerable value from its information repository with customers' preferences and body types, and from its IT management skills

	VALUE CREATION		VALUE SUSTAINABILITY		
	Value	Rarity	Imitation	Substitution	Transfer
INFORMATION ASSET					
IT Infrastructure	M	M	H	M	H
Information Repository	H	M	M	L	M
INFORMATION CAPABILITY					
Technical Skills	M	L	M	M	M
IT Management Skills	H	H	L	L	M
RELATIONSHIP SKILLS					
<i>Externally Focused</i>	H	M	L	M	L-M
<i>Spanning</i>	H	H	L	L	L

FIGURE 2.8 Information resources at Zara, by attribute.

Source: Adapted from M. Wade and J. Hulland, "The Resource-Based View and Information Systems Research: Review, Extension and Suggestions for Future Research," *MIS Quarterly* 28, no. 1 (2004), 107–142.

and spanning relationships skills. Not only do Zara store managers communicate daily with designers about customer preferences, but also the information, which is stored in Zara's information repository, is easily retrievable by the designers, market specialists, procurement planners, and production managers. It would be a challenge for other companies to develop and apply the rich information not only because of the volume of data, but also because of the working relationships that have been shaped to use it. Thus the information repository has great value to Zara and is relatively rare because of its integration with Zara's operations and personnel. It is also relatively difficult to imitate or transfer, extremely difficult to substitute. The tight-knit teams at headquarters are very unusual and allow Zara the ability to correctly interpret and quickly respond to customers' needs. IT is integrally involved in supporting the way work is performed. These working relationships and managerial skills are not easy to replicate or purchase in the marketplace. They would all be very difficult to imitate. Overall, Zara is able to create high value from its IT management and relationship skills. It would be moderately to extremely difficult to substitute or transfer them.

Most firms don't really have a choice of creating competitive advantage by manipulating industry forces or by adding value, either through their use of information resources or IT-enhanced activities. Rather, all affect the firm, though the relative impact may differ depending on the firm's industry, environment, and executives' choice.

► STRATEGIC ALLIANCES

The value chain helps a firm focus on adding value to the chains of its partners. The resource-based view considers the value created using externally oriented relationships skills. The latest era of information resources evolution emphasizes the importance of collaborative partnerships, and the increasing number of Web applications focused on collaboration and social networking only foreshadow even more emphasis. 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 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. As introduced earlier, SCM is another frequently discussed type of IT-facilitated strategic alliance.

Strategic alliances often are based on trust and respect that can only develop over time as a result of a repeating pattern of interactions. Ring and Van de Ven have developed a four-stage model that demonstrates the importance of repeating patterns. The first stage in the cycle is the *negotiation stage*, in which individuals in two or more companies talk with one another and try to understand what each individual is seeking—both as a representative of the company and also as a person with individual goals. An agreement is made that calls for one party to deliver a product or service and to receive payment in return. These agreements, which are created in the *commitment stage*, can be either formal or informal. Formal agreements are called contracts. The product is delivered and payment is received in the *execution stage*. Both parties assess what has happened during the ongoing *assessment stage*, and if happy, they repeat the cycle, sometimes negotiating for even more products or services and receiving more rewards for delivering. With enough repetition, roles are created that continue to be followed, even if the original employees who started the negotiations leave the organization. (See Figure 2.9.)

Co-opetition

Clearly, not all strategic alliances are formed with suppliers or customers as partners. Rather, co-opetition is becoming an increasingly popular alternative model. As defined by Brandenburg and Nalebuff in their book of the same name, **co-opetition** is a strategy whereby companies cooperate and compete at the same

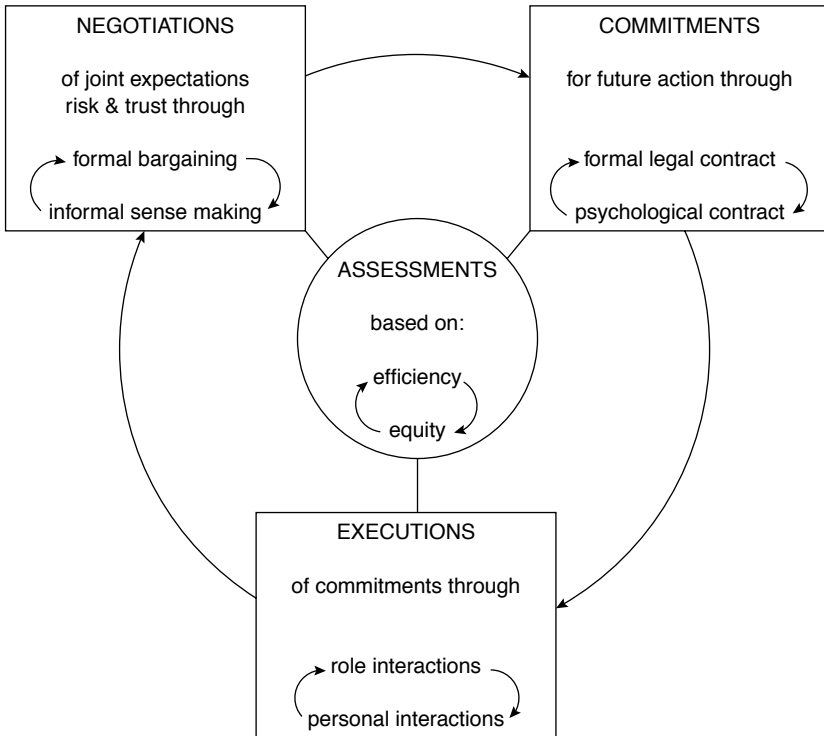


FIGURE 2.9 Four-stage model by Ring and Van de Ven.

Source: Developmental processes of cooperative interorganizational relationships. Ring, Peter S.; Van de Ven, Andrew H., *Academy of Management Review*. 1994 Jan, Vol 19(1) pg 97.

time with companies in its value net.¹² 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.

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, grew out of a consortium of competitors General Motors, Ford, and Daimler-Chrysler, Nissan and Renault. By addressing multiple automotive functional needs across the entire product life cycle, Covisint offers support for collaboration, supply

¹² A. Brandenburg and B. Nalebuff, *Co-opetition* (New York: Doubleday, 1996).

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. Netflix awoke a sleeping giant and ended up with a new partner. Despite its size and merchandising savvy, Wal-Mart was stymied by Netflix's head start in the rapidly expanding niche of online DVD rentals. Wal-Mart turned over its online DVD business to Netflix in 2005 and still offers access to Netflix from its Web site. Netflix, in turn, reminds its customers that they can purchase DVDs at Wal-mart.com.
- *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 problems 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 the effects of 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. More recently, Webvan thought it had learned from Streamline. Webvan invested heavily in an infrastructure that would allow its employees to take customers' orders online and deliver them within 30 minutes. Unfortunately for Webvan, many of its customers worked during the day and wanted their groceries delivered at home at night. This made the 30-minute delivery window—and the related infrastructure expenses—unnecessary.
- *Web-based alternative removes advantages.* With increasingly more applications moving to Web-based platforms, managers must consider the risk of losing any advantage obtained by an information resource that later becomes available as a service on the Web. The Web-based alternative may be much less expensive to use, be more easily available, and include a similar set of advantages.
- *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. 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. More recently, Apple experienced a problem over their proprietary software, which violates legislation passed in France and possibly Scandinavia, where governments insist on more open systems.

Every business decision has risks associated with it. However, with the large expenditure of IT resources needed to create sustainable, strategic advantages, the manager will want to carefully identify and then design a mitigation strategy to manage the associated risks.

► FOOD FOR THOUGHT: CO-CREATING IT AND BUSINESS STRATEGY

Throughout this chapter we have discussed the alignment of IT strategy with business strategy. Certainly they must be carefully aligned to ensure that maximum

value is achieved from IT investments. However in the fast-paced business environment where information is increasingly a core component of the product or service offered by the firm, we are seeing the co-creating of IT and business strategy. That is to say that IT strategy *is* business strategy; one cannot be created independent of the other. In many cases they are now one in the same.

For companies whose main product is information, such as financial services companies, it's clear that how information is managed is the core of the business strategy itself. How an investment firm manages the clients' account, how their clients interact with the company, and how investments are made are all done through the management of information. A financial services company must co-create business and IT strategy.

But consider a company like FedEx, most well known as the package delivery company. Are customers paying to have a package delivered or to have information about that package's delivery route and timetable? One could argue that they are one in the same, and that increasingly the company's business strategy **is** its information systems strategy. Certainly there are components of the operation that are more than just information. There are actual packages to be loaded on actual trucks and planes, which are then actually delivered to their destinations. However, to make it all work, the company must rely on information systems. Should the information systems go down, FedEx would be unable to do business. A company like this must co-create IT strategy and business strategy.

This was not true a few years ago. Companies could often separate information systems strategy from business strategy, in part because their products or services did not have a large information component. For example, a few years ago, should the information system of a trucking company stop working, the trucks would still be able to take their shipments to their destination and pick up new shipments. It might be slower or a bit more chaotic, but the business wouldn't stop. Today, that's not the case. Complicated logistics are the norm, and information systems are the foundation of the business, such as seen at FedEx.

As the number and type of applications increase on the Web and on future technologies that we can only fantasize at this point, we expect to see only co-creation of business and IT strategy. Managers who think they can build a business model without considering the opportunities and impact of information systems, both the resources owned by the firm and those available on the Web will find they have significant difficulties creating any type of sustainable advantage in their marketplace.

This raises the question, however, of whether IS is always necessary for strategic advantage. Some experts believe that companies do not have to use IT to gain strategic advantage, although many companies will. There are strategies that can be competently executed without a major IT component, where perhaps IT is just a utility like the lights and electricity in a business. IT is necessary to create components of the strategy, but not a major focus of the business strategy. In an increasingly Web-enabled world, this debate is just beginning.

► SUMMARY

- Information resources include data, technology, people, and processes within an organization. Information resources can be either assets or capabilities.
- Three major categories of IT capabilities are technical skills, IT management skills, and relationship skills.
- 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 implies 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.
- CRM systems are a coordinated set of activities designed to help an organization better know and understand their customers.
- The resource-based view (RBV) helps a firm understand the value created by their strategy. RBV maintains that competitive advantage comes from the information resources of the firm. Resources enable a firm to attain and sustain competitive advantage.
- IT can facilitate strategic alliances. Supply chain management (SCM) is one example of a mechanism for creating strategic alliances.
- Co-opetition is the complex arrangement through which companies cooperate and compete at the same time with other companies in its value net.
- 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. 60)
co-opetition (p. 66)
information resources
(p. 48)

IT asset (p. 49)
IT capability (p. 49)
network effects (p. 51)
resource-based view
(RBV) (p. 62)
strategic alliance (p. 66)

supply chain management
(SCM) (p. 60)
Web 2.0 (p. 49)

► 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
 - e. A Web-based wine retailer
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
 - e. A Web-based wine retailer
4. Use the resource-based view as described in this chapter to describe how information technology might be used to provide and sustain 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
 - e. A Web-based wine retailer
5. Some claim that no sustainable competitive advantages can be gained from IT other than the capability of the IS organization itself. Do you agree or disagree? Defend your position.
6. 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 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?
7. Tesco, the UK retail grocery chain, used their CRM system to generate annual incremental sales of £100 million. Using a frequent-shopper card, a customer got discounts at the time of purchase, and the company got information about their purchases, creating a detailed database of customer preferences. Tesco then categorized customers and customized discounts and mailings, generating increased sales and identifying new products to expand their offerings. At the individual stores, data showed which products must be priced below competitors, which products had fewer price-sensitive customers, and which products must have regular low prices to be successful. In some cases, prices are store-specific, based on the customer information. The information system has enabled Tesco to expand beyond groceries to books, CDs, DVDs, consumer electronics, flowers, and wine. The chain also offers services such as loans, credit cards, savings accounts, and travel planning. What can Tesco management do now that they have a CRM that they

could not do prior to the CRM implementation? How does this system enable Tesco to increase the value provided to customers?

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: Adapted from Fara Warner, “Lear Won’t Take a Backseat,” *Fast Company* 47 (June 2001), p. 178, available at <http://www.fastcompany.com/online/47/bestpractice.html>.

CASE STUDY 2-2

ZIPCAR

Zipcar was an answer for customers who want to rent a car for a few hours in their home city, rather than for a few days from a traditional rental agency. Car reservations were for a specific pick up time and location around the city, often in neighborhoods so the customers need only to walk to pick up their reserved car. Customers applied for a Zipcard, which enabled them to reserve a car online and unlock their car when they arrive at the car’s location.

The company operated with a very small staff compared to traditional rental agencies. Very little human interaction was required between the customer and Zipcar for a transaction. A customer reserved a car online, entered into the reserved car by waving the RFID-enabled Zipcard against the card reader mounted behind the windshield on the driver side, returned the car to the same location, and was billed on the credit card already on file. The customer could check all rental records and print receipts from the online reservation system. The system also had a color-coded time chart showing availability and location of all rental cars in the vicinity. This transparent information exchange allows a customer to pick the car he or she wants, if available, or delay the reservation until the car was returned by another customer. Zipcar also created and installed a GPS-enabled wireless device in each car, which allowed members to find and reserve a nearest vehicle using a cell phone.

All the cars were outfitted with patented wireless technology. Their proprietary IT platform carried information flow between customers, vehicles, and the company. It was used to monitor car security, fulfill reservations, record hourly usage, and maintain mileage information. It also relayed vital technical information such as battery voltage and fuel level. It even informed the central system if a customer forgot to turn off headlights, which can quickly drain battery power.

This business model provided unique advantages over traditional car rentals. The customer did not have to stand in line or fill out papers to rent a car. The customer knew exactly which make and model he or she would be getting. Unlike most off-airport rental agency locations, which were only open during business hours, Zipcar locations were open 24 hours. The Zipcar rates also included the cost of gas and insurance, as well as reserved parking spots at some locations.

Additionally, the company used social networking technologies to develop an online community of Zipcar members—Zipsters. It encouraged Zipsters to talk about their Ziptrips (i.e., share their personal experiences with Zipcar).

Thus, information technology was not only the key enabler of this business model but also was a facilitator in creating a buzz and encouraging community development around the concept. Zipcar changed the rules of the rental car industry by bringing the new Web 2.0 mind-set of focusing on automation, customer empowerment, transparency, and community. Zipcar has been very successful, with over 200,000 paying members and renting over 5,000 vehicles in 50 markets in the United States, Canada, and the UK.

Discussion Questions

1. Analyze the business model of Zipcar using Porter's five forces model.
2. Discuss the synergy between the business strategy of Zipcar and information technology.
3. What *network effects* are part of the strategy of Zipcar? How do they add value?
4. As the CEO of Zipcar, where is your most threatening competition? What would you do to sustain a competitive advantage?

Source: Adapted from "A Self-Service Rental Car," by Paul Boutin, *BusinessWeek*, May 4, 2006; "RFID: A Ticket to Ride," by Mary K. Pratt, *ComputerWorld*, December 18, 2006; www.zipcar.com.